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UNIVERSITI MALAYSIA PAHANG

UNDERGRADUATE PROSPECTUS

2020/2021

www.ump.edu.my

UMPMalaysia

TEKNOLOGI UNTUK MASYARAKAT

5 STARS
QS RATED FOR EXCELLENCE 2018

751-800
QS WORLD UNIVERSITY RANKINGS 2021

#133 ASIA
QS WORLD UNIVERSITY RANKINGS 2021

MALAYSIA ON YOUR DOORSTEP

Geographically, Malaysia is as diverse as its culture. Malaysia is divided into 13 states and three Federal Territories, separated by the South China Sea with 11 states and two federal territories (Kuala Lumpur and Putrajaya) in Peninsular Malaysia and two states and one federal territory (Labuan) in East Malaysia.

One of Malaysia's key attractions is its extreme contrasts. Towering skyscrapers look down upon wooden houses built on stilts, and five-star hotels sit several meters away from ancient reefs. Cool hideaways are found in the highlands that roll down to warm, sandy beaches, and rich humid mangroves.

Pahang, which covers an area of 35,960 sq. km, is the largest state in Peninsular Malaysia. Pahang has so much to offer the visitor that tourists, both locals and foreign, come back again and again.

Pahang has cool green mountains, rain forests, hill resorts, tranquil fishing villages, long stretches of sandy beaches, mysterious caves, and unspoiled lakes.

With a population of one million, the state, which lies on the East Coast of Peninsular Malaysia, offers the finest beaches such as the famous Cherating Beach, Teluk Chempedak and Beserah Beach. There are also renowned hill resorts of Cameron Highlands, Genting Highlands, and Frasers Hill. If you are looking for an adventure, why not visit parks such as Kenong Rimba, Endau-Rompin and Taman Negara (National Park).

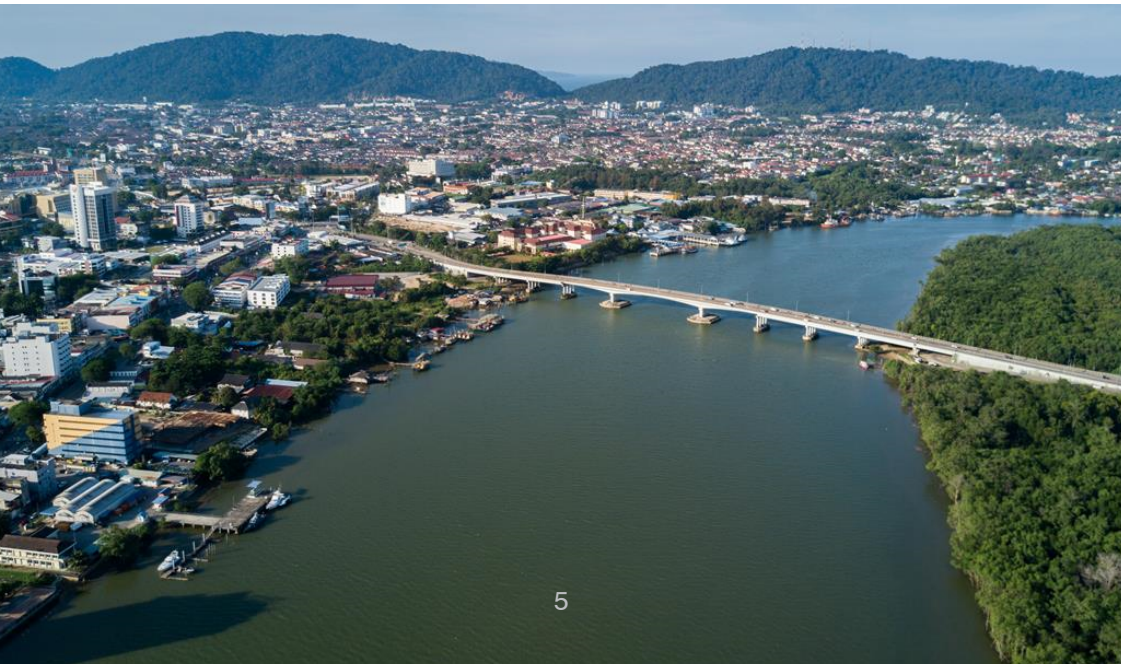
WELCOME TO KUANTAN

Kuantan, the capital of the state of Pahang is the gateway to an adventurous, thrilling, and exhilarating tropical holiday.

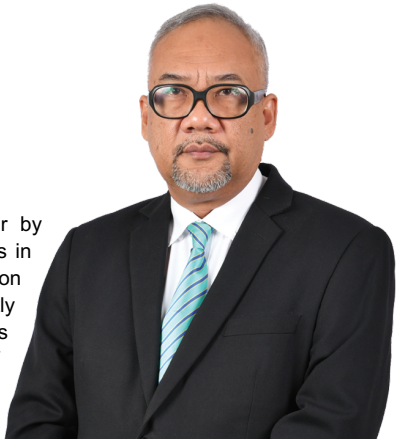
The town, located on the east of the state of Pahang facing the South China Sea, is fast developing into a modern commercial centre while still retaining its unique age-old charm and heritage. Modern high-rise structures cohabit harmoniously with pre-war shop houses and colonial buildings. The State Mosque, with its distinctive dome and minarets in a pastel shade of sky blue and mint green stands regal in the middle of the town as a prominent landmark to newcomers.

Place of interests are aplenty in and on the outskirts of Kuantan. A visit to Kuantan is not complete without visiting some of these places, which never fail to arouse the curiosity of the visitors.

The Kuantan river cruise takes visitors through the picturesque landscape of a 500-year mangrove forest reserve that spreads along the Kuantan River. The swamp which covers an area of 340 hectares is home to fascinating varieties of estuarine plants, birds, and fish species.



FOREWORD



Locally rooted, globally acknowledge. Rated 5-star by Quacquarelli Symonds (QS) Stars University Ratings in 2018 and the Ministry of Higher Education Institution Rating System (SETARA) in 2017, UMP is currently ranked first among Malaysian technical universities and 188th among Asian Universities. As one of Malaysian's Public Universities, UMP offers a wide range of high quality academic programmes in engineering, science, technology and management at the undergraduate and postgraduate levels.

As a member in Malaysian Technical Universities Network (MTUN), UMP is committed to developing its niche in chemical engineering, industrial biotechnology and automotive - engineering alongside other disciplines namely civil and environmental engineering, electrical and electronics engineering, mechanical engineering, manufacturing engineering, engineering technology, software systems, science and management.

This Undergraduate Prospectus provides you with useful information about the University's background, admission requirement, academic structure, the faculties as well as other services and facilities available at our Pekan and Gambang Campuses.

We look forward to welcoming you as part of our diverse and vibrant academic community. Experience the best engineering, science and technology education here in UMP!

Regards,

Professor Ir. Wan Azhar Wan Yusoff
Vice-Chancellor

VISION

A Distinguished Technological University.

MISSION

We provide world class education, research and services in an ecosystem of creative and innovative engineering and technology to maximize human potential for societal good.

OBJECTIVES

1. To produce outstanding graduates by providing competitive engineering and technological programmes.
2. To spearhead cutting edge industry-relevant research initiatives.
3. To be a leading service provider to industries and community based on our niche and areas of expertise.
4. To be recognized as an institution for excellent management and work culture.

PHILOSOPHY

Knowledge, a trust bestowed by Allah to man as vicegerent on earth, is to be fully utilized. Emphasis is an applied knowledge guided by Islamic values to develop human capital towards universal harmony and prosperity.

CORE VALUES

1. Strong bond with the Creator.
2. Steadfast in upholding shared principles.
3. Creative in making wise decisions.
4. Resolute in facing challenges.
5. Proactive in taking actions.

RESEARCH AND DEVELOPMENT

UMP research and development are centered around specific niche areas which are:

- Chemical Engineering and Industrial Biotechnology
- Automotive Engineering and Manufacturing

The University focused on applied research and industrial projects to boost the teaching and learning process with four focus groups and six expert groups:

Focus Groups:

- Chemical Engineering
- Biotechnology
- Automotive
- Manufacturing

Experts Groups

- Process Instrumentation and Control
- Innovative Construction
- Information Technology
- Human Sciences
- Environmental
- Advance Material

INTERNATIONAL RECOGNITION AND ACHIEVEMENTS

The University has established links with reputable institutions of higher learning in Germany, United States, Indonesia, and other countries focusing on academic collaboration, student as well as staff exchange and research collaboration. Exhibition of research products by renowned researchers of the University is among the university's main agenda. UMP has received various awards from the International Invention, Innovation, Industrial Design and Technology Exhibition (ITEX), the International Exhibition Ideas-Inventions New Products (IENA 07) in Germany, the Malaysian Invention and Design Society (MINDS) and many more.

UNIVERSITI MALAYSIA PAHANG

Established as a technical university in 2002, Universiti Malaysia Pahang (UMP) offers a variety of engineering- and technology-based technical programmes, including high-level Technical and Vocational Education and Training (TVET).

Ranked as one of the best in Research and Innovation among Malaysian Technical University Network (MTUN) and Non-Research University (Non RU), UMP is steadfastly committed to innovating and developing unique academic programmes through strategic international collaborations.

A milestone of such innovation is UMP's world class dual-degree engineering programme offered in collaboration with Germany's Karlsruhe University of Applied Sciences (HsKA) – now seen as the benchmark for other public institutions of higher learning in Malaysia.

In the field of research, UMP collaborates with local industries to focus on industry-related applications. Such research collaboration enriches the teaching and learning modules at the university, while simultaneously promotes commercialization of research output and products.

UMP CAMPUS IN PEKAN, PAHANG

UMP main campus in Pekan began its operation in 27 July 2009. When construction is fully completed, the Pekan campus can accommodate up to a total of 10,000 students and 2,000 staffs.

At present, the campus is the home for three engineering faculties and one centre, namely the Faculty of Electrical and Electronics Engineering, Faculty of Mechanical and Automotive Engineering Technology, Faculty of Manufacturing and Mechatronic Engineering Technology and Centre for Modern Languages.

UMP CAMPUS IN GAMBANG, KUANTAN, PAHANG

Situated in Gambang, near the East Coast Expressway, UMP is just 30km drive from Kuantan, with an area of 126 acres and can accommodate up to 5,000 students. UMP is strategically located in the East Coast Industrial Belt of Peninsular Malaysia - which hosts a large number of multinational corporations (MNCS) in the chemical, petrochemical, manufacturing, automotive and biotechnology industries. UMP students get extensive exposure to the latest development in the fields of engineering and technology.

At present, this campus is the home for one college, five faculties, one institute and two centres namely College of Engineering, Faculty of Civil Engineering Technology, Faculty of Chemical and Process Engineering Technology, Faculty of Industrial Sciences and Technology, Faculty of Industrial Management, Faculty of Computing, Institute of Postgraduates Studies, Centre for Mathematical Sciences and Centre for Human Sciences.

ACADEMIC FACILITIES AND RESOURCES

LIBRARY

UMP has two libraries, one at each campus. The library of UMP plays an important role in its service for resources in teaching and learning, research, and consultancy. It is also a catalyst in promoting culture of knowledge sharing at UMP and the community enriching various knowledge repositories.

The library in Pekan campus started its services since March 2010. UMP libraries have a vast collection of books and multimedia for circulation and reference. UMP also subscribes to various repository databases. Physical facilities include discussion rooms, seminar rooms, multimedia rooms, computer laboratories, and audio visual rooms.

The e-Resources of UMP library provide comprehensive access to full-text e-journals available at the library. The portal allows you to search for online databases, e-journals, e-books by title, or browse title by subject.

STUDENT SUPPORT AND SERVICES

UMP in Gambang has been specially refurbished to provide an excellent study and learning environment. The university provides a wide variety of campus facilities for its academic staffs and students. UMP has set up facilities to ensure that students enjoy the convenience of travel and accommodation when undertaking a programme at the university.

UMP is equipped with wireless internet accesses, which allow students and staffs to access the internet from their laptops. Wireless internet access points have been installed at strategic locations on campus to facilitate internet access. UMP students, with notebooks, thus have the advantage of being able to access the internet anywhere, anytime on campus that is within range of the wireless internet access points. This flexibility allows them to access and download material from the web directly to their notebooks at their conveniences.

Accommodation

UMP provides ample accommodation for undergraduate and graduate students in five residential colleges. Room types available are single, twin sharing, and quad sharing. Bus services are provided for students who are living at nearby housing estates for commuting to the campuses.

Wallid Wahidi Bin Hamzah
Staff's Housing in UMP
09-4245712

Wan Aishah Rubaini Binti Meor Zainudin
Residential College 1
09-5492703

Mohamed Noor Ghadafi Bin Ahmad
Residential College 2
09-5492534

Noor Ashikin Binti Ramly
Residential College 3
09-5492675

Mat Roppi Bin Ismail
Residential College 4
09-5491517

Noraini Binti Hamzah
Residential College 5
09-4245726

Inter Campus Transportation

An inter-campus bus services is also provided every 15 minutes in the morning and evening.

Sport Facilities

Sport facilities available in UMP campus are gymnasium, badminton court, squash court, table tennis, tennis court, basketball court, soccer field, volleyball court, and takraw court. The sports complex building has the biggest capacity in Pahang with 12 badminton courts. UMP also has a jogging track with exercise equipment.

- Sport Complex Hall UMP Gambang (12 Badminton Courts, 4 Sepak Takraw Court, 3 Volleyball Courts, 2 Netball Court, 2 Handball Court, 1 Basketball Court, 10 Table Tennis, 2 Squasy Court, 2 Set Combat Sport Pitch & 36 target butt for Indoor Archery)

- Roof Court at UMP Gambang (1 FIFA Futsal Court, 2 Futsal Court, 1 Handball Court, 2 Netball, 1 Basketball Court)

- Mini Stadium UMP Gambang (Football Field FIFA Size with 500 Spectator)

- Open Court UMP Gambang (3 Tennis Court, 2 Volleyball Court, 2 Sepak Takraw Court, 1 Futsal Court, 8 Petanque Pitch, 12 Target Butt Archery Field, Outdoor Gym with 12 Station & Jogging Track)

- Sport Hall UMP Pekan (6 Badminton Court, 4 Sepak Takraw Court, 2 Volleyball Court, 10 Table Tennis)

- Open Court UMP Pekan (1 FIFA Futsal Court, 1 Handball Court, 2 Volleyball Court, 2 Netball Court, 4 Sepak Takraw Court, Outdoor Gym with 12 Station & Jogging Track)

- Recreation Centre (Kayak, Canoe, BBQ Park, Team Building Camp, Water Remote Control Game & Fishing Competition)

- Male & Female Gymnasium at UMP Gambang & Pekan.

Health Services

UMP has a medical centre that gives outpatient services to the students and staffs of UMP. It is situated strategically at both campus Pekan and Gambang with easy access for all.

CENTRE FOR INTERNATIONAL RELATIONS (CIR)

CIR was previously known as UMP International Office and has been established since 2009. CIR has participated in many activities with the collaborative relationships with universities and other institutions in many countries. CIR works on matters relating to the process of administration of international students to UMP as well as university programmes involving overseas institution or universities. CIR also provides support services to international students and their dependents in matters related to immigration issues. The main mission of CIR is to provide high quality services to our internal and external clients. We will also strive to promote and enrich the academic and cultural experience at Universiti Malaysia Pahang by facilitating the exchange of peoples and ideas.

FACULTY	PROGRAMMES	DURATIONS	SPM	STPM	MATRIC/ FOUNDATION	DIPLOMA/ EQUIVALENT	A-LEVEL	NON MALAYSIAN
COLLEGE OF ENGINEERING	B.Eng (Hons.) Electrical Engineering (Electronics)	4 years		√	√	√	√	√
	B.Eng (Hons.) Electrical Engineering (Power Systems)	4 years		√	√	√	√	√
	B.Eng (Hons.) Mechanical Engineering	4 years		√	√	√	√	√
	B.Eng (Hons.) Mechanical Engineering (Automotive)	4 years		√	√	√	√	√
	B.Eng (Hons.) Civil Engineering	4 years		√	√	√	√	√
	B.Eng (Hons.) Chemical Engineering	4 years		√	√	√	√	√
FACULTY OF COMPUTING (FKOM)	Bachelor of Computer Science (Software Engineering) with Honours	4 years		√	√	√	√	√
	Bachelor of Computer Science (Computer Systems & Networking) with Honours	4 years		√	√	√	√	√
	Bachelor of Computer Science (Graphics & Multimedia Technology) with Honours	4 years		√	√	√	√	√
	Diploma in Computer Science	2 years 9 months	√					
FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY (FSTI)	Bachelor of Applied Science (Hons.) Industrial Chemistry	4 years		√	√	√	√	√
	Bachelor of Applied Science (Hons.) Industrial Biotechnology	4 years		√	√	√	√	√
	Bachelor of Applied Science (Hons.) Material Technology	4 years		√	√	√	√	√

FACULTY	PROGRAMMES	DURATIONS	SPM	STPM	MATRIC/ FOUNDATION	DIPLOMA/ EQUIVALENT	A-LEVEL	NON MALAYSIAN
	Bachelor of Occupational Safety and Health with Hons	4 years		√	√	√	√	√
	Diploma in Occupational Safety and Health	2 years 9 months	√					
	Diploma in Industrial Sciences	2 years 9 months	√					
CENTRE FOR MATHEMATICAL SCIENCES (PSM)	Bachelor of Applied Science (Hons.) Data Analytic	3 ½ years						
FACULTY OF INDUSTRIAL MANAGEMENT (FPI)	Bachelor of Project Management with Hons.	4 years		√	√	√	√	√
	Bachelor of Industrial Technology Management with Hons	4 years		√	√	√	√	√
	Bachelor of Business Engineering with Honours	4 years		√	√	√	√	√
FACULTY OF CIVIL ENGINEERING TECHNOLOGY (FTKA)	Bachelor of Engineering Technology (Energy & Environmental) with Honours	4 years		√	√	√	√	√
	Bachelor of Engineering Technology (Infrastructure Management) with Honours	4 years		√	√	√	√	√
	Diploma in Civil Engineering	2 years 9 months	√					
FACULTY OF ELECTRICAL AND ELECTRONNICS ENGINEERING TECHNOLOGY (FTKEE)	Bachelor of Engineering Technology (Electrical) with Honours	4 years		√	√	√	√	√
	Bachelor of Electrical Engineering Technology (Power & Machine) with Honours	4 years		√	√	√	√	√
	Bachelor of Electronics Engineering Technology (Computer System) with Honours	4 years		√	√	√	√	√

	Bachelor of Technology in Industrial Electronics Automation with Honours	3 ½ years		√	√	√	√	√
	Bachelor of Technology in Electrical Systems Maintenance with Honours	3 ½ years		√	√	√	√	√
	Diploma in Electrical Engineering (Industrial Electronics)	2 years 9 months	√					
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY (FTKKP)	Bachelor of Manufacturing Engineering Technology (Pharmaceutical) with Honours	4 years		√	√	√	√	√
	Bachelor of Chemical Engineering Technology with Honours	4 years		√	√	√	√	√
	Bachelor of Mechanical Engineering Technology (Petroleum) with Honours	4 years		√	√	√	√	√
	Bachelor of Technology in Oil & Gas Facilities Maintenance with Honours	3 ½ years		√	√	√	√	√
	Diploma in Chemical Engineering	2 years 9 months	√					
FACULTY OF MANUFACTURING AND MECHATRONIC ENGINEERING TECHNOLOGY (FTKPM)	B.Eng (Hons.) Mechatronics Engineering (Collaboration programme with HsKA, Germany))	4 ½ years		√	√	√	√	√
	Bachelor of Engineering Technology (Manufacturing) with Honours	4 years		√	√	√	√	√
	Bachelor of Technology in Industrial Machining With Honours	3 ½ years		√	√	√	√	√
	B.Eng (Hons.) Manufacturing Engineering	4 years		√	√	√	√	√
	B.Eng (Hons.) Mechatronics Engineering	4 years		√	√	√	√	√
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY (FTKMA)	B.Eng (Hons.) Automotive Engineering (Collaboration programme with HsKA, Germany)	4 ½ years		√	√	√	√	√
	Bachelor of Technology in Welding with Honours	3 ½ years		√	√	√	√	√
	Bachelor of Technology in Automotive with Honours	3 ½ years		√	√	√	√	√
	Diploma in Mechanical Engineering	2 years 9 months	√					

UNIVERSITI MALAYSIA PAHANG
ACADEMIC CALENDAR
2020/2021 ACADEMIC SESSION

PRELIMINARY SEMESTER (DIPLOMA)

ACTIVITIES	DURATION	DATE
Online Registration of New Students'	5 Day	20 July 2020 to 25 July 2020
Students' Registration At The Hostel	1 Day	1 August 2020 (Saturday)
Students Orientation Day	2 Day	1 August 2020 to 2 August 2020 (Saturday and Sunday)
Lecture	8 Weeks	3 August 2020 (Monday) to 25 September 2020 (Friday)
Examination	1 Week	28 September 2020 (Monday) to 4 October 2020 (Sunday)

- Birthday of KDYMM Sultan Pahang - 30 July 2020 (Thursday).
- Eid al-Adha 1441H - 31 July 2020 (Friday).

SEMESTER I

ACTIVITIES	DURATION	DATE
Registration of New Students	1 Day	14 October 2020 (Wednesday)
Orientation Week	4 Day	15 October 2020 to 18 October 2020 (Thursday to Sunday)
Lecture	13 Weeks	19 October 2020 (Monday) to 15 January 2021 (Friday)
Study Week	1 Weeks	16 January 2021 (Saturday) to 24 January 2021 (Friday)
Examination	2 Weeks	25 January 2021 (Monday) to 7 February 2021 (Sunday)

- Semester Break - 8 February 2021 (Monday) to 28 February 2021 (Sunday).
- Orientation Week - 15 October to 18 October 2020 (Thursday to Sunday).
- Registration of new students for Degree Program (Appeal) – 26 October 2020 (Monday).
- Deepavali - 14 November 2020 (Saturday).
- Christmas - 25 December 2020 (Friday).
- New Year 2021 - 1 January 2021 (Friday).

SEMESTER II

ACTIVITIES	DURATION	DATE
Registration of Degree Students (February Intake)	1 Day	26 February 2021 (Friday)
Orientation Day	2 Day	26 February - 27 February 2021 (Friday and Saturday)
Lecture	13 Weeks	1 March 2021 (Monday) to 4 June 2021 (Friday)
Study Week	1 Weeks	7 June 2021 (Saturday) to 13 June 2021 (Sunday)
Examination	2 Weeks	14 June 2021 (Monday) to 27 June 2021 (Sunday)

- Orientation Day - 26 to 27 February 2021 (Friday to Sunday).
- Nuzul Al-Quran - 29 April 2021 (Thursday).
- Labour Day - 1 May 2021 (Saturday).
- Hol Pahang & Wesak Day - 7 May 2021 (Friday).
- Eid al Fitr 1442H - 13 to 14 May 2021 (Thursday to Friday).

SHORT SEMESTER

ACTIVITIES	DURATION	DATE
Course Registration	2 Days	1 July 2021 (Thursday) to 2 July 2021 (Friday)
Lecture	7 Weeks	5 July 2021 (Monday) to 20 August 2021 (Friday)
Examination	1 Week	23 August 2021 (Monday) to 29 August 2021 (Friday)

- Eid al-Adha 1442H - 20 July 2020 (Tuesday).
- Awal Muharram 1443H - 10 August 2021 (Tuesday).

Notes :

- Academic Calendar 2020/2021 has been decided at the 160th Senate Meeting No. 3/2020 on 1 April 2020.
- This academic calendar is subject to change (if any) which will be notified by the University.

PROGRAMMES OFFERED ACADEMIC SESSION 2020/2021

UPU CODE	UMP CODE	COLLEGE /FACULTY / PROGRAMMES	DURATION
COLLEGE OF ENGINEERING			
DEPARTMENT OF ELECTRICAL ENGINEERING (P)			
UJ6523001	BEE	B.Eng (Hons.) Electrical Engineering (Electronics)	4 years
UJ6522001	BEP	B.Eng (Hons.) Electrical Engineering (Power Systems)	4 years
DEPARTMENT OF MECHANICAL ENGINEERING (P)			
UJ6521001	BMM	B.Eng (Hons.) Mechanical Engineering	4 years
UJ6525001	BMA	B.Eng (Hons.) Mechanical Engineering (Automotive)	4 years
DEPARTMENT OF CIVIL ENGINEERING (G)			
UJ6526001	BAA	B.Eng (Hons.) Civil Engineering	4 years
DEPARTMENT OF CHEMICAL ENGINEERING (G)			
UJ6524001	BKC	B.Eng (Hons.) Chemical Engineering	4 years
COLLEGE OF COMPUTING AND APPLIED SCIENCE (KKSG)			
FACULTY OF COMPUTING (FKOM) (G)			
UJ6481002	BCS	Bachelor of Computer Science (Software Engineering) with Honours	4 years
UJ6481001	BCN	Bachelor of Computer Science (Computer Systems & Networking) with Honours	4 years
UJ6481003	BCG	Bachelor of Computer Science (Graphics & Multimedia Technology) with Honours	4 years
UJ4481001	DCS	Diploma in Computer Science	2 years 9 months
FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY (FSTI) (G)			
UJ6545001	BSK	Bachelor of Applied Science (Hons.) Industrial Chemistry	4 years
UJ6545002	BSB	Bachelor of Applied Science (Hons.) Industrial Biotechnology	4 years
UJ6545003	BSP	Bachelor of Applied Science (Hons.) Material Technology	4 years
UJ6862001	BPS	Bachelor of Occupational Safety and Health with Hons	4 years
UJ4862001	DPS	Diploma in Occupational Safety and Health	2 years 9 month
UJ4545001	DSI	Diploma in Industrial Sciences	2 years 9 months
CENTRE FOR MATHEMATICAL SCIENCES (PSM) (G)			
UJ6462001	BSD	Bachelor of Applied Science (Hons.) Data Analytic	3 ½ years
COLLEGE OF MANAGEMENT AND HUMAN SCIENCE (KPSK)			
FACULTY OF INDUSTRIAL MANAGEMENT (FPI) (G)			
UJ6345001	BPP	Bachelor of Project Management with Hons.	4 years
UJ6345002	BPT	Bachelor of Industrial Technology Management with Hons	4 years
UJ6345003	BPN	Bachelor of Business Engineering with Honours	4 years
COLLEGE OF ENGINEERING TECHNOLOGY			
FACULTY OF CIVIL ENGINEERING TECHNOLOGY (FTKA) (G)			
UJ6522002	BTV	Bachelor of Engineering Technology (Energy & Environmental) with Honours	4 years
UJ6526002	BTC	Bachelor of Engineering Technology (Infrastructure Management) with Honours	4 years
UJ4526001	DAA	Diploma in Civil Engineering	2 years 9 months
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY (FTKEE) (P)			
UJ6522004	BTE	Bachelor of Engineering Technology (Electrical) with Honours	4 years
UJ6522005	BTW	Bachelor of Electrical Engineering Technology (Power & Machine) with Honours	4 years
UJ6523006	BTS	Bachelor of Electronics Engineering Technology (Computer System) with Honours	4 years
UJ6523005	BVI	Bachelor of Technology in Industrial Electronics Automation with	3 ½ years

		Honours	
UJ6522003	BVE	Bachelor of Technology in Electrical Systems Maintenance with Honours	3 ½ years
UJ4523001	DEE	Diploma in Electrical Engineering (Industrial Electronics)	2 years 9 months
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY (FTKKP) (G)			
UJ6524003	BTF	Bachelor of Manufacturing Engineering Technology (Pharmaceutical) with Honours	4 years
UJ6524002	BTK	Bachelor of Chemical Engineering Technology with Honours	4 years
UJ6524006	BTO	Bachelor of Mechanical Engineering Technology (Petroleum) with Honours	4 years
UJ6524004	BVF	Bachelor of Technology in Oil & Gas Facilities Maintenance with Honours	3 ½ years
UJ4524001	DKC	Diploma in Chemical Engineering	2 years 9 months
FACULTY OF MANUFACTURING AND MECHATRONIC ENGINEERING TECHNOLOGY (FTKPM) (P)			
UJ6523003	BHM	B.Eng (Hons.) Mechatronics Engineering (Collaboration programme with HsKA, Germany))	4 ½ years
UJ6521005	BTM	Bachelor of Engineering Technology (Manufacturing) with Honours	4 years
UJ6521002	BVM	Bachelor of Technology in Industrial Machining With Honours	3 ½ years
UJ6521004	BFF	B.Eng (Hons.) Manufacturing Engineering	4 years
UJ6523002	BFM	B.Eng (Hons.) Mechatronics Engineering	4 years
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY (FTKMA) (P)			
UJ6525002	BHA	B.Eng (Hons.) Automotive Engineering (Collaboration programme with HsKA, Germany)	4 ½ years
UJ6521003	BVW	Bachelor of Technology in Welding with Honours	3 ½ years
UJ6525003	BVA	Bachelor of Technology in Automotive with Honours	3 ½ years
UJ4521001	DMM	Diploma in Mechanical Engineering	2 years 9 month

For Futher Information:
CENTER OF MARKETING AND ACADEMIC ADMISSION
Tel.: +609-424 5263 / 5268 / 5277
Fax: +609-424 5262 —e-Mail: intake@ump.edu.my
Portal: http://mid.ump.edu.my

COLLEGE OF ENGINEERING

COLLEGE OF ENGINEERING

INTRODUCTION

The establishment of the UMP College of Engineering begins with the New Academic Structuring Workshop held on June 29, 2019 at The Zenith Hotel Kuantan. The workshop is an initiative taken into account in the proposed new academic restructuring in UMP. The final result of the workshop was that the UMP's new academic structure proposal was approved at the Senate Meeting on June 26, 2019. The UMP New Academic Structure was subsequently followed by the approval of the Special UMP's Board of Directors Meeting on July 6, 2019.

According to that approval, all of the existing undergraduate engineering programs previously run by engineering faculties are officially located into five departments under College of Engineering.

PROGRAMMES OFFERED

a) Department of Chemical Engineering

i. B.Eng.(Hons.) Chemical Engineering

b) Department of Civil Engineering

i. B.Eng (Hons.) Civil Engineering

c) Department of Mechanical Engineering

i. B.Eng (Hons.) Mechanical Engineering

ii. B.Eng (Hons.) Mechanical Engineering (Automotive)

d) Department of Electrical Engineering

i. B.Eng (Hons.) Electrical Engineering (Electronics) - BEE

ii. B.Eng (Hons.) Electrical Engineering (Power System) - BEP

e) Department of Industrial Engineering

- *Will offer new programme on 2021/2022 Academic Session*

CAREER OPPORTUNITIES

Program	Career Opportunity
Chemical Engineering	• Chemical Engineer • Technical Executive/ Supervisor • Shift Engineer/ Field Operator • R&D Engineer

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

	• Plant Engineer • Quality Assurance Engineer • Researcher/ Research Assistant • Production Engineer • Process Engineer • Sales Engineer • Bioprocess Engineer • Consultant • Oil & Gas Technical Executive • Lecturer/ Trainer • Technopreneur
Civil Engineering	• Academician • Civil Engineer • Environmental Engineer • Site Engineer • Project Engineer • Structural Engineer • Design Engineer • Research & Development Engineer • Consultant • Contractor
Mechanical Engineering	• Project Engineer • Design Engineer • Operation Engineer • Mechatronic Engineer • Manufacturing Engineer • Robotic Engineer • Research & Development Engineer • Energy Engineer • Process Plant Engineer • Sales Engineer • QA Engineer • Production Engineer • Material Engineer • Consultant • Instrumentation & Control Engineer • CAD/CAM Engineer • Technopreneur
Electrical Engineering	**BEP (Power System)** • Electrical Engineer • Power System Engineer • Project Engineer • Electrical Plant Project Engineer • Service & Maintenance Engineer

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

	• Hardware Engineer • Maintenance Engineer • Power Quality Engineer • Academician **BEE (Electronics)** • Electronics Engineer • Research & Development Engineer • Production Engineer • Process Engineer • Control Systems Engineer • Software Engineer • Quality Assurance Engineer • Quality Control Engineer • Academician
Industrial Engineering	• Project Engineer • Design Engineer • Operation Engineer • Mechatronic Engineer • Manufacturing Engineer • Robotic Engineer • Research & Development Engineer • Energy Engineer • Process Plant Engineer • Sales Engineer • QA Engineer • Production Engineer • Material Engineer • Consultant • Instrumentation & Control Engineer • CAD/CAM Engineer • Technopreneur

DEPARTMENT OF CHEMICAL ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING
CURRICULUM STRUCTURE
B.ENG (HONS.) CHEMICAL ENGINEERING

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND		FIRST	SECOND
COURSES	UHR1012 Islamic And Asian Civilisations 1 / UHS1021 Soft Skills 1	UHL24** English Courses	UHL24** English Courses	UHL24** English Courses	UHL2432 English For Professional Communication	UHF1**1 Foreign Languages Level 1	BKF4915- Industrial Training (LI) 10 Weeks	BKC4944 Undergraduate Research Project II	UHF2**1 Foreign Languages Level 2
	UQB1**1 Co-Curriculum I	UHR1012 Islamic And Asian Civilisations 1 / UHS1021 Soft Skills 1	BUM2413 Applied Statistics	BKF2143 Computer Programming For Engineers	UHM2022 Ethnic Relations	UHS2021 Soft Skills 2		BKC4913 Process & Plant Design I	BKC4934 Process & Plant Design II
	BUM2133 Ordinary Differential Equations / BUM2123 Applied Calculus	BUM2133 Ordinary Differential Equations / BUM2123 Applied Calculus	BKF2332 Electrical & Instrumentation Technology	BKF2423 Heat Transfer	BKF3142 Process Engineering Economics	BKC3**3 Elective 1		BKC4543 Environmental Engineering	BKF4812 Process Engineering Management
	UGE2002 Technopreneurship	UQ*2**1 Co-Curriculum II	BKF2413 Chemical Engineering Thermodynamics	BKF2432 Mass Transfer	BKC3533 OSH in Chemical Industries	BKF3472 Chemical Reaction Engineering II		BKC 3**3 Elective 2	BKC4**3 Elective 3
	BKF1313 Engineering Mechanics	BKF1243 Analytical Chemistry	BKF2353 Fluid Mechanics	BKF2443 Numerical Methods & Optimization	BKF3463 Unit Operation	BKF3731 Unit Operation Lab			
	BKF1323 Organic Chemistry	BKF1253 Physical Chemistry	BKF2343 Material & Energy Balance	BKC2463 Science & Engineering Materials	BKF3413 Process Control & Dynamic	BKC3922 Undergraduate Research Project I			
	BKF1513 Engineering Ethics & Professionalism	BKF1333 Thermodynamics		BKF2453 Chemical Reaction Engineering I	BKC3492 Separation Process	BKF3791 Process Control & Instrumentation Lab			
	BKF1751 Basic Science & Engineering Lab				BKF3741 Chemical Reaction Engineering Lab	BKF3553 Process Simulation and Computer Aided Design			
						BKF3923 Process Synthesis			
TOTAL CREDIT PER SEMESTER	17 - 18	14 - 17	16	19	18	17	5	13	10
Note	1. UHL24** English Courses: UHL2400 Fundamentals Of English Language, UHL2412 English For Academic Communication and UHL2422 English For Technical Communication. 2. UHM2022 Ethnics Relations: International Students (starting cohort 2016/2017) must register UHM1012 Malaysian Studies (Pre-requisite). 3. BUF1113 Basic Physics: Compulsory for new students who did not take Physics during Matriculation / Foundation Level.								
130	OVERALL TOTAL CREDIT FOR GRADUATION								

*** The structure of curriculum presented here is effective from January 2018. The university however reserves the right to amend this structure in future for any improvement.**

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B.ENG (HONS.) CHEMICAL ENGINEERING

BKF1313
Engineering Mechanics
Credit : 3
Prerequisite : None

Synopsis

This subject will introduce students with concept of statics and dynamics and its application in related engineering field. The topics covered in this subject are static of particle, static of rigid body, distributed forces, analysis of structure, friction, kinematics and kinetics of particles. By completing the course, students will comprehend the basic mechanisms and applications of statics and dynamics in related engineering field.

Course Outcomes

CO1: Apply the basic concepts in statics to solve problems concerning resultant of forces acting on a particle and equilibrium of a particle.
CO2: Analyze problems involving the equilibrium of a rigid body and use the fundamental principles in statics to solve them.
CO3: Analyze problems involving the kinematics and kinetics of rectilinear and curvilinear motions of a particle by applying the basic principles in dynamics.

BKF1323
Organic Chemistry
Credit : 3
Prerequisite : None

Synopsis

This course discuss the fundamental theory of the properties, synthesis and organic reactions where use the functional group as framework as a basic level courses with an organic chemical content. This course focuses on the key concepts of organic chemistry through a study of the reactions selected nonfunctional aliphatic, alicyclic, cyclic and aromatic molecules. Particular emphasis is placed on the underlying mechanistic pathway that are involved and their stereo chemical consequences. The stereochemistry of the molecular structure is also considered.

Course Outcomes

CO1: Able to understand the common organics structures, properties and reactions of aliphatic and aromatic hydrocarbons, alkyl halides, alcohol groups, carbonyl groups and amines.
CO2: Formulate chemicals reactions and steps of mechanism for the synthesis and transformation of functional group.
CO3: Discuss the bonding properties of carbon which cause it to be present in such a large number and variety of important compounds.
CO4: Explain the common types of reactions mechanism and modern synthesis techniques.

BKF1513
Engineering Ethics & Professionalism
Credit : 3
Prerequisite : None

Synopsis

This subject gives an overview of engineering, the profession and its requirement in Malaysia scenario. Topics that will be included are ethics, management and contribution of engineering also generic skills and study skills. Basic calculations, unit conversions, create an engineering graph and solving iterative problem using computer consisted in this subject as preparation as an engineering student. Plant visits and seminar were also conducted as an exposure to the real field of engineering.

Course Outcomes

CO1: Define engineering and identify different branches of engineering
CO2: Explain engineering ethics, management and contribution.
CO3: Explain and comprehend the ethics, skills of teamwork and leadership
CO4: Perform basic calculation and apply generic or study knowledge that used in engineering field

BKF1751
Basic Science & Engineering Lab
Credit : 1
Prerequisite : None

Synopsis

In basic engineering lab, students are required to perform laboratory works which covered the basis concept of physical and chemistry such as concepts of solubility and miscibility, buffer effect, heat determination and gravimetric analysis of chloride. The lab also contains experiments which cover the basic concepts of engineering such as pressure change analysis, head losses in piping system and material properties. The aim is to strengthen the student's fundamental knowledge as it covers some

of the basic science and engineering subjects such as physical and organic chemistry, fluid mechanics, thermodynamics and science and engineering materials.

Course Outcomes

CO1: Apply the basic science and engineering theories in the corresponding experimental works
CO2: Apply the concepts of basic science and engineering in solving problems and interpretation of experimental data
CO3: Adapt the team working behavior and commitment as a member while working on the group assignment

BKF1243
Analytical Chemistry
Credit : 3
Prerequisite : None

Synopsis

The syllabus covers the basic knowledge and application of sample and data handling, calibration techniques and quality of analysis in analytical laboratory. It also deals with separation techniques and its basis application such as solid phase extraction, GC and HPLC. The introduction to the theory and application of spectroscopic techniques used in chemical analysis such as UV-Vis, FT-IR, MS and AAS are discussed. The combinations of above techniques with their advantages are covered in this course.

Course Outcomes

CO1: Explain and describe the theory and application of Analytical Chemistry
CO2: Interpret and analyze the analytical data
CO3: Solve the problems related to analytical chemistry
CO4: Explain the concept and application of analytical equipment such as: GC, HPLC, FTIR, UV-Vis, and AAS.

BKF1253
Physical Chemistry
Credit : 3
Prerequisite : None

Synopsis

This course discusses some introductory to thermodynamics in physical chemistry followed by continuation topics related to liquids and their mixtures, principles of chemical equilibrium and rate reactions. The solid surfaces including their applications will be also discussed in this course. The development of key skills is facilitated by a program of tutorials and practical.

Course Outcomes

CO1: Explain and describe the principle of thermodynamics.
CO2: Apply basic physical chemistry principle to solve the problem.
CO3: Ability to communicate effectively and presenting in related topic.

BKF1333
Thermodynamics
Credit : 3
Prerequisite : None

Synopsis

This course is designed to introduce basic concept in thermodynamic in a thorough way. Topics cover are properties of pure substances, thermodynamics system, heat transfer through conduction, convection and radiation, the first law of thermodynamics for closed systems, open systems and their application in steady-flow and unsteady-flow processes, the second law of thermodynamics, entropy, introduction to refrigeration and steam power plant.

Course Outcomes

CO1: Discover the state of properties from property diagram and obtaining data from property table
CO2: Solve energy balance (heat, mass and work) of a process for both closed and open system by using the first law of thermodynamics and the concept of entropy through its reversible and irreversible processes
CO3: Analyze the thermal efficiency of heat engine, heat pump, and refrigerator and Carnot cycle using Second Law of Thermodynamics

BKF2332
Electrical & Instrumentation Technology
Credit : 2
Prerequisite : None

Synopsis

This course is designed to introduce the fundamental of electrical system principles for chemical engineering students. The underlying principles that will be covered in this course include an introduction to an electrical system, electrical safety, basic laws

(Ohm's law, Kirchhoff laws, current/voltage divider, wye-delta transformation), simple direct current (D.C.) circuits, method of analysis, circuit theorems, single phase series and parallel circuits series, parallel combination of resistor, inductor and capacitor, power in AC circuit, single and multiphase systems and alternating current. Apart from that, student also introduce to the topics on instrumentation which include introduction to process instrumentation elements and instrumentation devices.

Course Outcomes

CO1: Ability to describe the concepts of electrical system and its components as well as awareness on electrical safety
CO2: Ability to analyze and solve electrical circuit problems both for direct and alternating currents
CO3: Ability to analyze and describe the instrumentation elements and instrumentation devices for chemical processes

BKF2413
Chemical Engineering Thermodynamics
Credit : 3
Prerequisite : BKF1333 Thermodynamics

Synopsis

This subject mainly covers the topics of pure substances, heat effects, thermodynamics properties, VLE, thermodynamics solution and chemical reaction equilibrium. The course entails the theory and applications of thermodynamics concept and deals with composition-dependent thermodynamics relations. This course requires conceptual thinking and requires greater mathematical sophistication to generate ideas and problem solving.

Course Outcomes

CO1: Apply equations of state or the generalized correlations for solving intrinsic properties PVT properties and apply energy equation for energy balance
CO2: Analyze thermodynamics properties, phase equilibrium (VLE), solution thermodynamics and chemical reaction equilibrium problems using thermodynamics equations
CO3: Design and solve flow sheet for a pre-determined chemical processes

BKF2353 Fluid Mechanics
Credit : 3
Prerequisite : None

Synopsis

The objective of this course is to introduce the concept and use of fluid mechanics, both static and dynamics fluid. The covered topics are fluid properties, fluid static and dynamics, Bernoulli's equation and applications, momentum equation and its application, analysis of flow in pipeline system and dimensional analysis.

Course Outcomes

CO1: Solve the variables and properties related to material and energy balance problems.
CO2: Analyze and solve material balance of processes in nonreactive system.
CO3: Analyze and solve material balance of processes in reactive system.
CO4: Analyze and solve energy balance of processes in nonreactive system.
CO5: Analyze and solve energy balance of processes in reactive system.

BKF2343
Material & Energy Balance
Credit : 3
Prerequisite : None

Synopsis

This course aims to equip students with basic chemical engineering principles such as different unit systems, unit conversion and process variables determination. This knowledge will then be applied extensively for material and energy balances for single or multiple unit operations of non-reactive and reactive chemical processes. In addition, students will also be exposed to the behavior of single phase and multiple phases and the equations that govern their characteristic, which represents the foundation of chemical separation engineering. Computer application using MS Excel to solve the material and energy balance also imbedded in this course.

Course Outcomes

CO1: Solve the variables and properties related to material and energy balance problems.
CO2: Analyze and solve material balance of processes in nonreactive system.
CO3: Analyze and solve material balance of processes in reactive system.
CO4: Analyze and solve energy balance of processes in nonreactive system.
CO5: Analyze and solve energy balance of processes in reactive system.

BKF2143
Computer Programming For Engineers
Credit : 3
Prerequisite : None

Synopsis

This subject aims to introduce the fundamental element and feasibilities of the computer programming by using MATLAB mathematical computing program. Students will be taught on analyzing data, developing a program using m-file and using the command window. They will learn to solve general engineering mathematical equations in MATLAB, displaying the data via 2D and 3D graphs and to learn to develop the graphical user interface (GUI) for program.

Course Outcomes

CO1: Organize and analyze the data by using MATLAB
CO2: Understand and develop the program to solve the mathematical problems.
CO3: Apply software to solve general chemical engineering and mathematical problems.
CO4: Demonstrate the ability to transform the problem to design and from design to an operational program

BKF2423
Heat Transfer
Credit : 3
Prerequisite : None

Synopsis

The objective of this course is to provide students with the concepts of heat transfer. This course will emphasize on the principles of the heat transfer in steady state by conduction, convection and radiation. Students will be exposed to the procedure for general problem solving and its application on heat exchanger. Experiments involve shell and tube heat exchanger and plate heat exchanger have been designed. Students will be given experiment objectives and conduct the experiment in group. Subsequently, the principles of unsteady-state convective heat transfer will be covered at the end of the course.

Course Outcomes

CO1: Solve heat transfer problems that involve conduction, convection and radiation in steady-state heat transfer.
CO2: Utilize the design equations for heat exchanger to solve problems related to heat exchanger.
CO3: Solve heat transfer problems related to the unsteady-state systems.

BKF2432
Mass Transfer
Credit : 2
Prerequisite : None

Synopsis

This course is to provide students with the concepts of mass transfer. This course will emphasize on the principles of the mass transfer in gases, liquids, biological solutions and gels, and solids. Subsequently, the principles of unsteady state and convective mass transfer will be covered to establish knowledge of mass transfer. The students will be exposed to the procedure for general problem solving and its application on real system.

Course Outcomes

CO1: Apply fundamental understanding of mass transfer in diffusion phenomena in gas, fluid and solid system.
CO2: Analyze and solve problems related to diffusion and convection mass transfer in steady/unsteady state.
CO3: Relate the concept of mass transfer in problems related to unit operations.

BKF2443
Numerical Methods & Optimization
Credit : 3
Prerequisite : BUM2133 Ordinary Differential Equations

Synopsis

This subject teaches the techniques by which mathematical problems are formulated so that they can be solved with arithmetic operations. Topics covered in this subject are roots of equation, systems of linear algebraic equations, optimization, curve fitting, numerical differentiation & integration, ordinary differential equation and partial differential equation. Some software packages are introduced to empower the students in problem solving.

Course Outcomes

CO1: Apply numerical methods as a problem-solving tool

CO2: Optimize a process employing numerical methods
CO3: Solve numerical methods problem by using MS Excel and MATLAB
CO4: Optimize a process employing MS Excel, Design Expert and MATLAB

BKC2463
Science & Engineering Materials
Credit : 3
Prerequisite : None

Synopsis

This course is designed to provide a working knowledge in the solving of materials problems encountered by chemical engineers and in the engineering of new and improved materials used in chemical processes. The approach used is the correlation of engineering properties with atomic and microstructures, utilizing the analysis techniques of materials characterization and phase relationships. Topics include structure and properties of metallic and nonmetallic materials of construction; interrelations between chemical bonding, structure, and behavior of materials, corrosion resistant materials, polymers and composites as construction materials, particularly for sustainable environment. Each of the materials classes (metals, ceramics, polymer and composites) is discussed in detail in this context.

Course Outcomes

CO1: Explain the elementary relationships between structure, properties and performance of materials that are essential for understanding the role of materials in the design of engineering systems
CO2: Distinguish the various classes of materials (metals, ceramics, polymers and composites), their fundamental chemical and structural nature and processing methods
CO3: Utilize the knowledge on structure and properties of materials to solve real engineering-based case studies

BKF2453
Chemical Reaction Engineering I
Credit : 3
Prerequisite : BKF2343 Material Energy Balance

Synopsis

This subject covers the knowledge of the reaction kinetics and reactor design which distinguishes chemical engineer from other engineers. The course introduces the basic design calculation and design of chemical reactors at the ideal conditions. The topics covered in this subject are kinetics of homogenous reactions, chemical reactions in batch and continuous reactor, multiple reactions and reactor heat effect.

Course Outcomes

CO1: Apply chemistry, thermodynamics and chemical reaction fundamentals such as reactant limitation, mole balance, rate law and stoichiometry in reactor design
CO2: Design isothermal reactors for a single reaction
CO3: Analyze reaction and determine reactor scheme for desired conversions, selectivity and yield
CO4: Design reactor under various heat effect
CO5: Optimize reactor design for chemical processes using engineering economics

BKF3142
Process Engineering Economics
Credit : 2
Prerequisite : None

Synopsis

This course deals with cost analysis in engineering decision-making, the management aspects and control of complex projects. Engineering economics topics include cost estimation, time value of money, interest formulas and equivalence calculations, measures of investment worth, depreciation and income tax analysis.

Course Outcomes

CO1: Discuss the need of chemical engineering graduates when they have to make financial decisions as a team member or project manager.
CO2: Explain theoretical and conceptual basis on which the practice of engineering economics project analysis is built.
CO3: Analyze the economic feasibility of a chemical plant, carried out by examining the capital cost and the manufacturing cost obtained from the cost estimation techniques.

BKC3533
OSH In Chemical Industries
Credit : 3
Prerequisite : None

Synopsis
This course is primarily to expose students with the fundamental concepts, practical aspects and

applications of occupational safety and health (OSH) in chemical and biotechnology industries. Among others, the students will be taught the fundamental application and day-to-day aspects of OSH and at the same time, the management aspects of it. Local and international regulations of SH&E such as OSHA and FMA will also be covered. Case studies from several chemical and biotechnology industries globally will also be discussed in details.

Course Outcomes

CO1: Value fundamentals of technical safety for chemical and biotechnology industries.
CO2: Explain the various features of OSH management and regulations.
CO3: Review and analyze the cause and effects of industrial incidents and proposed for improvement.
CO4: Evaluate OSH aspects in the design and operation of chemical and biotechnology industries such as Threshold Limit Values, Toxicology Study, Risk Assessment, HAZOP study, source model, dispersion model, fire triangle, fire protection and prevention.

BKF3463
Unit Operation
Credit : 3
Prerequisite : BKF2343 Material & Energy Balance

Synopsis

The objective of this course is to provide students with concepts of separation processes and unit operation in chemical engineering. It will cover the gas-liquid, vapor-liquid, liquid-liquid and solid-liquid separation process. By completing the subject, students will understand the basic mechanisms, operations and basic design parameters of the selected unit operations such as evaporation, distillation, absorption, liquid extraction and leaching

Course Outcomes

CO1: Apply knowledge of chemical engineering fundamentals such as mass transfer, materials and energy balance to the solution of unit operation problems.
CO2: Identify type of separation processes and analyze the unit operation problems to obtain number of stages and separator sizing.
CO3: Design, optimize and/or develop an appropriate separator to solve the industrial problems by considering public health, safety and environment.

BKF3413
Process Control & Dynamic
Credit : 3
Prerequisite : BKF2343 Material & Energy Balance

Synopsis

This is an introductory level course in chemical process dynamics and control. The topics that will be included in this subject are fundamentals and concepts of control system, development of theoretical and empirical model for chemical and physicals processes, dynamic behavior of processes, application of Laplace transform and transfer function, block diagram, design and analysis of control system, stability analysis, advanced process control and computer simulation/analysis.

Course Outcomes

CO1: Summarize the basics of modelling and process control
CO2: Analyze the feedback control system
CO3: Construct Process and Instrumentation Diagram
CO4: Apply the PID tuning and analyze the stability
CO5: Evaluate the control loop interactions in multiloop control

BKC3492
Separation Process
Credit : 2
Prerequisite : BKF2343 Material & Energy Balance

Synopsis

This course aims to introduce the principles of typical unit operations involved in chemical and petrochemical industry such as drying of process material, adsorption and fixed-bed separation, membrane separation, mechanical-physical separation and crystallization. At the end of this course, it is expected that the students will understand theories, principles, calculations and basic design parameters associated with every unit operation.

Course Outcomes

CO1: Explain, discuss and interpret the concept of unit operations i.e drying, adsorption, fixed bed separation crystallization, membrane separation and mechanical-physical separation
CO2: Analyze problems related to unit operation in related chemical processes.
CO3: Determine basic design parameters associated with certain unit operations.

BKF3741
Chemical Reaction Engineering Lab
Credit : 1
Prerequisite : BKF2453 Chemical Reaction Engineering I

Synopsis

This lab is one of the most important labs in the chemical engineering study. In this lab, student will perform experiments to support their theoretical study of Chemical Reaction Engineering. It includes the experimental studies using different type of reactors for determining kinetic and RTD data.

Course Outcomes

CO1: Design the experiments to acquire the kinetic and RTD data
CO2: Analyse the experimental data to obtain the reaction rate expression (reaction order and specific reaction rate constant)
CO3: Attain competency in running the bench scale and pilot scale reactors.
CO4: Inculcate good communication skill and team working spirit.

BKF3472
Chemical Reaction Engineering II
Credit : 3
Prerequisite : BKF2453 Chemical Reaction Engineering I

Synopsis

This subject furthers the knowledge of chemical reactor. Topics to be covered are the heterogeneous systems of the catalytic reaction, including the effects which significantly influence the reactor performance, the study of the real scenario for nonideal reactors in industries, and introduction of biochemical reaction systems. The analysis of industrial chemical reactors frequently requires solution of non-linear algebraic and differential equations. Hence, modeling the nonideal reactor will be the crucial skill to fulfill the outcome requirement for each chemical engineer and researcher in chemical reaction engineering.

Course Outcomes

CO1: Explain the factors that affect the performance of industrial reactor such as diffusion, mixing and other limiting situation.
CO2: Apply the fundamental of biochemical reaction systems.
CO3: Evaluate the performance of the reactor which is affected by diffusion and catalyst deactivation.
CO4: Predict the non-ideal reactor performance based on the residence time distribution data using an appropriate model.

BKF3731
Unit Operation Lab
Credit : 1
Prerequisite : BKF3463 Unit Operation

Synopsis

This laboratory course is offered to enhance student's understanding and application of theories learnt in Chemical Engineering Unit Operation by doing experiments. This lab includes experiment on absorption, solid liquid extraction, pressure swing adsorption, evaporation, crystallization, distillation and drying. In this lab, students are divided into small groups to run the experiment under supervision of the instructor (lecturer and technical staff). This lab aims to promote group work (60%) as well as individual excellence (40%). The main objective of this course is to develop student skills of presenting their findings with logical scientific based reasoning orally and in writing. Besides that, students will be exposed to environment and safety precaution related to unit operation.

Course Outcomes

CO1: Describe the fundamental of chemical engineering unit operation.
CO2: Applied chemical engineering knowledge on unit operation handling.
CO3: Write technical report effectively with logical scientific based reasoning.
CO4: Present effectively as an individual and in group throughout the semester based on individual and group-based tasks assigned.

BKC3922
Undergraduate Research Project I
Credit : 2
Prerequisite : BKF3463 Unit Operation

Synopsis

This course is designed to expose the students to a research project. They have to apply all the knowledge they have learned in the program to complete the research project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the research project I, the students will be able to do a

literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, preliminary results, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

Course Outcomes

CO1: To apply knowledge of mathematics, science, engineering fundamentals or engineering specialization to the research problems
CO2: To identify, formulate and analyse research problems using the principles of mathematics, natural sciences or engineering science
CO3: To design and develop solutions based on research problems
CO4: To engage in independent and life-long learning in the broader context of technological change, enhance individual's soft skill and organization skills in research activities
CO5: To communicate effectively on research outcomes with the engineering community and society (oral)
CO6: To communicate effectively on research outcomes with the engineering community and society (written)

BKF3791
Process Control & Instrumentation Lab
Credit : 1
Prerequisite : BKF3413 Process Control & Dynamics

Synopsis

This laboratory have been developed to address the key engineering educational challenge of realistic problem solving within the constraints of a typical lecture-style course in process dynamics and control. Students will conduct experiments based on two major process operations which are based on computer simulation and plant experimental works. In computer simulation, students will simulate a case study using Matlab software, Simulated Process Control (SPC) software and also operate a system on Distributed Control System (DCS). The students also run the experiment using pilot plant available in this laboratory. This application will encourage students to apply their process control theories into practical term and inculcate the critical thinking among the group members.

Course Outcomes

CO1: Analyse dynamic behaviour of 1st and 2nd order process
CO2: Develop control strategies manually and automatically using Simulated Process Control (SPC) software
CO3: Practice control strategies using pilot plants and Simulated Process Control (SPC) software
CO4: Adapt team working and commitment behaviour

BKF3553
Process Simulation & Computer Aided Design
Credit : 3
Prerequisite : BKF3463 Unit Operation
BKF2453 Chemical Reaction Engineering I

Synopsis

This particular course will introduce the usage of process simulation and flow sheeting software to students, i.e; Aspen Plus or Aspen Hysys. This software wil be used to simulate steady state model for chemical and oil and gas processes. This subject is very important to prepare students for future usage of the advanced modeling tool in chemical engineering and other related fields involving design and simulation.

Course Outcomes

CO1: Learn to construct flowsheet, including adding blocks and streams, reconnecting streams, and breaking/joining streams
CO2: Apply the software to model and simulate problems related to chemical engineering unit operations.
CO3: Develop flowsheet to model and simulate problems related to chemical engineering processes and other related disciplines.

BKF4915
Industrial Training
Credit : 5
Prerequisite : OSH in Chemical Industries (BKC3533)
Unit Operation (BKF3463)

Synopsis

In industrial training the students should gain insight into the industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo 10 weeks of industrial training during the end of the semester of the third academic year. The performance of each student during the periods of his/her Industrial

training is evaluated jointly by the faculty staff, and the representatives from employer organizations. The student is required to maintain proper records and submit reports on the training received by him/her. The industrial training report should cover all periods of approved employment. The report document is expected to demonstrate development of practical and professional skills in Engineering through technical experience and application of theoretical knowledge. Development of skills in dealing with people, and communication skills are part of the subject objectives. The student should be able to present the report to university supervisor, as a complement to their degree.

Course Outcomes

CO1: Display independency in actual working environment with minimal supervision
CO2: Display communication skill with different levels of staff in the organization
CO3: Present technical documents related to the work completed
CO4: Practice positive attitude during the training

BKF3923
Process Synthesis
Credit : 3
Prerequisite :
Chemical Reaction Engineering I (BKF2453)
Unit Operation (BKF3463)

Synopsis

This course guides students to design a process. Process is an integrated system which has material and energy balance. It is not considered feasible for production of a chemical until its synthesis goes through steps of thorough review, selections and evaluation of successive unit operations. The challenge is when all calculations carried out are interconnected among them and considering numerous variables and tremendous amount of factors with respect to process decisions. This course helps student understand the technique of process synthesis. The focus will be particularly given to the conceptual design method whereby the synthesis follows six (6) hierarchical steps of decision making on the process. Thus, the lessons from the previous courses would help them here make all necessary engineering decisions. Process selection and evaluation is optimized by using the economic potential method starting from the second step where material balance calculation begins. Six (6) steps of process decision include mode of operation, input-output structure, reactor-recycle schemes, separator trains, heat exchanger network and control. The simulation software will also be introduced to ease the calculation. The environmental impact posed by the process would also need to be considered during the process synthesis. At the end of this subject, the students are expected to come out with their own process flow diagrams whether as a grass-root plant or a retrofitted plant.

Course Outcomes

CO 1: Review on raw material and product, synthesis route and reaction kinetics, and technology in existing processes
CO2: Discover necessary material properties, technologies and engineering fundamentals for process decision
CO3: Calculate material and energy balance
CO4: Apply process synthesis method, heuristics, algorithm or rule of thumbs in decision making.
CO5: Analyze the decided scheme/type of unit operations at respective levels of process decision
CO6: Manage environmental aspects of process

BKC4944
Undergraduate Research Project II
Credit : 4
Prerequisite : Undergraduate Research Project I (BKC3922)

Synopsis

This subject is the continuation of the subject Research Project I. In this subject, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of this semester, the students are required to produce a research project report and present it to faculty's evaluation panel.

Course Outcomes

CO1: To apply knowledge of mathematics, science, engineering fundamentals or engineering specialization to the research problems
CO2: To identify, formulate and analyse research problems using the principles of mathematics, natural sciences or engineering science.

CO3: To design and develop solutions based on research problems
CO4: To conduct investigation on research problems including design of experiments, analysis and data interpretation, and conclusion.
CO5: To have good practices in laboratory and simulation
CO6: To engage in independent and life-long learning in the broader context of technological change, enhance individual's soft skill and organization skills in research activities.
CO7: To communicate effectively on research outcomes with the engineering community and society (written)
CO8: To communicate effectively on research outcomes with the engineering community and society (oral)

BKC4913
Process & Plant Design I
Credit : 3
Prerequisite :
BKF3463 Unit Operation
BKF3472 Chemical Reaction Engineering II
BKF3553 Process Simulation & Computer Aided Design
BKF3923 Process Synthesis
BKC3533 OSH In Chemical Industries

Synopsis

The lessons from the previous subjects would be used by the students here to make all necessary engineering decisions in synthesizing the process flow diagram. By implementing optimization approach using the economic potential strategies, the decisions are analyzed by integrating material and energy balance through four hierarchical steps beginning with mode decision and ending with separation train decision. The students would have to use engineering calculations including design equations and heat integration by the aid of the simulation software. The environmental impact posed by the process would also need to be considered during the process synthesis. At the end of this subject, the students are expected to come out with their own process flow diagrams whether as a grass root plant or a retrofit plant.

Course Outcomes

CO1: Review on raw material and product, synthesis route and reaction kinetics, and technology in existing processes
CO2: Discover necessary material properties, technologies and engineering fundamentals in each decision level of process synthesis
CO3: Analyze material and energy (when necessary) balance for each decision level of process synthesis
CO4: Determine the scheme/type of unit operations and estimate their optimum design at respective decision level of process synthesis
CO5: Manage safety and health aspects of process
CO6: Manage environmental aspects of process
CO7: Synthesize feasible design of process
CO8: Draw process flow diagram
CO9: Simulate the synthesized process without any non-convergence
CO10: Present design report for the proposed case study in group

BKC4543
Environmental Engineering
Credit : 3
Prerequisite : None

Synopsis

This subject is designed to introduce to the students the principles and testing techniques of the environmental engineering. Topics includes introduction of environmental engineering, wastewater quality management, wastewater treatment, air, solid waste treatment and management. The techniques covered involved in environmental samples testing, and an ability to critically evaluate data from a sampling program. Skills gained will be directly applicable to careers in environmental engineering both in data collection and managing field assessments.

Course Outcomes

CO1: Explain the ethics & responsibilities as engineer towards environment and expose to environmental legislation & regulation practices in Malaysia
CO2: Review problems and its solving involving wastewater treatment
CO3: Analyze the concept involved in air pollution control, management of solid waste and hazardous waste
CO4: Develop various analytical methods and operate wastewater treatment pilot plant, air contaminants and its equipment for air pollution reduction

BKC4934
Process & Plant Design II
Credit : 4

Prerequisite : BKC4913 Process & Plant Design I

Synopsis

In this course, students will carry out a plant design project to demonstrate the practical aspects in designing Chemical/Bio/Gas processing plant. The students will be divided into groups where they are expected to design Chemical/Bio/Gas processing plant. They will also apply their previous knowledge from Process & Plant Design 1 and other related subject, in completing the design task given. Students will be assessed based on their individual performance, presentation and final report.

Course Outcomes

CO1: Justify the manual calculation results of the mass and energy balance
CO2: Evaluate mass and energy balance using commercial process simulators
CO3: Design of process equipment
CO4: Propose appropriate utility system
CO5: Decide suitable control mechanism
CO6: Conduct hazard and operability study (HAZOP)
CO7: Propose appropriate waste management plant
CO8: Perform process viability and economics analysis
CO9: Rationalize the proposed design verbally and in written form
CO10: Demonstrate the ability to work in group
CO11: Synthesize process flow sheet

BKF4812
Process Engineering Management
Credit : 2
Prerequisite : None

Synopsis

This course deals with Process Engineering Management. It covers knowledge on roles &responsibilities, planning, organizing, time, tools & techniques, cost, constraint, quality, and risk management.

Course Outcomes

CO1: Explain theoretical and conceptual basis on which the practice of engineering operation and project management in industry.
CO2: Describe the need of chemical engineering graduates when they have to make management decisions as a team member or manager.
CO3: Apply basic operation and project management concepts and principles through case study

BKB3413
Applied Biochemistry (E)
Credit : 3
Prerequisite : None

The subject provides an overview of fundamental concepts in microbiology, biochemistry and its application in biotechnology industries. The subject covers on the microorganism, cell cultures, and major biomolecules in living systems. The student will be exposed to metabolic pathway of aerobic respiration, enzyme catalyzed reaction, cell culture behavior and good manufacturing practices. The course will also emphasize on the laboratory skills which includes basic biology and biochemistry analysis.

Course Outcomes

CO1: Describe the cell properties, microbial growth characteristic and media selection
CO2: Determine enzymatic reaction and describe the mechanism of enzyme regulation
CO3: Demonstrate the knowledge in microbiology handling, cell cultures and biochemistry analysis

BKB3423
Bioreactor Engineering (E)
Credit : 3
Prerequisite : None

Synopsis

This subject covers the basic concepts of microbial growth phase, growth kinetic, stoichiometry of microbial growth and bioreactor operational mode selection. This subject also emphasizes on the application of transport phenomena in bioreactor, sterilization and aseptic technique, scale up, monitoring and control of bioreactor.

Course Outcomes

CO1: Construct conceptual design of a fermentation process according to first, second and third levels of hierarchical process synthesis.
CO2: Solve the calculation regarding to the culture kinetic in different fermentation modes, and the stoichiometry of cell growth and product formation.

CO3: Discuss different bioreactor designs and its related instrumentation and control.
CO4: Solve the calculation regarding to the mixing, heat transfer and mass transfer in a bioreactor.
CO5: Solve the calculation regarding to the sterilization in a bioreactor and analyse the effect of scale-up.

BKB3443
Bioprocess Technology (E)
Credit : 3
Prerequisite : None

Synopsis

This subject covers the basic concepts of bioreactor operational mode and its culture kinetics. This subject also emphasizes on the application of transport phenomena in bioreactor, scale up, monitoring and control of bioreactor. This subject also includes the introduction of the unit operations that commonly employed to separate biological products. An idealized process of bioseparation consists of four phases which are the removal of insoluble products, the isolation of desired biological products or concentration, the purification and lastly, polishing of biological products. The basic methods that will be covered in this course include filtration, centrifugation, cell disruption, precipitation, extraction, adsorption, and chromatography. In addition, an overview on the complete train of bioseparation will also be introduced.

Course Outcomes

CO1: Discuss different bioreactor operational modes, designs, and its related instrumentation and control.
CO2: Solve the calculation regarding to the culture kinetic in different fermentation mode.
CO3: Solve the calculation regarding to the mixing and mass transfer in a bioreactor and analyse the effect of scale-up.
CO4: Differentiate four phases involve in bioseparation which are recovery, isolation, purification and polishing.
CO5: Explain the principles of each technique.
CO6: Justify the underlying reasons for choosing a particular technique, as well as suggest any related improvements.

BKG3453
Gas Processing & Liquefaction (E)
Credit : 3
Prerequisite : None

Synopsis

In this subject, two main parts including upstream and downstream processes of natural gas are covered. The course mainly focuses on the treatment processes involving in transforming raw hydrocarbon gas produced from offshore fields into several valuable products. In fact, the natural gas processes such as hydrocarbon gas processing, conditioning and liquefaction are vital for meeting the pipeline specifications and customer requirements. The common natural gas processes, namely; dry or steam reforming of natural gas and Fischer-Tropsch synthesis (FTS) are also discussed in this subject.

Course Outcomes

CO1: Explain the socioeconomic effects of having hydrocarbon gas industry and its related activities. Comprehend simple PFD of Gas Processing Plant for treating raw natural gas to become sales gas and NGLs.
CO2: Explain the main effect of the presence of impurities such as water, acid gases, heavier hydrocarbons and others in natural gas flow. Then, solve and decide the suitable type of treatment processes.
CO3: Explain the natural gas liquefaction process which involves refrigeration and perform related engineering calculations.

BKG3433
Gas Transmission & Distribution (E)
Credit : 3
Prerequisite : None

Synopsis

This course aims to provide fundamentals knowledge to design piping systems for oil and gas transmission and distribution. These include gas pipeline design, engineering, fabrication, installation, testing and commissioning, as well as the gas pipeline network analysis. Students will also be exposed on the requirements for installation, codes and standards used in the design and installation of gas systems. Other relevant topics such as welding, corrosion control, odorizer system and gas metering skids will also be introduced.

Course Outcomes

CO1: Design and evaluate the gas pipeline transmission and distribution system
CO2: Calculate the pressure losses in gas pipeline using several networking analysis method

CO3: Illustrate gas pipeline construction from acquiring of the right of way up to the commissioning process

BKG4463
Gas Storage & Reticulation (E)
Credit : 3
Prerequisite : None

Synopsis

This subject aims to enable students to identify various types of storing methods of liquefied petroleum gas (LPG), natural gases (NG) and liquefied natural gas (LNG). Besides that, the understanding of gas reticulation system is provided. Students will be provided with a working knowledge to design the gas storage and reticulation systems.

Course Outcomes

CO1: Explain the fundamental concepts and characteristic of LPG, NG and LNG storage systems
CO2: Analyze the gas load consumption, pipe and storage sizing, total of gas withdraw from LPG, NG and LNG storage and others related equipment
CO3: Respond with the current issues in gas storage technology and development
CO4: Design LPG, NG and LNG storage system and its accompanying piping or reticulation system

BKG3413
Combustion & Gas Utilization (E)
Credit : 3
Prerequisite : None

Synopsis

This course enables students to understand the concept of combustion, fuel properties & characteristics, explosion phenomena and other related terms. The course also cover the application of mass & energy balance calculation related to combustion products and other important requirement i.e. theoretical air ratio, flue gases etc. Students will be exposed to the burner conversion calculation & design which is applicable in industry application. Venting systems option was also being discussed base on the appropriate circumstances. The gas fuel utilization methods and system was introduced based on current scenario application.

Course Outcomes

CO1: Explain the concept of combustion, fuel properties & characteristics, explosion phenomena and other related terms.
CO2: Perform mass and energy balance in combustion system and burner conversion calculation
CO3: Classify types of gas burner and equipment, burner conversion design and related energy generated technologies
CO4: Keep abreast with the current issues in gas utilization method and system

BKC3783
Oil & Gas Technology (E)
Credit : 3
Prerequisite : None

Synopsis

This course introduces the concept of upstream, midstream and downstream activities of the oil and gas industry. By the end of this course, students should be able to identify and describe the main branches of petroleum exploration and exploitation activities such as geology, drilling, reservoir engineering and production. Students should also be able to explain the stages and process of hydrocarbon formation, how it is found and later produced. Exposure to the reservoir and production engineering calculations will be provided to illustrate the applications of engineering principles in oil and gas production activities. To complete the understanding of the oil and gas life cycle, the midstream and downstream aspects of the oil and gas industry such as, topsides facilities, refinery operations, gas processing, product transportation as well as economy aspects and current issues affecting the industry will also be covered.

Course Outcomes

CO1: Distinguish the fundamental concept of upstream, midstream and downstream
CO2: Estimate reservoir volumes and hydrocarbons in place and production calculations
CO3: Select and design separators based upon well construction, fluid properties and production scenario.
CO4: Evaluate the current issues and environmental effects in oil and gas industry

BKC3643
Industrial Safety Practices In Oil & Gas Sector (E)
Credit : 3
Prerequisite : None

Synopsis

This subject will help to increase the undergraduate student safety knowledge and awareness plus on top of that they will know the current practice in the oil and gas industries. Topics to be covered are as follows,
i) Introduction to OSHA 1994 & EQA 1974 Acts.
ii) PTW Systems i.e. cold work permit, hot work permit, vessel entry permit and excavation permit.
Iii Lock Out & Tag Out (LOTO), confined space, gas detection and energy isolation.
iv) Transportation and Distribution Safety (TDS).
v) Behavior Based Safety (BBS) and PPE.

Course Outcomes

CO1: Relates and explains the various acts / legislation governing OSHA & EQA.
CO2: Used and apply the various permits to work (PTW) systems and knows the important PTW and minimum PPE requirement in the oil & gas industries.
CO3: Distinguished the Do's & Don't of safety practices in a running oil & gas plant.

BKC3713
Process Optimization (E)
Credit : 3
Prerequisite : None

Synopsis

This subject introduces and develops techniques in formulating and solving optimization problems. Emphases will be given in optimization basics, unconstrained and constrained optimizations, linear programming, non-linear programming, and mixed integer programming. Applications of those concepts will be found in solving optimization issues in chemical processes such as heat transfer, separation, fluid flow and reactor design and operation.

Course Outcomes

CO1: Explain optimization basics and the scopes within the chemical processes
CO2: Formulate mathematical models to solve optimization problems in chemical processes
CO3: Use an optimization software i.e General Algebraic Modeling System (GAMS)
CO4: Execute, evaluate and perform sensitivity analysis for the developed optimization models

BKC3723
Advanced Process Modelling & Simulation (E)
Credit : 3
Prerequisite : None

Synopsis

This course will extend the knowledge and skills introduced in the course BKF3553 (Process Simulation and Computer Aided Design). Students will be exposed to the development and solving first principle model and empirical model of chemical process. Computational tools such as Matlab and Aspen software will be applied to solve complex problems. This subject will prepare the students with advance knowledge and skills involving modelling and simulating chemical process.

Course Outcomes

CO1: Develop and solve first principle model using Matlab and Aspen software
CO2: Develop steady state and dynamics process model related to chemical engineering and simulating it in Aspen software
CO3: Perform sensitivity analysis and optimization study for process improvement using Aspen software
CO4: Adapt positive team working behaviour

BKC3853
Process Monitoring (E)
Credit : 3
Prerequisite : None

Synopsis

This is an introductory level course of statistical-based process monitoring, which includes univariate and multivariate-based systems. The topics covered are introduction to process monitoring, statistical process control (SPC), multivariate statistical process monitoring (MSPM) and also industrial monitoring applications. In particular, the last chapter mainly exposes the students with variety applications of monitoring approaches as well as reviewing the issues of various monitoring extensions.

Course Outcomes

CO1: Critically discuss the essentials and benefits of applying process monitoring system for ensuring smooth as well as safe industrial operability
CO2: Apply as well as analyze the univariate monitoring performance based on the progression of the means and range charts of SPC framework
CO3: Comprehensively explain in writing as well as solve mathematically the principles of multivariate analysis based on complex monitoring problem of MSPM framework
CO4: Develop fault detection mechanism as well as perform investigation based on a specified case study by using Matlab
CO5: Conduct a critical review of the current industrial monitoring issues particularly on the MSPM extensions

BKC3883
Process Integration (E)
Credit : 3
Prerequisite : None

Synopsis

This course deals with the concept of process integration consisting of mass integration, heat integration and cogeneration. The course uses pinch analysis to achieve the maximum both energy and mass recovery. The course also explains the integration and combination of power and steam.

Course Outcomes

CO1: Discuss the need of chemical engineering graduates when they have to make an evaluation on energy consumption and estimate the energy recovery achievable.
CO2: Explain and propose alternative ways for energy and mass minimization and estimate the benefits for the industry.
CO3: Able to design the heat exchanger network for optimal design, the mass integration as well as the cogeneration network.

BKC4633
Polymer Design Technology (E)
Credit : 3
Prerequisite : None

Synopsis

This course is designed to provide an introduction to polymer design technology. It covers topics such as structure and elastic properties, viscoelasticity, yield and fracture, reinforced polymers, design and manufacture of polymer materials. Upon completion of the course, the students should be able to apply the essential knowledge on the polymer mechanical behaviors in designing the polymer-based products.

Course Outcomes

CO1: Explain the theoretical and conceptual basis on polymer design technology
CO2: Apply knowledge of the polymer materials, structure & properties and fracture.
CO3: Analyse the mechanical properties of polymer in the design and manufacturing process.

BKC4673
Polymer Testing & Characterization (E)
Credit : 3
Prerequisite : None

Synopsis

This course is designed to introduce students to polymer testing and characterization for material development. It will cover various testing methods, standards and codes for polymer testing by its properties. Emphasize will be given to mechanical properties, thermal properties, physical properties, chemical resistance, degradation effects, flammability properties and electrical properties. The course also includes polymer characterization with different method like spectroscopy and thermal analysis.

Course Outcomes

CO1: Describe the physical/chemical properties of the polymer materials and application.
CO2: Identify the appropriate experimental method for a particular characterization problem
CO3: Explain the basics, capabilities and limitations of structural, morphological, thermal and mechanical characterization analyses.
CO4: Develop a work plan to solve a characterization problem and utilize some specific instruments for materials characterization.

BKC4653
Polymer Technology (E)
Credit : 3

Prerequisite : None

Synopsis

This course will provide in depth knowledge of polymer science and technology. It will polymerization reaction, kinetics, reactor, synthesis and processing technique of different types of plastics, rubber and composites. It will also deal with the current issues on polymer. Upon completing this course, students will be able to explain how polymers are processed into end-products and can suggest specific applications for specific polymers.

Course Outcomes

CO1: Explain what polymers are and how they can be produced and how to control the properties of polymer
CO2: How to manufacture end product by using different manufacturing techniques
CO3: Identify different application on the basis of properties

BKC3693
Electrochemical Engineering (E)
Credit : 3
Prerequisite : None

The course will cover the fundamental principles of electrochemistry, including electrochemical thermodynamics, kinetics, and corrosion. Students will be exposed to the application of these principles in electrowinning, electrorefining, electroplating, fuel cells, batteries, and production of fine chemicals. Students will be able to perform efficiency analysis in these systems. They will also be able to understand the differences between types of fuel cells and distinguish between electrochemical and chemical energy systems. For each of the above application areas students will learn the criteria used to determine their performance, their current state of development, and their advantages/disadvantages

Course Outcomes

CO1: Apply the fundamentals of electrochemistry to develop kinetic models and to elucidate the kinetic parameters of electrochemical reactions
CO2: Design the electrochemical systems on the basis of the fundamentals of electrochemistry
CO3: Evaluate the performance of electrochemical systems

BKC3683
Wastewater Treatment (E)
Credit : 3
Prerequisite : None

Synopsis

This subject covers the basic concept of water and wastewater treatment methods that include physical, chemical, biological and advances treatment methods. The physical, chemical and biological characteristics of water and wastewater are introduced briefly in this course. The project field work will be carried out for the students to get the exposure in this field.

Course Outcomes

CO1: Explain and discuss the methods that used to characterize water and wastewater in accordance with the engineering fundamentals and environmental legislation
CO2: Analyze, estimate, compare and solve problems of water and wastewater using different methods/processing
CO3: Describe, evaluate, formulate and design of the engineered system for water and wastewater purification based on sustainable development

BKC3833
Recycling Technology (E)
Credit : 3
Prerequisite : None

Synopsis

This course aims to give a perspective on the use of chemical engineering knowledge in the recycling industry. Students will be taught on the overall issues of wastes, waste management and regulation related to it. Emphasis will be given on the awareness of recycling activities in Malaysia and other parts of the world, showing the technologies involved in doing the recycling. Students will have the opportunity to prepare and present the market survey and business plan on a chosen topic of interest in recycling of waste material in Malaysia, which require them to search for the most feasible recycling activity that can convince financial institution to finance the project. Students are also required to visit a related recycling plant to understand the nature of the business. At the end of this course, it is expected that the students will be able to appreciate the importance of recycling, the nature of recycling industry and bring the interest to them to venture into recycling business after completing their studies.

Course Outcomes

CO1: Explain, describe and interpret the issue of waste, waste management and regulation, and recycling activities
CO2: Apply knowledge of chemical engineering in developing the recycling process suitable for a specific waste material
CO3: Prepare market survey and business plan on recycling of waste material into high value added product.

BKC4683
Food Engineering (E)
Credit : 3
Prerequisite : None

Synopsis

This course is designed to introduce the applications of certain unit operations in the processing of different types of food products. The principles and methods of heating and dehydration, refrigeration and freezing, are discussed with emphasis on their applications in the processing of dairy, fruit and vegetables, eggs, poultry, meat and fish products. The course will also provide an appreciation on the importance of food packaging, food safety and hygiene.

Course Outcomes

CO1: Discuss the current status and future trends of food industry in Malaysia
CO2: Apply and analyze the principles of dehydration in food products
CO3: Discuss and elaborate on the production of refrigerated foods
CO4: Elaborate on the materials used and roles of food packaging
CO5: Discuss the importance of safety and hygiene in food production

BKC3653
Membrane Technology (E)
Credit : 3
Prerequisite : None

Synopsis

This subject is primarily to expose students to the membrane separation process which involves liquid and gas separation. The students will be taught the type of membranes (i.e. microfiltration, ultrafiltration, nanofiltration and reverse osmosis), membrane module and material, membrane manufacturing mainly for phase inversion technique other new techniques (interfacial polymerization, grafting, coating etc.) and a few concepts such as transport theory, concentration polarization, osmosis phenomenon etc. Membrane characterization and performance will be taught as well including physical characterization, number of modules, required membrane area for feed processing, etc. Some common case studies and applications will be delivered in this subject to expose the students to the current and future technology for membrane separation process (i.e. forward osmosis).

Course Outcomes

CO1: Understand the basic principle in membrane separation technology and the classification of membrane
CO2: Gain general information regarding the membrane manufacturing techniques, membrane characterization and membrane module design.
CO3: Know the current and future applications of membrane separation technique

BKC4663
Ultrasonics (E)
Credit : 3
Prerequisite : None

Synopsis

This course aims to introduce the complete fundamental physics of ultrasonics, describe in detail equipment and procedures for chemical process systems. The principles of ultrasonics operations involved in chemical processes such as cleaning, machining, forming and joining, liquid atomization and droplet formation, agglomeration and flocculation, extraction proceses, demulsification of crude petroleum, miscellaneous chemical effects and applications, electrolysis and electroplating. At the end of this course, it is expected that the students will understand theories, principles, calculation for the basic mechanisms, basic design parameters and applications of ultrasonics and are able to solve chemical engineering problems related to them.

Course Outcomes

CO1: Explain the fundamentals of frequency, intensity and power of ultrasonics
CO2: Review problems and its solving involving ultrasound processing technology
CO3: Analyze wave propagation and associated phenomena for desired ultrasound wave fields technique
CO4: Able to apply various analytical methods and operate ultrasonic horns for processing application and use of ultrasonics in non-

destructive testing of metals for chemical processes using the analytical skills, modeling skills or engineering economics

BKC3893
Scale-Up of Chemical Process (E)
Credit : 3
Prerequisite : None

Synopsis

This subject covers the aspects of scale-up of chemical and biological processes and commercialization.
The course introduces the basic concept and application of scale-up of chemical and biotechnology related processes. The topics cover in this subject are introduction to the theory of scale-up; modeling and simulation; pilot plant; reactor scale-up; unit operation scale-up; fine/specialty chemical processes scale-up.

Course Outcomes

CO1: Master the basic fundamentals of scale-up theory, and commercialization of R&D.
CO2: Acquire the analytical and modeling skills required for conversion of lab scale processes to commercial scale.
CO3: Improve communication and teamwork skills through group assignments.

DEPARTMENT OF CIVIL ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING
CURRICULUM STRUCTURE
B.ENGINEERING (HONS.) CIVIL ENGINEERING

YEAR	FIRST			SECOND		THIRD			FOURTH	
SEMESTER	FIRST	SECOND	THIRD	FIRST	SECOND	FIRST	SECOND	THIRD	FIRST	SECOND
COURSES	BAA 1112 ENGINEERING DRAWING	BAA 1912 ENGINEERING SURVEYING FIELDWORK	BAA 1131 ENGINEERING SURVEYING CAMP	BAA 2713 FLUID MECHANICS	BAA 2941 ENGINEERING LABORATORY III	BAA 3012 LAW OF CONTRACT & ESTIMATION	BAA 3213 REINFORCED CONCRETE DESIGN II	BAA 4976 INDUSTRIAL TRAINING	BAA 4023 PROJECT FOR PROFESSIONAL PRACTICES	BAA 4**3 ELECTIVE I
	BAA 1322 CONSTRUCTION ENGINEERING	BAA 1931 ENGINEERING LABORATORY I		BAA 2113 THEORY OF STRUCTURES	BAA 2513 SOIL MECHANICS & GEOLOGY	BAA 3921 ENGINEERING LABORATORY IV	BAA 3312 BUILDING SERVICES & MAINTENANCE		BAA 4513 FOUNDATION ENGINEERING	BAA 4**3 ELECTIVE II
	BAA 1113 ENGINEERING MECHANICS	BAA 1133 MECHANICS OF MATERIALS		BAA 2921 ENGINEERING LABORATORY II	BAA 2723 HYDRAULICS	BAA 2213 REINFORCED CONCRETE DESIGN I	BAA 3513 GEOTEHCNICAL ENGINEERING		BAA 3922 RESEARCH METHODOLOGY & PRE-PROJECT	BAA 4**3 ELECTIVE III
	BAA 1312 CIVIL ENGINEERING MATERIALS	BAA 1323 ENGINEERING SURVEYING		BUM 2313 NUMERICAL METHODS	BAA 2012 COMPUTER PROGRAMMING	BAA 3713 HYDROLOGY & WATER RESOURCES	BAA 3023 PROJECT MANAGEMENT IN CONSTRUCTION		BAA 4222 ENGINEERS IN SOCIETY	BAA 4914 FINAL YEAR PROJECT
	UHL 2400 FUNDAMENTALS OF ENGLISH LANGUAGE	UHM 2022 ETHNIC RELATIONS		UQ* 2**1 CO-CURRICULUM II	BAA 2123 STRUCTURAL ANALYSIS	BAA 2413 HIGHWAY & TRAFFIC ENGINEERING	UHS 2021 SOFT SKILLS II		BAA 3322 ENGINEERING ECONOMICS	UGE 2002 TECHNO PRENEURSHIP
	BUM 2123 APPLIED CALCULUS	BUM 2133 ORDINARY DIFFERENTIAL EQUATIONS		UHL 2432 ENGLISH FOR PROFESSIONAL COMMUNICATION	UHE 3**2 ELECTIVE COURSES	BUM 2413 APPLIED STATISTICS	UHF 2**1 FOREIGN LANGUAGES LEVEL II		BAA 3223 STEEL & TIMBER DESIGN	
	UHL 2412 ENGLISH FOR ACADEMIC COMMUNICATION	UHL 2422 ENGLISH FOR TECHNICAL COMMUNICATION			UHS 1021 SOFT SKILLS I		BAA3613 ENVIRONMENTAL ENGINEERING			
	UHR 1012 ISLAMIC AND ASIAN CIVILISATIONS 1				UHF 1**1 FOREIGN LANGUAGES LEVEL I					
	UQB 1**1 CO-CURRICULUM 1									
TOTAL CREDIT	17	16	1	13	16	15	16	6	15	15
TOTAL CREDIT FOR GRADUATION	**130 (MATRICULATION –SCIENCE PHYSICS/ STPM/ DIPLOMA)** **133 (MATRICULATION-LIFE SCIENCE)**									

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

COURSE SYNOPSIS B.ENG (HONS.) CIVIL ENGINEERING (BAA)

BAA1112
Engineering Drawing
Credit Hour: 2
Prerequisite: None

Synopsis

The objective of this course is to teach civil engineering students the basic skills of civil engineering drawing and drafting by using a computer-aided design and drawing software. Autodesk product AutoCAD will be used throughout the course. The AutoCAD software is one of the most widely used design and drafting tools in the world. Students will be able to gain proficiency in AutoCAD software by creating/modifying plans, drawings, or design files used for a variety of civil and environmental engineering projects. Course topics may also include works of real field examples

Course Outcome

CO1: Use Autocad to draw foundation key plan, foundation schedules, column schedules, beams key plan, slab key plan and column key plan.
CO2: Use Autocad to draw foundation and column detailing of a two-storey administration building.
CO3: Use Autocad to draw beams and slabs detailing, reinforced concrete gutters details, apron details and rain water pipe details of a two-storey administration building.
CO4: Use Autocad to draw door and window schedule detailing of a two-storey administration building.
CO5: Use Autocad to draw roof detailing, front elevation, rear elevation, left elevation and right elevation of a two-story administration building.

BAA1322
Construction Engineering
Credit Hour: 2
Prerequisite: None

Synopsis

This compulsory and basic subject will introduce the students to the world of construction industry. As an introduction, students are given information on the current situations in construction industries including the main person in-charge and their role in the project. The students will be taught the fundamental knowledge on elements involved in construction work process that would lead towards completion of strong and stable structure at the end of project. Students who are successfully complete this course will be equipped with basic and fundamental knowledge that a civil engineer should have.

Course Outcome

CO1: Explain the responsibilities of parties involved in construction project and construction work process including types of temporary work structure and equipment's used.
CO2: Explain the types of sub-structure and superstructure in building construction, retaining wall, highway and bridge construction.
CO3: Explain sustainable modern construction techniques.
CO4: Explain the application of quality control in construction project.

BAA1113
Engineering Mechanics
Credit Hour: 3
Prerequisite: None

Synopsis

The subject in Engineering Mechanics is the fundamental of all courses in engineering, which requires students to have basic knowledge in both statics and dynamics. The emphasis is on the development and correct application of the fundamental concepts of rigid body mechanics. Topics covered for both statics & dynamics are force system resultants, condition of equilibrium, centroid & moment of inertia; force & acceleration and work & energy.

Course Outcome

CO1: Analyze the concept of static mechanics system in two and three dimensions problems and solve it by applying the equilibrium condition.

CO2: Determine the location of centroid and moment of inertia for a body of arbitrary shape.
CO3: Analyze the kinematics of motion that involves force & acceleration and work & energy principle.

BAA1312
Civil Engineering Materials
Credit Hour: 2
Prerequisite: None

Synopsis

This course will enable students to demonstrate understanding in the fundamental properties of construction material. Students will learn the basic properties of cement, aggregate, water, admixtures, manufacturing of concrete, masonry, timbers, metals, and other construction materials. At the end of the course students should be able to identify the suitability of each material in a construction, analyse and provide basic solution to the problematic material, and recognize the importance of sustainability practice in construction material.

Course Outcome

CO1: Demonstrate understanding in the fundamental properties of construction materials.
CO2: Identify the suitability of one material in civil construction.
CO3: Analyze and provide solutions to the problematic material in civil construction.
CO4: Understand how the concept of sustainability applies to construction materials.

BAA1912
Engineering Surveying Fieldwork
Credit Hour: 2
Prerequisite: To be taken simultaneously with BAA1323 Engineering Surveying

Synopsis

This course will enable students learn appropriate skills to conduct practical fieldworks in the area of linear survey, theodolite traverse, levelling, topographical and site survey, curve ranging, computation and setting-out.

Course Outcome

CO1: Carry out and conduct linear survey fieldwork.
CO2: Carry out and conduct theodolite traverse survey fieldwork.
CO3: Carry out and conduct levelling survey fieldwork.
CO4: Carry out and conduct topographical and site survey fieldwork.
CO5: Carry out and conduct curve ranging, computation and setting-out survey fieldwork.

BAA1931
Engineering Laboratory I
Credit Hour: 1
Prerequisite: None

Synopsis

This ENGINEERING LAB I covers material testing. The experiments are complimentary to the theory that students have learned in the classroom and also to expose them to the practice work at the construction industry.

Course Outcome

CO1: Able to apply and conduct laboratory test and use significant and limitation of properties based on related standard requirement.
CO2: Collect, analyze and interpret experimental data.
CO3: Interact professionally among themselves and able to use communication skills to transfer their findings in a formal report format.

BAA1133
Mechanics of Materials
Credit Hour: 3
Prerequisite: Passed BAA1113 Engineering Mechanics

Synopsis

The aims of this course are the study of the behavior of engineering or structural elements subjected to loads. It is provides an introduction on elastic stress and strain analysis, axial deformations and analysis of column. Thus, properties and behavior of engineering materials including stress-strain relations. This course

also deals with the analysis of direct and torsional shear stresses and their deformation; shear force and bending moment of beam also the stresses in beams; transformations of stresses.

Course Outcome

CO1: Identify and analyze the state of stresses, strains and deformation response of elastic solids in the external loading and axially load assemblies and describe and determine the mechanical behavior of materials under load.
CO2: Illustrate and analyze the shear-moment diagrams accordingly calculate the bending and shear stress in determinate beams.
CO3: Identify and solve the principal stresses and angles in plane cases using analytical method and Mohr's circle.
CO4: Identify and calculate the stresses, deformation and twist of angle of a torsional bar.
CO5: Apply the Euler formula to determine the magnitude of the critical load of buckling column

BAA1323
Engineering Surveying
Credit Hour: 3
Prerequisite: None

Synopsis

This subject will expose to the civil engineering students the role of survey engineering in their field. The subject topics encompasses introduction to the engineering surveying, surveying equipment, measurement unit, bearing/angle and distance measurement for horizontal control, coordinate system, area & volume calculation, mass transfer diagram & mass transfer measure and the final setting out for construction work.

Course Outcome

CO1: Identify and describe the definition and the principle of engineering survey including the engineering surveying roles in civil engineering works [i.e. determination point location technique, coordinate system, read and understand the information shown in site plan].
CO2: Describe the procedure to perform horizontal and vertical control based on related provision i.e. theodolite and traversing and leveling [angle, horizontal distance and vertical distance measurement and cogo computation.
CO3: Understand the range of calculations that can be made with surveying data i.e. An ability to make a necessary calculation to fix position of forming a horizontal and vertical curve, area and volume of construction work project.

BAA1131
Engineering Surveying Camp
Credit Hour: 1
Prerequisite: Passed BAA1912 Engineering Surveying Fieldwork

Synopsis

This engineering surveying camp encompasses carrying out horizontal and vertical control survey, detailing survey to locate man-made and natural features, preparation of site plan, related computation and setting-out simple construction work.

Course Outcome

CO1: Organize a small survey work for project.
CO2: Practice the significant of survey work using engineering survey techniques based on related provision.
CO3: Use various survey instruments at site.
CO4: Write report effectively.

BAA2713
Fluids Mechanics
Credit Hour: 3
Prerequisite: None

Synopsis

To introduce the fundamental principles of fluid mechanics, the basic equations governing fluid statics and fluid flow, and the methods of solving engineering problems related to fluid mechanics

Course Outcome

By the end of semester, students should be able to:

CO1: Describe fluid properties and the fundamentals of Fluid Mechanics concept.
CO2: Analyze fluid mechanics system and devices such as capillary tube viscometer, falling ball viscometer, manometers, and piezometer.
CO3: Apply and analyze fluid mechanics theories such as Bernoulli's Theorem, Continuity Equation, Darcy-Weisbach Equation and Reynold's Number in Fluid Mechanics system.
CO4: Analyze the pipeline systems as related to civil engineering and its application for water distribution

BAA2113
Theory of Structures
Credit Hour: 3
Prerequisite: None

Synopsis

In this course students will be introduced to the analysis of statically determinate and indeterminate structures. The course covers the fundamental concepts of determining the structural stability and determinacy, analysis of statically determinate beams and frames, trusses and arches. Also to determine the deflection of beam and truss, and the analysis of indeterminate beams and frames.

Course Outcome

CO1: Analyze the deflection and slope of determinate Beams
CO2: Analyze an indeterminate beams and frames to obtain the end moments
CO3: Analyze internal forces and compute deflection of determinate plane trusses
CO4: Analyze 3-pinned arch to obtain the internal forces

BAA2921
Engineering Laboratory II
Credit Hour: 1
Prerequisite:

Synopsis

This course covers structure laboratory testing. The experiments are complimentary to the theory that students have learned in the classroom and also to expose them to the practice work at the construction industry.

Course Outcome

By the end of semester, students should be able to:
CO1: Able to apply and conduct laboratory tests and use significant and limitations of properties based on related standard requirement.
CO2: Collect, analyze and interpret experimental data
CO3: interact professionally among themselves and able to use communication skills to transfer their findings in a formal report format.

BAA2941
Engineering Laboratory III
Credit Hour: 1
Prerequisite: Taken BAA2713 Fluid Mechanics

Synopsis

This Engineering Lab III covers the laboratory testing for subjects Fluid Mechanics, Hydraulics, Hydrology & Environmental Engineering. These all experiments are complimentary to the basic theory that students have learned in the classroom and also to expose them to the practical work at the real world application in civil engineering field.

Course Outcome

On completion of this course, students should be able to:
CO1: Able to apply and conduct laboratory tests and use significant and limitations of properties based on related standard requirement.
CO2: Collect, analyze and interpret experimental data.
CO3: Interact professionally among themselves and able to use communication skills to transfer their findings in a formal report format.

BAA2513
Soil Mechanics & Geology
Credit Hour: 3
Prerequisite: BAA1113 Engineering Mechanics

Synopsis

Soil Mechanics provides students with a basic

knowledge of the fundamental concepts of soil behaviour and gives an introduction into general geotechnical engineering. The course describes: the relationship between soils and its geological origins and demonstrates the significance of the particles size distribution and mineralogy; soil description; phase relationships; classification of soil; compaction of soil; soil permeability and principle of effective stress; stress distribution and shear strength of soil.

Course Outcome

CO1: Recognize the problems given and draft the solutions by applying the soil and geotechnical fundamental.
CO2: Prepare appropriate table/graph/chart/diagram in order to overcome the problems/issues in soil.
CO3: Analyze the data, generate solutions and evaluate the results obtained.

BAA2723
Hydraulics
Credit Hour: 3
Prerequisite: BAA2713 Fluids Mechanics

Synopsis

This course introduces the concept and use of equations for open drainage and flow analyses (uniform & non-uniform flow) in open channel. It also covers the various phenomena such as hydraulic jump and backwater, specific energy and specific force concept application, analyses of hydraulics machinery principles and dimensional analysis & hydraulic similarity concepts. The application software package (such as: HEC-RAS) will be introduced in this course.

Course Outcome

By the end of semester, students should be able to:
CO1: Describe the hydraulic principles and apply the fundamental concept in analyzing uniform and non-uniform flow in open channels.
CO2: Differentiate and analyze the Rapidly Varied Flow (RVF) & Gradually Varied Flow (GVF) phenomena, then design the open channel for steady & unsteady flow cases using HEC-RAS Hydraulics Software.
CO3: Establish the dimensional analysis formulation and apply hydraulic similarity concepts in scaling analysis.
CO4: Discuss hydraulics machinery principles and apply the fundamental concepts in analyzing the performance of hydraulic pump.

BAA2012
Computer Programming
Credit Hour: 2
Prerequisite: None

Synopsis

The topics learned in this course are variables and data types, input/output instruction, assignment instruction, decision instruction, repetition instruction, functions, arrays, string and reading/writing from text files. The outcome of the course is described below.

Course Outcome

At the end of this course, the students should be able to:
CO1: Ability to write computer programs to solve computational problems.
CO2: Ability to map/visualize problems into computational framework.
CO3: Ability to read, analyze and understand computer program codes.

BAA2123
Structural Analysis
Credit Hour: 3
Prerequisite: BAA2113 Theory of Structures

Synopsis

Structure Analysis is the continuity studies of the Theory of Structures course that exposes the advanced analysis in the civil engineering structures and laboratory works. The course focuses on analyzing the column, statically indeterminate trusses, arches and cables and determines the displacement by using the Stiffness Matrix method for trusses, beams and frames. The principles and methods used to meet the objectives are drawn from prerequisite courses in mechanics, physics and mathematics.

Course Outcome

On completion of this course, students should be able to:

CO1: Determine and construct influence lines for determinate beams.
CO2: An ability to analyze the trusses to determine the internal forces and displacement of indeterminate plane trusses by using the Virtual Work Method
CO3: An ability to analyze the arches and cables to determine the reactions and internal forces in arches and cables
CO4: An ability to apply the Stiffness Matrix Method to determine the displacement in trusses, beams and Frames, hence to understand the principle of finite elements analysis

BAA3012
Law of Contract & Estimation
Credit Hour: 2
Prerequisite: None

Synopsis

The course covers topics of tendering, contract, condition of contract, contract administration/management, contract procurement, estimation, taking-off and the importance of information technology in estimation work.

Course Outcome

By the end of this course, students will have the ability to:
CO1: Describe and analyze the type of construction contracts and tender documents.
CO2: Differentiate types of contracts and propose the right suitable contract for the construction.
CO3: Describe and analyze the type of project delivery in construction.
CO4: Describe and apply the method of estimation to estimate the cost of construction projects.
CO5: Analyze and interpret the constructions data to estimate the cost involved in construction projects.

BAA3921
Engineering Laboratory IV
Credit Hour: 1
Prerequisite: BAA2513 Soil Mechanics & Geology, BAA2413 Highway & Traffic Engineering

Synopsis

This Engineering Lab IV covers Highway & Traffic and Soil Mechanics & Geotechnical laboratory testing. The experiments are complimentary to the theory that students have learned in the classroom and also to expose them to the practice work at the construction industry.

Course Outcome

CO1: Able to apply and conduct laboratory tests and use significant and limitations of properties based on related standard requirement.
CO2: Collect, analyze and interpret experimental data.
CO3: Interact professionally among themselves and able to use communication skills to transfer their findings in a formal report format.

BAA2213
Reinforced Concrete Design I
Credit Hour: 3
Prerequisite: BAA2113 Theory of Structures

Synopsis

This course covers the introduction of reinforced concrete design, the limit state principles, ultimate strength analysis and flexural design. Shear, bond and torsion, analysis and design of beams and solid slab, staircases and introduction to axial column design. Using codes require for design and detailing. Group design project for double story house.

Course Outcome

By the end of this course, students will have the ability to:
CO1: Analyze first principle for single and double reinforced concrete beam and design reinforced concrete beam in accordance to the relevant codes of practice in building design.
CO2: Analyze, design and detail reinforced concrete slab in accordance to the relevant codes of practice in building design.
CO3: Analyze, design and detail reinforced concrete staircase in accordance to the relevant codes of practice in building design.
CO4: Analyze, design and detail reinforced

concrete non-slender column in accordance to the relevant codes of practice in building design. 5. Design project of a double story house in group as project team work and apply relevant code of practice, manuals and software in the design and detailing of structural components in reinforced concrete structures.

BAA3713
Hydrology & Water Resources
Credit Hour: 3
Prerequisite: BAA2713 Fluids Mechanics

Synopsis

This course will be introduced the application of hydrological theory to solve problem in water resources engineering. The knowledge in hydrology will be used in planning, development, management and design of water resources project. This course also introduces the knowledge of reservoir management, engineering economy and determination of water demand requirement in water resources planning.

Course Outcome

By the end of semester, students should be able to:

CO1: Define and explain the basic concept of hydrology processes.
CO2: Analyze and solve rainfall, stream flow, flow routing, runoff, hydrograph, groundwater, evapotranspiration and infiltration problems using various methods.
CO3: Estimate peak discharge and propose urban drainage dimensions using MASMA (Urban Storm water Management Manual for Malaysia) and Probability Distribution.
CO4: Describe the physical characteristics of reservoir and propose the yield, capacity & reliability of reservoir.
CO5: Explain and analyze the elements in water resources planning such as the economic and financial feasibility of engineering projects and computation of water requirement for irrigation.

BAA2413
Highway & Traffic Engineering
Credit Hour: 3
Prerequisite: None

Synopsis

This course is designed to introduce students on the basic understanding of highway & traffic engineering with an emphasis on the design standards that being used in Malaysia. Topic covers are Malaysian Road Network, Traffic Engineering Studies which includes fundamentals principles of traffic flow and Highway Capacity Analysis, Traffic Signal System, Road Geometric Design, Pavement Design and Pavement Management System.

Course Outcome

At the end of this course, the students should be able to:

CO1: Classifying various types of road and highways within road network system, recognize how different road user groups interact and the consequence for traffic engineering.
CO2: Explaining speed, volume and density relationship, analyzing highway capacity and LOS for interrupted and uninterrupted flow.
CO3: Carry out fundamentals of Road Geometric Design allowing for different terrains, horizontal and vertical alignments.
CO4: Identify the properties of pavement materials, its structural and characteristics, design the pavement according to the principle, evaluate pavement deterioration and assess alternative maintenance schemes for highways including surface and sub-surface drainage system.

BAA3213
Reinforced Concrete Design II
Credit Hour: 3
Prerequisite: BAA2213 Reinforced Concrete Design I

Synopsis

This course covers the design of column, foundation, retaining wall and introduction to prestressed concrete design and also typical design of a reinforced concrete building under the design project.

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

Course Outcome

On completion of this course, students should be able to:
CO1: Analyze structure framing and design reinforced concrete columns.
CO2: Analyze and design shallow foundations.
CO3: Analyze and design reinforced concrete cantilever retaining walls.
CO4: Describe the application and design of prestressed beams.
CO5: Design a four story building project.

BAA3312
Building Services & Maintenance
Credit Hour: 2
Prerequisite: None

Synopsis

This course will provide the fundamental knowledge of engineering design of the building services and maintenance in building through a specific design project

Course Outcome

At the end of this course, the students should be able to:
CO1: Design and illustrate air flow system to the building by applying physical fundamentals of ventilation in building
CO2: Apply Application of Electrical Distribution Network System and Design a lighting and electrical application in a building system and Housing Development Area.
CO3: Apply appropriate techniques and analyses to the effective design of both drainage & sewerage systems in single building and Housing Development Area
CO4: Able to Calculate and design the water demand and pipe sizing systems for the water supply Housing Development Area.
CO5: Able to recognise and Design Fire Prevention & Fire Fighting System in Building

BAA3513
Geotechnical Engineering
Credit Hour: 3
Prerequisite: BAA2513 Soil Mechanics & Geology

Synopsis

Geotechnical Engineering provides students with further discussion and explanation related to soil engineering. The course describes: Soil compression, consolidation and settlement, Lateral pressure of soil, Slope stability, bearing capacity of soil, Site Investigation and environment geotechnics.

Course Outcome

CO1: Describe the principal tests used to determine the compressibility parameters of soil and calculate consolidation, time for settlements of a foundation and embankment.
CO2: Describe theory of earth pressure and apply the theory in calculation and design of earth retaining wall structure.
CO3: Describe theory and calculate slope stability using slip surfaces and method of slices.
CO4: Describe theory and calculate the shear strength of soil
CO5: Describe the purpose and basic principle of soil investigation
CO6: Describe the purpose and basic principle of environmental geotechnics in civil engineering

BAA3023
Project Management in Construction
Credit Hour: 3
Prerequisite: None

Synopsis

To introduce the concept of project management which will cover the life cycle of the projects, roles of project manager, type of project organization, resources management, techniques of planning and scheduling, monitoring and controlling and types of software for project planning and scheduling that have been practiced in construction industry.

Course Outcome

CO1: Explain the concept of project management and project life-cycle.
CO2: Describe and explain role of project manager as an important person in construction project.
CO3: Describe and explain role of project manager as an important person in construction project.

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

CO4: Differentiate and apply methods and techniques of resource management.
CO5: Examine and apply the appropriate techniques of project planning, scheduling, monitoring and controlling.

BAA3613
Environmental Engineering
Credit Hour: 3
Prerequisite: None

Synopsis

This course is an introduction to the different aspects of environmental engineering. The course outline is divided into six main topics: Water Quality, Water Treatment Engineering, Wastewater Treatment Engineering, Water Pollution, Air Pollution, Noise Pollution and Solid Waste Management in which contemporary issues and principles of sustainable development are highlighted.

Course Outcome

On completion of this course, students should be able to:
CO1: Able to classify water samples by analyzing relevant water quality parameters
CO2: Able to establish each phase of the potable water treatment process in detail
CO3: Able to design a simple wastewater treatment system
CO4: Able to evaluate the sources of solid waste, air, noise and water pollution as well as the measures that may be taken to sustainably deal with them.

BAA4976
Industrial Training
Credit Hour: 6
Prerequisite: BAA3023 Project Management in Construction, BAA3012 Law of Construct & Estimation, BAA3513 Geotechnical Engineering, BAA2723 Hydraulics, BAA2213 Reinforced Concrete Design I

Synopsis

This course involves placement of students in relevant industry for approximate 10 weeks duration to get real-world working experience. Every student will be assigned an advisor/lecturer from the faculty who will co-operate with the industrial counterpart. At the end of the industrial training, students need to submit report. In addition, the respective industrial counterpart need to evaluate and provide comments on the students performances. CIDB structured module will be used as a part of evaluation.

Course Outcome

On completion of this course, students should be able to:
CO1: Behave according to organizations regulation and procedures while performing to basic professional skill during the available duration.
CO2: Practice and contribute taught theories to solve real time problem through involvement in various scopes of works such as planning concept, design, construction & project administration.
CO3: Adjust to professional and quality work ethics in order to become an effective, motivated and responsible engineer.
C04: Communicate effectively on complex civil engineering activities such as being able to comprehend and write effective reports and design documentation and make effective presentations.

BAA4023
Project for Professional Practices
Credit Hour: 3
Prerequisite: BAA2113 Theory of Structures, BAA3213 Reinforced Concrete Design II

Synopsis

This course is a Capstone Design Project that offering experience in multidisciplinary project-based learning. This course is design to ensure minimum proficiency and equipment of the upcoming graduate. This course is conducted with numbers of partners from industry which is involve the engineer, architect, surveyor, town planner, contractor, etc. in the direction of giving real exposure to the student. This course provides an opportunity for students to integrate and apply their knowledge learn in the class. This course comprises a comprehensive group design project and a series of seminars from expert.

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

Course Outcome

On completion of this course, students should be able to:
CO1: Able to develop and propose planning layout for new development area that fulfilling all the necessary requirement from local authorities
CO2: Able to design, construct and scheduling proper planning for the new project development
CO3: Able to design and produce structural detailing
CO4: Able to estimate the costing for the project
CO5: Able to generate proposal for project development
CO6: Able to justify all the proposal in final presentation

BAA4513
Foundation Engineering
Credit Hour: 3
Prerequisite: BAA3513 Geotechnical Engineering

Synopsis

Focuses on geotechnical design of shallow and deep foundations, including spread footings, mats, driven piles, and drilled piers. Coverage includes bearing capacity, settlement, group effects, and lateral load capacity of the various foundation types. Additional topics include subsurface exploration, construction of deep foundations, and analysis of pile behavior using wave equation and dynamic monitoring methods.

Course Outcome

On completion of this course, students should be able to:
CO1: Designing Shallow Foundation based on Bearing Capacity Analysis
CO2: Designing Shallow Foundation Based on Settlement Analysis
CO3: Mat Foundation
CO4: Designing Pile Foundation
CO5: Designing Sheet Pile
CO6: Designing Braced Cuts

BAA3922
Research Methodology & Pre-Project
Credit Hour: 2
Prerequisite:
1. Student Year 3 and above
2. Subject related to the research area must be taken before registering for Research Methodology & Pre-Project (BAA3922)

Synopsis

Students are required to attend a research workshop at the beginning of the course, where they will be taught on how to do research; research methodology, conducting literature review, data sampling, collection, analysis, and interpretation. Students will be guided by their respective supervisors on how to plan for the research, which will be conducted later in PSM 2 course. Students will have to carry out weekly discussion with their supervisors on the research topic, objective, scope, research program, and the extent of the development of the research proposal. A report and a presentation of the research proposal are required at the end of the course.

Course Outcome

At the end of this course, the students should be able to:
CO1: Select topic, identify the objectives, categorize the scope of works and prepare schedule for the implementation of a civil engineering related projects
CO2: Choose, review, discuss and interpret issues and problems related to particular project by conducting adequate literature review.
CO3: Choose, propose, employ, and develop or formulate the appropriate methodology to carry out the experiment and or data collection as to achieve the objectives of an engineering project.
CO4: Demonstrate, describe, discuss, illustrate, argue and predict about the selected topic, objectives, project approach, schedule, budget and expected outcomes for an engineering project in an oral presentation.
CO5: Solve and meet all deadlines and project commitments.

BAA4222
Engineers in Society
Credit Hour: 2
Prerequisite: None

Synopsis

Qualified engineers of tomorrow will need to be market conscious, commercially adept, environmentally sensitive and responsive to needs of society. They must also be good communicators, organizers and managers. Therefore, this course is designed to enrich the students and intended to introduce them to the professional practice of civil engineering, with emphasis on the roles of practicing engineers, professional practice organization, engineering ethics, professional registration and communication skills.

Course Outcome

This course will cover three scopes which is technology in society, organization of engineering society and communication. The course features several guest speakers and all are civil engineering practitioners and professional, providing the students an opportunity to interact with professionals in their major field of interest.

CO1: Adopt and show concern to professional, regulation and ethical responsibilities.
CO2: Ability to function as an individual, member or leader in diverse teams and multi-disciplinary settings
CO3: Ability to communicate effectively and write effective reports and make effective presentation
CO4: Adopt and show concern the relationship between technology, engineering, and safety issues
CO5: Ability to apply the aspects of project management and quality in engineering

BAA3322
Engineering Economics
Credit Hour: 2
Prerequisite: None

Synopsis
This subject covers the principles and applications of economic analysis in the field of engineering to make sound decision among alternatives.

Course Outcome

By the end of semester, students should be able to:

CO1: Realize the importance and role of economic decision in final decision making process of engineering project.
CO2: Identify the sources of data, and analyze the cost and benefit (financial matter) of engineering project.
CO3: Analyze the time value of money problem and apply the principles and techniques of engineering economics for effective decision making among alternatives.

BAA3223
Steel & Timber Design
Credit Hour: 3
Prerequisite: BAA2123 Structural Analysis

Synopsis

This course covers the analysis and design steel structures toEC3 for beams, column, connections, trusses, compression members and tension members. This course is also covered an introduction to Timber design to MS544.

Course Outcome

At the end of this course, the students are expected to fulfil the following course outcomes:

CO1: Analyse & design beam according to the relevant code of practice in building design.
CO2: Analyse & design column according to the relevant codes of practice in building design.
CO3: Analyse & design steel trusses in according to the relevant codes of practice in building design.
CO4: Analyse & design steel connection in according to the relevant codes of practice in building design.
CO5: Analyse and design a typical timber structure
CO6: Communicate effectively within a team designing a multi-story steel building project using appropriate design software and modern tools to produces a report and present the project according to a given time.

BAA4413
Transportation Engineering
Credit Hour: 3
Prerequisite: None

Synopsis

This course is designed to introduce students to fundamental aspects in transportation engineering.

The topics covered include four step travel demand models, traffic management and public transport.

Course Outcome

At the end of this course, the students should be able to:

CO1: Evaluate transport related problems using theoretical and/or practical calculations and observations.
CO2: Assess the performance of infrastructure or public service provision and recommend improvement

BAA4233
Finite Element Analysis
Credit Hour: 3
Prerequisite: BAA2123 Structural Analysis

Synopsis

This course will expose to students various techniques in analyzing common structures using stiffness methods, truss equations and beam equations. Students are taught how to analyze frame structures using frame and grid equations. In addition, finite element analysis procedures such as plane stress, plane strain stiffness equations and linear-strain triangle equations will be delivered in class. Axisymmetric elements and isoperimetric formulations are second last topic for this course. Towards the end, students will learn various ways in analyzing three-dimensional stress and use finite elements software - ANSYS to solve structural engineering problems.

Course Outcome

CO1: Able to analyze common structures using stiffness methods, truss equations and beam equations.
CO2: Able to analyze frame structures using frame and grid equations
CO3: Able to analyze finite element using plane stress, plane strain stiffness equations and line restrain triangle equations
CO4: Able to analyze axisymmetric elements and isoperimetric formulations
CO5: Able to analyze three-dimensional stress and use finite elements software - ANSYS to solve structural engineering problems

BAA4253
Bridge Engineering
Credit Hour: 3
Prerequisite: BAA2213 Reinforced Concrete Design I

Synopsis

This course covers on prestressed concrete bridge design, prestressing system, loss of prestress for bridge beams, analysis and design of section for flexural, shear and also principles and design of prestressed concrete members for prestressed concrete bridge. The course also covers prestressed concrete one-way slab and two-ways slab design for prestressed concrete bridge.

Course Outcome

CO1: Able to design prestressed concrete beam with prestressing tendon for bridges
CO2: Able to design deck slabs and calculate prestressed losses, deflection, camber for concrete bridges
CO3: Able to design piers and shear reinforcement for concrete bridges
CO4: Able to design anchorages, pile caps and foundations for bridges
CO5: Able to conduct overall design for serviceability limit state and ultimate limit state and use CIVILFEM softwares for bridges design

BAA4313
Geographical Information System
Credit Hour: 3
Prerequisite: None

Synopsis

The goal of this course is to give knowledge and understanding about application of GIS in Civil Engineering. The main content of this course is about an application of GIS in Civil Engineering. Amongst the main topics discussed are:

1. Fundamental and development of GIS in civil engineering
2. Data processing such as data capture, data management, spatial analysis, data manipulation and data output.
3. Current application of GIS (focus in Malaysia)

Course Outcome

By the end of semester, students should be able to:

CO1: Student will be able to identify and describe the main component of GIS and advantages of GIS in civil engineering.
CO2: Student will be able to explore about the data capture, processing and organization spatial data.
CO3: Student will be able to analyze and solve the spatial problem.
CO4: Student will be able to use GIS software.

BAA4323
Building Information Modelling
Credit Hour: 3

Synopsis

This course focuses on theoretical and technical knowledge of Building Information Modelling (BIM). The theoretical aspect emphasises on the fundamental concept of BIM. It covers the three crucial elements of People, Process and Technology. In the process element, the student will learn about the different stages of BIM delivery. Additionally, BIM standards and BIM manual of work process are also be included to provide a better understanding. In the people elements, the focus of teaching concentrates on different responsibilities of BIM associated roles. It covers the function of each role to deliver the BIM scope of work effectively. Lastly, the technology elements focus specifically on the technical aspect of BIM. It will covers four interconnected activities of delivery to use 3D Parametric Authoring Tools. (INPUT, SETUP, MODELLING, OUTPUT) . At the end of the class, the students should be able to produce 3D Information rich BIM models.

Course Outcome

On completion of this course, students should be able to

CO1: Analyze complex engineering structures using truss, beam, plane stress and plane strain equations for static and dynamic structural analysis, heat transfer, fluid flow and electrostatic analysis
CO2: Apply finite element techniques to perform simulations of structures subjected to static and dynamic loading, heat transfer, and fluid flow through porous media
CO3: Analyze complex engineering structures using Finite Element Software
CO4: Develop finite element formulations as well as solution algorithms for various types of analyses, structural elements and materials

BAA4253
Soil Improvement
Credit Hour: 3
Prerequisite: BAA2513 Soil Mechanics & Geology, BAA3513 Geotechnical Engineering

Synopsis

This course deals with the principles of ground improvement and soil stabilization. Among the topics covered are mechanical compaction, preloading and vertical drain, dynamic deep compaction, vibrio compaction and replacement, grounding, deep soil mixing, earth reinforcement, tiebacks, soil nailing and sustainability in ground improvement.

Course Outcome

At the end of this course, students should be able to:

CO1: Apply the principles, application and design procedure for various soil methods.
CO2: Calculate theoretical/numerical calculation and field observation of performance to evaluate rationality of a particular soil/ground improvement procedure applied.
CO3: Evaluate alternative solutions and evaluate their effectiveness in solving problems.

BAA4723
Applied Hydraulics Engineering
Credit Hour: 3
Prerequisite: BAA2723 Hydraulics

Synopsis

This course is to provide students with the advanced principles in applied methods towards hydraulic problems. It covers application and analysis of urban storm water facilities, sedimentation processes and erosion problems which will equips the students with the skills on techniques of hydraulics analysis. Few examples and case studies from the MSMA 2nd Edition

will be introduced as a guideline to assist and expose student in real world applications.

Course Outcome

CO1: Define and analyze the hydraulics concept of uniform and non-uniform flow in open channels and the hydraulics machinery principles
CO2: Apply and design the roof property drainage, rainwater harvesting system and on-site detention facilities
CO3: Classify and determine the pavement drainage and the drain and swales for urban storm water management
CO4: Identify and analyze the sedimentation & erosion process and recommend the suitable erosion & sediment control plan (ESCP).
CO5: Define and calculate scour at piers and abutments.
CO6: Classify and discover the characteristics and application of hydraulics structures in various water related project

BAA4833
Business for Engineering and Construction
Credit Hour: 3
Prerequisite: None

Synopsis

The module provides an introduction to Business Skills for Engineers in Construction practice. It highlights how management theory and established practice. It highlights how management theory and established practice and procedures are applied to support the non-core business of an organisation. It also develops an understanding of the requirement of a contractor in relation to the management of services which support an organisation.

Course Outcome

CO1: Apply Business philosophy in Construction Sector relate to construction economy, market system and basic concept of economy in the market system.
CO2: Explain the related legal system in the country and their potential contribution to construction environment.
CO3: To evaluate the project management life cycle, construction accounting and financial management used this in making decision and sets out to explain this key aspect of business.
CO4: To evaluate the potential enhancements to systems and techniques
CO5: Analyses overall project planning and cash flow analysis for construction project.

BAE4443
Waste Management
Credit Hour: 3
Prerequisite: None

Synopsis

Waste management is the module focuses on waste management such as solid waste management. In this module student will be exposed on the regulation, processes and design for safe waste management begin from generation, storage, and transportation until disposal of solid waste. In this subject, the students will be introduced to the sustainability technique of waste management such as the application of Life Cycle Assessment (LCA). It is important for student to learn and understand this subject in order to develop clean and safe environment for human and health.

Course Outcome

CO1: Apply the engineering fundamental for solving practical waste management challenges
CO2: Demonstrate their ability to research existing and emerging technologies for the treatment of waste and recovery of value from waste.
CO3: Apply the role of decision making tools in the assessment of waste issues such as Life Cycle Assessment (LCA) and appreciate the role of recycling.
CO4: Summarize the increasing importance of waste management in achieving environmental sustainability and able to demonstrate waste minimization and monitoring system in solid or hazardous waste for environmental concern and public health.

BAE4483
Advanced Water and Wastewater Treatment
Credit Hour: 3
Prerequisite: BAA3613 Environmental Engineering

Synopsis

This course aims to extend and deepen the scope of the water and wastewater treatment engineering. The purpose of this course is to provide and educate students the theory and practices of advanced technologies for water and wastewater treatment. The syllabus is designed to include the topics on water treatment engineering (water characteristics, water quality, conventional water treatment process, advanced water treatment technologies and water reuse) and wastewater treatment engineering (wastewater characteristics, effluent quality standard, conventional wastewater treatment process, advanced wastewater treatment technologies and wastewater reuse.

Couse Outcome

CO1: Apply the fundamental of engineering to solve the engineering problems related to water and wastewater process engineering.
CO2: Analyse the requirement and system design which address practical of advanced technology for the treatment of water
CO3: Analyse advanced wastewater treatment components and systems to determine overall process and individual unit effectiveness
CO4: Evaluate the increasing importance of water and wastewater management in achieving environmental sustainability

BAE4813
Advanced Hydrology & Water Resources
Credit Hour: 3
Prerequisite: BAA3713 Hdrology & Water Resources

Synopsis

This course is to provide students with the knowledge in advanced hydrological methods towards water resources problems. It equips the students with the skills on techniques of hydrological and water resources data analysis, modelling and prediction. This course begins with advanced methods in runoff model, hydrograph analysis and flood routing analysis. Other topics will be covered are probability and frequency analysis, the introduction of Urban Storm water Management Manual for Malaysia (MSMA) in storm water quantity control and water resources management including water uses, policy and regulation, system and economics analysis of water resources system. The knowledge in this course will be used in planning, development, management and design of water resources project.

Course Outcome

CO1: Apply and analyse the rainfall runoff relationship and flow routing using multiple components and methods
CO2: Analyse and evaluate the various approaches in probability and frequency distribution in the hydrological data analysis
CO3: Analyse and design the storm water quantity control such as detention pond and infiltration facilities using Urban Storm water Management Manual for Malaysia Second Edition (MSMA2) and software
CO4: Evaluate and relate the characteristics and applications of water resources management in various water related projects

BAA4533
Peat Soil Engineering
Credit Hour: 3
Prerequisite:

Synopsis

This course deals with recognizing and understanding the behaviour of tropical peat soil in comparison to mineral type of soils. Because of the increasing demand to utilize marginal sites due to economic, political or/and environmental reasons, peat and organic soil has been a part of many present day civil engineering projects. This is especially true for the modern day urban development. A civil engineer is often required to have general knowledge in this aspect.

Course Outcomes

CO1: Understand the principles, applications, and design procedures for various types of peat and organic soil conditions.
CO2: Investigate rationality of a particular peat and organic soil improvement procedure applied using analytical/theoretical/numerical calculations and field observations of engineering performance.
CO3: Evaluate alternative solutions and their effectiveness before, during and after construction in peat ground.

BAA4273
Earthquake and Wind Engineering
Credit Hour: 3
Prerequisite:

Synopsis

This course enables students to understand the mechanism of earthquake and its hazard. The damages on buildings caused by earthquake as well as seismic design for reinforced concrete building also will be covered in this course. Students also will be exposed to the meteorological of wind and its effect of buildings and environmental. Besides, this course also covering the simulation and design considering wind load. In order to give better understanding and practice, students will conduct group project to design four to ten storey reinforced concrete building with consideration of wind and seismic load.

Course Outcomes

Describing the earthquake and wind hazard and their impact on buildings and environment.

CO1: Investigation and design of reinforced concrete beam and column with seismic provision to Eurocode 8.

CO2: Analyze and design four to ten story reinforced concrete building with earthquake and wind load consideration by using computer software.

CO3: Developing the design response spectrum using simple programing and exposure to computational fluid dynamic.

DEPARTMENT OF ELECTRICAL ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING
CURRICULUM STRUCTURE
BACHELOR OF ELECTRICAL ENGINEERING (ELECTRONICS)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND		FIRST	SECOND
	BEE1133 CIRCUIT ANALYSIS 1	**BEE1143** CIRCUIT ANALYSIS 2	**BEE1313** INSTRU-MENTATION & MEASUREMENTS	**BEE2122** PROJECT MANAGEMENT	**BEE2223** MICRO-PROCESSOR	**BEE3133** ELECTRICAL POWER SYSTEMS	**BEE3805** INDUSTRIAL TRAINIG (LI) 10 WEEKS	**BEE4323** EMBEDDED CONTROLLER TECHNOLOGY	**BEE4**3** (ELECTIVE 3)
	BEE1931 BASIC ELECTRONICS INSTRU-MENTATION	**BEE1213** DIGITAL ELECTRONICS	**BEE2123** ELECTRICAL MACHINES	**BEE2143** SIGNALS & NETWORKS	**BEE3113** ELECTRO-MAGNETIC FIELDS THEORY	**BEE3233** ELECTRONICS SYSTEM DESIGN		**BEE4413** DIGITAL SIGNAL PROCESSING	**BEE4**3** (ELECTIVE 4)
	BEE1971 LOW VOLTAGE ELECTRICAL INSTALLATION	**BEE1233** COMPUTER PROGRAMMING	**BEE2213** ANALOG ELECTRONICS 1	**BEE2233** ANALOG ELECTRONICS 2	**BEE3313** PRINCIPLES OF CONTROL SYSTEMS	**BEE3333** INTEGRATED ENGINEERING DESIGN		**BEE4**3** (ELECTIVE 1)	**BEE4**3** (ELECTIVE 5)
	BUF1113 BASIC PHYSICS	**BEE1332** FUNDAMENTAL OF ENGINEERING	**BEE1951** TECHNICAL DRAWING	**BEE2331** ENGINEERING COMPUTER LITERACY	**BEE3413** PRINCIPLES OF COMMUNICATION SYSTEMS	**BEE3942** MICRO-CONTROLLER PROGRAMMING & INTERFACING		**BEE4**3** (ELECTIVE 2)	**BEE4724** ENGINEERING PROJECT 2
	BUM2133 ORDINARY DIFFERENTIAL EQUATION	**BUM2123** APPLIED CALCULUS	**BEE1961** MOTOR CONTROL	**BEE2332** ENGINEERING ECONOMICS	**BEE4213** MULTIMEDIA TECHNOLOGY & APPLICATIONS	**BEE4632** MAINTENANCE TECHNOLOGY		**BEE4712** ENGINEERING PROJECT 1	
	UHL2412 ENGLISH FOR ACADEMIC COMMUNICATION	**UHL2422** ENGLISH FOR TECHNICAL COMMUNICATION	**UHS1021** SOFT SKILLS 1	**BEE2931** BASIC PLC	**BEE1611** OSH	**BEE4642** ENGINEERS & SOCIETY		**UGE2002** TECHNO-PRENEURSHIP	
	UHR1012 ISLAMIC AND ASIAN CIVILIZATIONS	**UHF11*1** FOREIGN LANGUAGE LEVEL 1	**UHL2432** ENGLISH FOR PROFESSIONAL	**BEE2971** IED PRINCIPLE	**UHS2021** SOFT SKILLS 2	**UHM2022** ETHNIC RELATIONS			
	UQB11** CO-CURRICULUM 1	**UQ*2**1** CO-CURRICULUM 2	**BUM2313** NUMERICAL METHODS	**UHF2**1** FOREIGN LANGUAGE LEVEL 2					
				BUM2413 APPLIED STATISTCS					
TOTAL CREDIT	**17**	**17**	**17**	**17**	**17**	**17**	**5**	**16**	**13**
TOTAL CREDIT FOR GRADUATION	**136**								

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

SYNOPSIS OF PROGRAMME COURSES

BACHELOR PROGRAMME COURSE SYNOPSIS

BEE1133
Circuit Analysis I
Credit: 3
Pre-Requisite: None

Synopsis

This course introduces the basic concepts and engineering methods of DC circuit analysis. The contents include Ohm's Law, Kirchhoff's Law, series and parallel circuits, Mesh and Nodal analysis, Superposition, Source Transformation, Thevenin's and Norton's theorems, Capacitor, Inductor and responses of First Order circuits.

Course Outcomes

CO1	Attribute the basic concepts of electrical quantities by using basic circuit laws (Ohm's law and Kirchhoff's law) and simplification of resistive circuits.
CO2	Analyze DC circuit problems using circuit theorem, nodal analysis and mesh analysis.
CO3	Attribute the basic concepts of capacitance and inductance and analyze the characteristic of natural and step response in first order circuits.
CO4	Construct DC electric circuits to apply the concept of electrical quantities and verify circuit theorems.
CO5	Demonstrate the role of individual in the team to achieve task completion.

BEE1143
Circuit Analysis II
Credit: 3
Pre-Requisite: BEE1133

Synopsis

This course provides the basic concepts and engineering methods of AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, second order circuit and Balanced 3-phase circuits are also covered.

Course Outcomes

CO1	Analyze AC circuit problems using nodal, mesh, Superposition, Source Transformation, Thevenin and Norton.
CO2	Perform AC steady-state power calculations, power triangle, power factor correction and 3-phase.
CO3	Analyze variation RLC circuits.
CO4	Apply the theorems and concepts in order to analyze any given linear electric circuit.
CO5	Work in a team and communicate effectively.

BEE1213
Digital Electronics
Credit: 3
Pre-Requisite: None

Synopsis

This course emphasizes on the fundamental of digital electronics. The student is first taught about the number system and logic gates before introducing them to digital IC technology. Then they are exposed to both combinational logic network and combinational MSI logic. In concurrence with this, the fundamental of sequential logic, flip-flop, counter and shift register will be taught. Finally, the memory devices are introduced.

Course Outcomes

CO1	Explain and apply various techniques for digital logic fundamental, sequential logic system, and memory devices.
CO2	Analyze sequential logic system in designing counter, shift register and MSI logic circuit.
CO3	Construct and apply various techniques in designing combinational and sequential logic system.

BEE1233
Computer Programming
Credit: 3
Pre-Requisite: None

Synopsis

This course presents the C programming language for electrical & electronics engineer. The contents emphasis not only on the theoretical knowledge of programming but also the practical implementation in real-life

situation. Students will learn basic structure of computer programming.

Course Outcomes

CO1 Identify the basic principles and concept of computer programming to solve the basic problem with utilization the knowledge of mathematics & sciences.
CO2 Apply structure programming technique and develop a computer program using high level programming language to solve a problem.
CO3 Demonstrate a solution using computer programming techniques and tools for solving engineering problems.

BEE1313
Instrumentation & Measurement
Credit: 3
Pre-Requisite: None

Synopsis

This course introduces students to the principles of instrumentation and measurements, determination of error that caused by the meters. The students will be exposed to the architecture and the operation of DC and AC meters, oscilloscope, signal generator, sensors and transducers, analysis of DC and AC meters and introduction to signal conditioning.

Course Outcomes

CO1 Explain the basic concept of Instrumentation & measurement system including the operations and calculations of AC & DC meters, oscilloscope, and signal generator.
CO2 Analyze measuring devices and signal conditioning based on amplifier, protection circuit, bridge circuit and filters.
CO3 Construct the operation of meters, measuring devices or signal conditioning circuits into trainer board and interpret the experimental results into report.
CO4 Differentiate the functional role of individual towards task accomplishment.

BEE1332
Fundamental of Engineering
Credit: 2
Pre-Requisite: None

Synopsis

This course introduces the basic understanding of engineering. The contents include, thermodynamics, some electrical and electronics engineering basics, static-dynamic systems, and special topic on electrical safety. This course promotes self-exploration on some of the basic principles of engineering.

Course Outcomes

CO1 Understand the basic of engineering profession with basic thermodynamics.
CO2 Demonstrate knowledge and understanding of basic of electrical and electronic engineering, and static-dynamic systems.
CO3 Identify and analyze with research/literature of electrical safety as a case study.

BEE1611
Occupational Safety & Health
Credit: 1
Pre-Requisite: None

Synopsis

The course aims to ensure worker safety and health by working with employers to create better working environments. Outreach, education and compliance assistance enable OSHA to play a vital role in preventing on-the-job injuries and illnesses. At the end of this course, students will be able to establish safety and health programs and identifying and correcting workplace hazards.

Course Outcomes

CO1 Interpret the legislative requirement and its liabilities under OSHA 1994.
CO2 Explain the principles of good housekeeping.
CO3 Conduct the vulnerability analysis of Emergency Response Plan and Interpret the emergency management plan.
CO4 Response to medical emergencies in safer manner.

BEE1931
Basic Electronics Instrumentation
Credit: 1
Pre-Requisite: None

Synopsis

This course will introduces students to basic electronics circuit development, implementing

basic measurements, use electronics design/simulation software and familiarizing the student with electronic instrumentation such as power supply, function generator, digital multimeter and oscilloscope.

Course Outcomes

CO1 Recognize and construct basic electronics components.
CO2 Measure basic electronics parameters.
CO3 Utilize electronics instrumentation and measurement tools.
CO4 Expose to electronics design/simulation software.

BEE1951
Technical Drawing
Credit: 1
Pre-Requisite: None

Synopsis

This course covers theoretical knowledge and practical-based on doing technical drawing by using mainly AutoCAD software. The course is focusing on the fundamental level of AutoCAD from scratch until the plotting technique. The students will be guided and exposed to technical drawing knowledge as well as electrical, electronic, geometrical and isometric drawing.

Course Outcomes

CO1 Apply the principles of technical drawing with utilization of knowledge of drawing and modifying techniques in AUTOCAD.
CO2 Construct electrical engineering schematic drawing using AUTOCAD.
CO3 Sketch electronic circuit using AutoCAD software.
CO4 Follow basic commands in AutoCAD to draw technical drawing.
CO5 Practice usage of AutoCAD software in other engineering discipline.

BEE1961
Motor Control
Credit: 1
Pre-Requisite: BEE1971

Synopsis

This course exposes students to various types of three phase induction motor starter circuit. The students also will learn about the principle of electrical motor and its protection system.

Course Outcomes

CO1 Illustrate the function, types and components of electrical motor.
CO2 Distinguish the different method of motor starter circuit.
CO3 Construct difference method of motor starter circuit.
CO4 Manipulate various type of tool and electrical accessories in motor starting circuit.
CO5 Practice right attitude and safety implementation.

BEE1971
Low Voltage Electrical Installation
Credit: 1
Pre-Requisite: BEE1971

Synopsis

This course introduces students to the single phase and three phase wiring and installation. The students will learn about supply system, rules and regulation, wiring system and electrical protection system. They are also will practice in applying trunking and conduits for electrical wiring as well as doing fitting and installation of electrical system devices. Then, they will conduct inspection and testing on their wiring and installation as safety conformation and fulfill the regulations.

Course Outcomes

CO1 Interpret rules and regulation for electrical wiring comprising of cable selection and load calculation.
CO2 Perform inspection and testing in electrical installation.
CO3 Construct electrical wiring using suitable wiring tools and accessories.
CO4 Apply ethical principles and commit to professional ethics.

BEE2122
Project Management
Credit: 2
Pre-Requisite: None

Synopsis

This course introduces students to the principles of managing a project systematically. Several approaches and techniques of proper project management are covered in wide range

of functions.

Course Outcomes

CO1 Explain fundamental principles of project management.
CO2 Produce a proper project planning using project management techniques and tool.
CO3 Develop personal action plan to apply the skill acquired at workplace.

BEE2123
Electrical Machines
Credit: 3
Pre-Requisite: BEE1133

Synopsis

This course introduces the fundamental concepts and principles of transformer and various types of electrical machines. It is intended for students to understand fundamental aspects of rotating electrical machines. The first part of the course is a quick review of some electromagnetism fundamental while the following will deal with the transformers and different types of electrical machines.

Course Outcomes

CO1 Acquire fundamental principles of electromagnetism, transformer and electrical machines.
CO2 Analyze the transformer and machines equivalent circuits and the operating conditions for electrical machines under steady state conditions.
CO3 Provide solution to technical problem on transformers and electrical machines.
CO4 Measure, determine and interpret the parameters of transformer and torque-speed characteristics of rotating machines.
CO5 Recognise the needs for, and possess the capability in life-long learning.

BEE2143
Signals & Networks
Credit: 3
Pre-Requisite: BEE1133 & BUM2133

Synopsis

This course introduces the students to various signals transformation techniques and its application to electrical circuits. This includes Fourier Series, Fourier Transforms and Laplace Transform. The concept of frequency response is introduced in filter.

Course Outcomes

CO1 Identify the different types & operations of signal, and suitable Fourier techniques.
CO2 Analyse electrical problems and passive filters using circuit laws, Fourier and/or Laplace technique.
CO3 Investigate signal and system characteristics using engineering software/knowledge.
CO4 Conduct independent readings and research in signal and system applications.

BEE2213
Analog Electronics I
Credit: 3
Pre-Requisite: BEE1133

Synopsis

This course introduces the fundamental of semiconductor devices which are diodes and transistors. It also describes BJT transistors operational characteristic that covers the DC and AC analysis. In addition, the various type of BJT configuration will be examined and analyzed. Furthermore, the analysis of the amplifier circuit will be extended to its frequency response.

Course Outcomes

CO1 Illustrate the characteristic and operation of semiconductor diodes and BJT transistor properties.
CO2 Analyze the operating condition and frequency response of various BJT configurations.
CO3 Design the semiconductor diode and BJT transistor circuit.
CO4 Work effectively as an individual and in a group.

BEE2223
Microprocessor
Credit: 3
Pre-Requisite: BEE1213

Synopsis

The aim of this course is to introduce to a microprocessor and embedded system. Students will be provided with an in-depth understanding of the internal architecture of the

microprocessor and the embedded system. In addition, they are exposed with various instruction sets either in assembly or high level language in order to develop an efficient program. Basic hardware and interfacing design with a range of typical microprocessor peripheral is also introduced.

Course Outcomes

CO1	Illustrate the architecture and interpret assembly language instruction sets of the microprocessor system.
CO2	Design, build and interface with various I/O devices.
CO3	Develop a program in a microprocessor system by using assembly language and high level language.
CO4	Work in a team effectively.

BEE2233
Analog Electronics II
Credit: 3
Pre-Requisite: BEE2213

Synopsis

This course introduces the fundamental of semiconductor devices which are transistors. It also describes Field-Effect Transistor (FET) operational characteristic that covers the DC and AC analysis. Some important devices such as op-amp and active filters are also introduced. Towards the end of this course, students are exposed to the applications of these semiconductor devices. During the laboratory sessions, students are expected to demonstrate and troubleshoot basic semiconductor device circuits.

Course Outcomes

CO1	Describe the characteristic and understand the operation of FET, Op-Amp and Active Filters.
CO2	Analyze various FET, Op-Amp and Active Filters configuration.
CO3	Design for various type of FET configuration and active filters.
CO4	Work effectively as individual, and as a member/leader in a team.

BEE2331
Engineering Computer Literacy
Credit: 1
Pre-Requisite: None

Synopsis

The primary objective of this course is to give students an ability to use computer-based technology in accessing, managing, integrating, evaluating, creating and communicating information. Student will be prepared for the academic development and professional careers.

Course Outcomes

CO1	Apply fundamental knowledge of Ms Word using DOTX template.
CO2	Adaptive references using reference manager software.
CO3	Analysing numerical data in a grid format using mathematical operations.
CO4	Construct presentation using an appropriate multiple application for future development.
CO5	Produce and publish information using collaborative software.

BEE2332
Engineering Economics
Credit: 2
Pre-Requisite: None

Synopsis

In this course the students will be exposed to the analysis of financial data, the concept of interest rates and time value of money. Students will be able to make choices between alternative projects using a set of basic tools and techniques of engineering analysis, including the time value of money, internal rate of return and benefit cost ratio. Furthermore, the student will be able to gather a comprehensive knowledge about advanced engineering economics topics like depreciation of assets, after tax cash flows and inflation. In addition, the student will gain knowledge about important decision making tools like sensitivity analysis, risk analysis and simulation.

Course Outcomes

CO1	Analyze the cost concept, cost structure and estimation.
CO2	Analyze the money-time relationship with/without taxes consideration.
CO3	Justify the best economical alternative in private and public engineering projects.

BEE2931
Basic Programmable Logic Controller
Credit: 1

Pre-Requisite: None

Synopsis

This course covers the fundamental of Programmable Logic Controller (PLC) including input and output component, memory address, wiring diagram, troubleshooting and design of ladder diagram.

Course Outcomes

CO1 Explain the operation and types of PLC configuration and network systems.
CO2 Construct ladder diagram of a control operating system using PLC program.
CO3 Design and simulate a ladder diagram of a control operating system using PLC program.
CO4 Trace the problems in PLC programming implementation.

BEE2971
Integrated Engineering Design Principle
Credit: 1
Pre-Requisite: None

Synopsis

This course introduces, educates and develops students to integrate their technical knowledge and generic skills gained in their first two years of study. It consists of knowledge and flow of a design project from sketching, design in necessary software. The translation of the idea into a professional drawing is also covered in this course. In the end of sessions, students are expected to be able to identify the complex problem to be solved, plan the solution for the problem and eventually execute the project. The course includes complex electrical and electronics engineering problems and proposal of design systems, components or processes that integrate core areas. Students will be divided into small groups of three or four members to conduct project that integrates multi-disciplinary areas. Students are required to produce product which considers environmental safety and sustainability.

Course Outcomes

CO1 Analyze and propose solutions for electrical engineering project complex engineering problem that integrates multi-disciplinary areas.
CO2 Design systems that includes various components or processes from different core areas using modern engineering tools and considering environmental issues for sustainability.
CO3 Work in a team effectively as an individual and in a group.
CO4 Capacity for independent critical thought, rational inquiry and self-directed learning.
CO5 Apply the theory of management principles and engineering to manage project .

BEE3113
Electromagnetic Fields Theory
Credit: 3
Pre-Requisite: BUM2133

Synopsis

This course introduces students on the importance and the applications of the Electromagnetic Fields Theory in the Electrical Engineering courses. The syllabus covered includes the concepts of electrostatic field, magnetostatic field and electromagnetic field (time varying field).

Course Outcomes

CO1 Apply knowledge of mathematics, science, and engineering fundamentals in 0-, 1-, 2- and 3-dimensional space problems of electrostatic, magnetostatic fields and electromagnetic wave.
CO2 Identify, formulate and analyze the electrostatic, magnetostatic fields and electromagnetic wave problems.
CO3 Conduct investigation into electrostatic and magnetostatic problems using fundamental knowledge and research methods.
CO4 Demonstrate the team working values to achieve task completion.

BEE3133
Electrical Power Systems
Credit: 3
Pre-Requisite: BEE1143

Synopsis

This course introduces the fundamental of electrical power system which are the overview of power system, generation, transmission lines, distribution, representation of components, basic power system analysis.

Course Outcomes

CO1 Compute load factor, load demand in distribution system and determine cost of electricity using the basic concept of electricity tariff and energy efficiency.
CO2 Develop the component representation of any balanced three phase power system using per-unit system and analyse the balanced fault system.
CO3 Calculate the performances of power transmission lines.
CO4 Assemble and analyse the circuit of distribution and transmission systems.
CO5 Explain the importance of electrical power system for sustainable development.

BEE3143
Power System Analysis
Credit: 3
Pre-Requisite: BEE3133

Synopsis

This course introduces students to the fundamental concepts of power system analysis which covered the power flow problem analysis, balanced and unbalanced fault analysis. Students will be exposed to the problems commonly encountered in power system engineering practice, analysis and techniques applied to solve some practical problems in power systems.

Course Outcomes

CO1 Apply knowledge of electrical power system fundamentals to the solution of complex electrical power system network.
CO2 Develop power flow solutions considering, if any, fault conditions for power system network.
CO3 Develop power system study (PSS) under steady state conditions using power system software.
CO4 Relate the works of engineer with the ethics and professionalism.

BEE3233
Electronic System Design
Credit: 3
Pre-Requisite: BEE1213

Synopsis

In this course, digital design is taught at a higher level of abstraction than BEE1213. It provides an in-depth coverage of systematical development and synthesis of digital system with emphasis on Field Programmable Gate Array (FPGA) technology. It covers with the proper planning techniques, design strategy and tools, functional verification and system implementation. The information gained can be applied to any digital design by using a top-down synthesis design approach. Through this course, student will be able to create digital design faster, shorten development time and lower the development costs.

Course Outcomes

CO1 Apply knowledge of digital electronic to realize the combinational logic system, arithmetic circuit and finite state machine using different technologies.
CO2 Design digital electronic system using combinational logic, arithmetic circuit and finite state machine (FSM) for various applications.
CO3 Construct digital electronic system using Hardware Description Language (HDL) and implement the system on FPGA.
CO4 Apply ethical principles and commit to responsibilities and norms of engineering practice in learning activities.

BEE3313
Principles of Control Systems
Credit: 3
Pre-Requisite: None

Synopsis

This course introduces students to the control system technology, mathematical models of feedback systems. The students will be exposed to transient and steady-state analysis, root locus, frequency response and analysis design of compensator. Students will utilize Matlab and Simulink software for simulating PID controller and will be exposed to PID controller trainer on actual implementation of the designed PID.

Course Outcomes

CO1 Derive and manipulate mathematical model and transfer function of physical systems.

CO2 Understanding control system performance in terms of time and frequency domains for both transient and steady-state responses of a linear time- invariant systems.
CO3 Analyze control system performance in terms of time and frequency domains for both transient and steady-state responses of a linear time-invariant systems.
CO4 Express ideas precisely, effectively and confidently, in written and oral communication.

BEE3333
Integrated Engineering Design
Credit: 3
Pre-Requisite: None

Synopsis

This course introduces, educate and develop students to integrate their technical knowledge and generic skills gained in their first two years of study. It consist of knowledge and flow of a design project from sketching, design in neccessary software. The translation of the idea into a professional drawing is also covered in this course. In the end of sessions, students are expected to be able to identify the complex problem to be solved, plan the solution for the problem and eventually execute the project. The course includes complex electrical and electronics engineering problems and proposal of design systems, components or processes that integrate core areas. Students will be divided into small groups of three or four members to conduct project that integrates multi-disciplinary areas. Students are required to produce product which considers environmental safety and sustainability.

Course Outcomes

CO1 Design systems that includes various components or processes from different core areas.
CO2 Utilize modern engineering tools or software in designing/developing the solution.
CO3 Relate environmental issues for sustainability development.
CO4 Work in a team effectively as an individual and in a group.
CO5 Apply the theory of management principles and engineering to manage project.
CO6 Demonstrate independent critical thought, rational inquiry and self-directed learning.

BEE3413
Principles of Communication Systems
Credit: 3
Pre-Requisite: BEE1133

Synopsis

This course introduces theories in the area of communication systems. Topics covered include the basic elements of communications, signal analysis, amplitude modulation, angle modulations and digital modulations, as well as transmission channels and noise impact on the modulation system. Finally, some emergence of digital communication technologies are presented and compared.

Course Outcomes

CO1 Analyze and differentiate analog modulation and demodulation techniques.
CO2Apply the knowledge of communication theory and techniques in wireless and mobile communication systems.
CO3 Analyze different types of digital transmission and digital modulation techniques.
CO4 Use and apply modern computational techniques and tools to measure the parameters for analog and digital communication system.
CO5 Shows ability to communicate effectively.

BEE3805
Integrated Engineering Design
Credit: 5
Pre-Requisite: BEE1611

Synopsis

In industrial training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo an industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

Course Outcomes

CO1 Identify in-depth the industrial organization, structure, operation, production and utilize engineering knowledge to identify and analyze

problem and then, provide the engineering solution.

CO2 Response and comply with the importance of society, environment and sustainability in engineering practices, decisions, and solutions.

CO3 Practice the professionalism and work etiquette that comply to be a good and responsible engineer.

CO4 Demonstrate communication and management/leadership skills to lead or manage effectively in an industrial environment.

CO5 Demonstrate the knowledge and ability to search and retrieve information and materials related to the industrial needs.

CO6 Demonstrate the knowledge and ability to conduct the given industrial activities and project.

BEE3942
Microcontroller Programming & Interfacing
Credit: 2
Pre-Requisite: BEE1213 & BEE1233

Synopsis

This course exposes students to the microcontroller in term of programming and hardware configurations. Beginning with understanding of microcontroller architecture, the programming software is applied to configure for several applications such as DI, DO, AI, ADC, and PWM. In addition, students are exposed to the integration between microcontroller and external devices.

Course Outcomes

CO1 Explain the principles, operation and function of microcontroller system.

CO2 Create applications program for specific task.

CO3 Demonstrate interface electronics circuit to control the external devices.

CO4 Pursue knowledge and look for relevant information.

BEE4113
Electrical Installation Design
Credit: 3
Pre-Requisite: BEE3133

Synopsis

This course provides knowledge in electrical installation design especially for commercial buildings. It explores the basic estimation and design procedure based on various codes of practice and standards. Student will be introduced to design a few basic systems in electrical installation such as lighting, protection system, grounding and lightning protection. Students also involve in problem solving and troubleshooting technique when they study on system inspection and testing.

Course Outcomes

CO1 Design lighting layout and power layout and draw using Autocad software.

CO2 Estimate electrical load for an installation and design single-line diagram for the installation.

CO3 Explain the protection system used in electrical installation.

CO4 Design grounding system and lightning protection system.

CO5 Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

BEE4143
Power System Protection & High Voltage
Credit: 3
Pre-Requisite: BEE3133

Synopsis

This course introduces students to the concept of power system protection and high voltage engineering. It covers in detail the components of power system protections and relay coordination. The theory of high voltage engineering will also be covered in this course.

Course Outcomes

CO1 Explain power system protection and electrical breakdown concept in high voltage engineering.

CO2 Perform calculation in power system protection and high voltage generation.

CO3 Design power system protection system and high voltage related system.

CO4 Develop solution for power system protection problem involving load, fault current and/or relay settings.

CO5 Relate the works of an engineer with ethics and professionalism.

BEE4153
Power Quality
Credit: 3
Pre-Requisite: BEE1143

Synopsis

This course is an introduction to power quality disturbances. It first introduces the concept of power quality and then quantifies the particular power quality disturbances that fall within the wider umbrella of electromagnetic phenomena. It provides a strong foundation for better understanding of the underlying principles of each power quality problem. Students are exposed to power quality solutions, standards, monitoring tools, grounding practices and distributed generation.

Course Outcomes

CO1 Explain the characteristic, causes & effects along with mitigation of power quality issues; sag, swell, transient, harmonics, interruptions, voltage variations & power factor.
CO2 Investigate a given power quality case/incident by utilising appropriate techniques and tools; including severity analysis and mitigation suggestion.
CO3 Relate the work of engineer with the ethics & professionalism.

BEE4163
Alternative Energy
Credit: 3
Pre-Requisite: None

Synopsis

This course introduces students to the alternative energy theories and concepts of some components and energy utilization in electric power system industries. It covers energy conversion, utilization and storage system for renewable technologies such as solar, wind, biomass, fuel cell, wave and etc. This course emphasis on fundamental of photovoltaic (PV) systems. It also touches upon the environmental consequences of energy conversion and how alternative energy can reduce pollution and global climate change

Course Outcomes

CO1 Describe fundamental and characteristics of renewable energy resources.
CO2 Analyze performance of renewable energy system and its components under certain condition.
CO3 Measure, determine and analyze data from various systems based on required design.
CO4 Apply common standards in designing the structure of renewable energy system.

BEE4173
Power System Operation & Control
Credit: 3
Pre-Requisite: BEE3133

Synopsis

This course presents the concept of power system operation and control. Students will be exposed to the concept of power system management to meet load demand at optimal operating cost and various ways in controlling electrical power.

Course Outcomes

CO1 Perform calculation and analyze related to Economic Dispatch (ED) of power system operation.
CO2 Perform calculation and analyze related to Active Power and Frequency Control.
CO3 Perform calculation and analyze related to Reactive Power and Voltage Control.
CO4 Relate the works of engineer with the ethics and professionalism.

BEE4203
Power Electronics and Drive Systems
Credit: 3
Pre-Requisite: BEE2213

Synopsis

The primary objective of this course are to give students a foundation of knowledge, understanding, analysis and design of power electronics circuits for energy conversion. This course presents concepts, fundamental analysis tools, practical consideration for design, and a range of power electronics applications. Practical experiments in the laboratory will also be conducted.

Course Outcomes

CO1 Investigate switching characteristics of basic solid-state power devices, operating principles, advantages and disadvantages of basic power electronics technologies.
CO2 Construct and analyse power electronics topology.

CO3 Explain the impact of power electronics technologies to engineering practice.

BEE4213
Multimedia Technology & Applications
Credit: 3
Pre-Requisite: None

Synopsis

The aim of this course is to prepare students for undertaking large Multimedia projects which include the development of Mobile Applications for Internet of Things (IoT) project. It introduces the students to the high-level strategies required for managing projects from their genesis to completion. This includes decision making regarding the overall project strategy, development environment, and testing strategy. This module also includes the basic principles of privacy and security in IoT systems and how these principles apply in a range of different contexts such as computer systems and mobile networks.

Course Outcomes

CO1 Describe the basic principles and processes used in multimedia applications development.
CO2 Apply the knowledge in multimedia applications development to design a solution for a real-world problem.
CO3 Properly assess the impact of secured multimedia applications in society and commit to professional ethics when developing a multimedia application.

BEE4223
Power Electronics and Drive Systems
Credit: 3
Pre-Requisite: BEE2213

Synopsis

The primary objective of the course is to give students a foundation of knowledge, understanding, analysis and design of power electronics circuits for energy conversion. This course presents concepts, fundamentals analysis tools, practical consideration for design, and a range of power electronics applications. Practical experiments in the laboratory will also be conducted.

Course Outcomes

CO1 Investigate switching characteristics of basic solid-state power devices, operating principles, advantages and disadvantages of basic power electronics technologies.
CO2 Construct and analyse power electronics topology.
CO3 Explain the impact of power electronics technologies to engineering practice.

BEE4233
Data Communications
Credit: 3
Pre-Requisite: BEE3413

Synopsis

This course emphasizes the importance and the applications of the Data Communications in the Electrical & Electronics Engineering courses. The syllabus covers Queue theory, data communications, communication networks, OSI and TCP/IP protocol suite and their application to optimal network design.

Course Outcomes

CO1 Understand and explain the basic queue theory, data communications principles and various types of computer network protocols.
CO2 Apply and compare OSI and TCP/IP standard protocols for data transmission in networks towards cost-effective and reliable communications.
CO3 Design and then appraise/evaluate/compare various types of Networks in terms of protocol uses and efficiency.
CO4 Demonstrate the social, culture, global and environmental responsibilities as an engineer.

BEE4253
Computer Vision System
Credit: 3
Pre-Requisite: None

Synopsis

This course introduces students to the principles of Computer Vision which includes image formation and low level image processing, theory and techniques for extracting features from images, measuring shape and location, and recognizing and classifying objects. Student will be exposed to design project using image processing software.

Course Outcomes

CO1 Explain the concept of computer vision and their applications.
CO2 Select and evaluate appropriate technique of image processing to solve engineering application.
CO3 Design and develop a vision system application using image processing software.
CO4 Demonstrate the social, culture, global and environment as an engineer.

BEE4273
High Voltage Direct Current & FACTS
Credit: 3
Pre-Requisite: None

Synopsis

This course deals with the operation of HVDC transmission, power conversion in HVDC transmission, analysis of HVDC converters. The FACTS devices are introduced in this course. The concept used and operation analysis are taught.

Course Outcomes

CO1 Identify the problems of power transmission system.
CO2 Introduction to HVDC transmission system and variety of FACTS devices.
CO3 Investigation analysis of operation HVDC transmission and FACTS devices.
CO4 Explain the impact of the HVDC transmission and FACTS devices to environment and society.

BEE4323
Embedded Controller Technology
Credit: 3
Pre-Requisite: None

Synopsis

This course is an introduction to a microcontroller and is designed to give the students a fundamental understanding of the microcontroller-based system. It provides an introduction to the architecture and the design of hardware and software for the Motorola M68HC11. Various instruction sets and internal features are explained. Its applications as a single chip controller are discussed and its interfacing with various I/O devices is demonstrated.

Course Outcomes

CO1 Illustrate the architecture of the microcontroller and interpret the instruction sets.
CO2 Design and develop a firmware using assembly language.
CO3 Demonstrate behaviour that are consistant with professional standard.

BEE4333
Intelligent Control
Credit: 3
Pre-Requisite: BEE1233 & BEE3313

Synopsis

This course introduces students to the principles of Artificial Intelligence which includes Expert System, Fuzzy Logic, Artificial Neural Networks and Genetic Algorithms. Project based exercise will also included in order to have a better understanding on the course.

Course Outcomes

CO1 Explain the concept of intelligent control and their applications.
CO2 Investigate the application of Fuzzy Logic and Artificial Neural Networks through case study or project based exercise.
CO3 Investigate the application of Genetic Algorithms system through case study.
CO4 Explain the impact of engineering solution in global context.

BEE4343
Process Control
Credit: 3
Pre-Requisite: None

Synopsis

The course introduces students to establishing the process performance through methods of specifying and measuring process performance. With basic overview of the control loop and its components, this leads students for designing process control loops, process control improvement and techniques to assist in the process of identifying the potential for improved process control performance in team with important consideration of professional engineering practice.

Course Outcomes

CO1 Appraise the basic principles and objectives of control in process industries with utilization the knowledge of mathematics & sciences.
CO2 Investigate the different techniques of system identification of process input output data analysis to form empirical models of a process plant.
CO3 To design a process control project by considering societal, health, safety, legal and cultural issues relevant to Engineering Act.

BEE4373
Robotics
Credit: 3
Pre-Requisite: None

Synopsis

This course provides an understanding of the principles of operation of automated equipment with particular reference to the industrial robot. This course covers classification and various types of robots and its application, robot kinematics, differential kinematics, robot dynamics, robot path planning and robot sensing.

Course Outcomes

CO1 Understand robotics and sensing system, its basic components and applications.
CO2 Design workcell based on industrial problem.
CO3 Analyze robot kinematics and dynamic using appropriate techniques and tools.

BEE4393
Electronics Drive
Credit: 3
Pre-Requisite: None

Synopsis

This course is designed to give students a foundation of knowledge of electrical drives systems and its control mechanism. The course is divided into the DC and the AC drives system to enhance students understanding of the practical aspects of the drives systems to relate them to theoretical aspects. This course also conducted practical experiments in the laboratory to give students some practical experience.

Course Outcomes

CO1 Explain the theoretical concepts of dynamics of electric drives.
CO2 Apply the appropriate control methods for an electric drives.
CO3 Analyze the performance of DC motor drives and AC induction motor drives for various operating conditions.

BEE4413
Digital Signal Processing
Credit: 3
Pre-Requisite: BEE2143

Synopsis

This course introduces students to the fundamental principles of Digital Signal Processing (DSP) including sampling theorems, Discrete-Time Systems (DTS) structures, Linear Time-invariant (LTI) systems analysis, z-transform, Discrete Fourier Transform (DFT), filter design, and filter structure. This course also exposes students to computational tools in solving engineering problems related to DSP and its applications.

Course Outcomes

CO1 Apply sampling theorem to obtain discrete-time signals, classify discrete-time system and perform convolution in time domain.
CO2 Design various types of filters using transfer function of LTI system, obtain filter response and perform convolution in frequency domain using DFT technique.
CO3 Conduct independent readings and researches in providing design solution for filter design problem by translating filter's transfer function into real-time using computational tools.

BEE4423
RF Circuit Design
Credit: 3
Pre-Requisite: BEE3413

Synopsis

This course emphasizes on the theory and principles of designing RF circuit in communication electronics system. The design of the RF circuit involves transmission line theory & waveguide, network analysis, impedance matching, active & passive RF circuits such as RF filters, amplifiers, RF mixers, and RF oscillators.

Course Outcomes

CO1 Apply transmission line theory, waveguide and impedance matching for RF principles.
CO2 Investigate the principle of RF components such as filters, amplifiers, mixers and oscillators.
CO3 Carry out study of active and passive RF circuits.
CO4 Demonstrate the social, culture, global and environmental responsibilities as an engineer.

BEE4433
Antenna and Propagation
Credit: 3
Pre-Requisite: BEE3113 & BEE3413

Synopsis

In this course the student will be exposed to the parameters of antenna such as radiation pattern, impedance matching techniques, practical antenna design, antenna measurement technique and introduction to radio wave propagation.

Course Outcomes

CO1 Characterize the fundamentals of antenna parameters and operations.
CO2 Design and evaluate various antennas to meet application requirements.
CO3 Describe and analyze the characteristic of the atmospheric and surrounding effects on radio wave propagation.
CO4 Demonstrate the social, culture, global and environmental responsibilities as an engineer.

BEE4523
Industrial Instrumentation
Credit: 3
Pre-Requisite: None

Synopsis

This course presents the process parameters that are applied in most processing industries of pressure, temperature, level and flow for both measurement and control applications. The principles applications of primary sensing elements, final control elements, transducers and transmitters which are used in process industries are discussed. Industrial application for instrumentation and process control is also covered.

Course Outcomes

CO1 Describe the function of sensor elements in an industrial system.
CO2 Investigate numerical problems related to industrial instrumentation.
CO3 Relate instruments installation procedure and conditions to the operation effectiveness, societal, health, safety, legal and cultural issues in industrial application.

BEE4553
VLSI Design & Process
Credit: 3
Pre-Requisite: None

Synopsis

This course introduces the fundamental of VLSI design which involves CMOS technology and fabrication process as well. The analysis on the characteristics of a CMOS transistor will also be discussed. The basic designing of a VLSI circuit such as sketching the stick diagram, schematics and layout design will be learned. The basic IC fabrication process such as Thermal Oxidation, Photolithography, Etching, Dopant Diffusion and Metal Evaporation will be included as well. Towards the end of this course, students are exposed to the applications of these processes of designing a VLSI circuit and the process it needs to be taken to fabricate it. During the laboratory sessions, students are expected to apply these design and fabrication process on the software that has been provided.

Course Outcomes

CO1 Explain the basic principles of IC design.
CO2 Analyze ICs based on CMOS technology.
CO3 Apply design rules to circuit topology.
CO4 Design subsystem circuits.
CO5 Describe the design process of IC fabrication.

BEE4563
Rapid Digital System
Credit: 3
Pre-Requisite: None

Synopsis

This course provides an in-depth coverage of systematical development and synthesis of

digital system using HDL and Field Programmable Gate Array (FPGA). It covers with the proper planning techniques, design strategy and tools, functional verification and system implementation. The information gained can be applied to any digital design by using a top-down synthesis design approach. Through this course, student will be able to create digital design faster, shorten development time and lower the development costs.

Course Outcomes

CO1 Use CAD tools to design digital systems.
CO2 Write synthesizable Hardware Description Language (HDL) programs.
CO3 Design, verify and test complex digital system in FPGA hardware.
CO4 Demonstrate a responsible and professional attitude regarding the role of engineers in society, culture, safety and health in creating solutions to complex engineering problems.

BEE4632
Maintenance Technology
Credit: 2
Pre-Requisite: None

Synopsis

This course exposed the students to various maintenance strategies and technologies available for solving maintenance problems in the industry. Besides, it also introduces students to many failure analysis techniques for finding solution to different maintenance problem. On top of that, maintenance data management using computerized maintenance management software is also embedded as technology tool. Maintenance solution is approach with the consideration of sustainable development in related issue using appropriate tools and techniques.

Course Outcomes

CO1 Explain and classify the types of maintenance strategies, procedures and tools.
CO2 Analyse and find solution to maintenance problem using failure analysis techniques.
CO3 Manage and analyse maintenance information using computerized maintenance software.
CO4 Provide a sustainable planning and solution to the maintenance issues using appropriate tools and techniques.

BEE4642
Engineers & Society
Credit: 2
Pre-Requisite: None

Synopsis

This course is to enable student to gain a deeper understanding of the ethical and laws issues and dilemmas that arise in one or more areas in professional conduct and their responsibility to society. It also intended to develop students to understand the academic responsibility and accountability of a profession in engineering and the organizational activities of professional engineering institutions.

Course Outcomes

CO1 Understand regulatory and statutory requirements and demonstrate engineer's role towards social, culture, global and environment responsibilities.
CO2 Explain ethical issues and problems that arise in professional environments and impact to society environmental context.
CO3 Develop the entrepreneurship skill in engineering practice.

BEE4712
Engineering Project I
Credit: 2
Pre-Requisite: BEE1143, BEE1213, BEE1233, BEE1313, BEE2233

Synopsis

This course introduces and exposes students to acquire and apply knowledge of sciences and electrical & electronics engineering fundamentals through individual project assessment. The students will learn how to identify, formulate and provide effective solution to engineering problem.

Course Outcomes

CO1 Explain the significance of the proposed project and produce a coherent literature review.
CO2 Propose an engineering solution using appropriate methods and apply appropriate techniques and tools.
CO3 Discuss the outcomes of the project through analysis of preliminary

	results and interpretation of data, and provide valid conclusions.
CO4	Demonstrate ability to handle electrical and electronic devices and softwares.
CO5	Demonstrate professionalism, general ethics and moral principle towards completion of the project.
CO6	Demonstrate professionalism, general ethics and moral principle towards completion of the project.
CO7	Identify project activities and resources and propose a comprehensive and feasible project plan.
CO8	Demonstrate independence in exploration of resources and decision-making towards completion of the project.

BEE4724
Engineering Project 2
Credit: 4
Pre-Requisite: BEE4712

Synopsis

This course introduces students to acquire and apply knowledge of sciences and electrical & electronics engineering fundamentals through individual project assessment. The students will learn to design and evaluate the performance of a system using integrated and interdisciplinary approaches.

Course Outcomes

CO1	Explain the significance of the proposed project and produce a coherent literature review.
CO2	Develop an engineering solution using appropriate methods and design a system that meet specified requirements.
CO3	Discuss the outcomes of the project through analysis of preliminary results and interpretation of data, and provide valid conclusions.
CO4	Apply appropriate tools and demonstrate ability to handle electrical and electronic devices and software's.
CO5	Explain the impact of the engineering solution to society, environment, and sustainability.
CO6	Demonstrate professionalism, general ethics and moral principle towards completion of the project.
CO7	Demonstrate clarity, coherence and cohesion in writing and oral presentation.
CO8	Demonstrate independence in exploration of resources and decision-making towards completion of the project.

DEPARTMENT OF MECHANICAL ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING
CURRICULUM STRUCTURE
B. ENG. (HONS.) MECHANICAL ENGINEERING

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEM	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	**UHL2400** Fund. of English Language	**UHL2422** English for Technical Comm.	**UHS1021** Soft Skills 1	**UHL2432** English for Professional Comm.	**UHE3**2** Elective Social Science	**BMM3533** Measurement & Instrumen -tation	**UHS2021** Soft Skills 2	**UHM2022** Ethnic Relations
	UHL2412 English for Academic Comm.	**UHR1012** Islamic and Asia Civilisation	**BMM2673** Thermodyna-mics	**BMM2683** Applied Thermodyna-mics	**BMM3513** Heat Transfer	**BMM3531** Eng. Thermodyna-mics Lab	**UGE2002** Technoprene-urship	**BMM4032** Engineer and Society
	BMM1313 Computer Programming	**BMM1553** Dynamics		**BMM2521** Eng. Mechanics Lab 2	**BMM3613** Automatic Control	**BMM3553** Mechanical Vibrations	**BMM4912** Final Year Project 1	**BMM4924** Final Year Project 2
	BMM1011 Introduction to Engineering	**BMM1533** Strength of Materials 1	**BMM2583** Strength of Materials 2		**BMM3623** Mechanical Design	**BMM3601** Integrated Design Project 1	**BMM4603** Integrated Design Project 2	
	BMM1563 Statics	**BMM1511** Eng. Mechanics Lab 1	**BMM 2533** Fluids Mechanics 1	**BMM2543** Fluids Mechanics 2	**BMM3521** Eng. Fluid Mechanics Lab	**BMM3563** FEM	**BMM4**3 Elective 1**	**BMM4**3 Elective 3**
	BMM1523 Engineering Materials	**BUM 2133** Ordinary Differential Equations	**BUM2313** Numerical Methods	**BUM2413** Applied Statistics		**BMM3023** Engineering Management and Safety	**BMM4**3 Elective 2**	**BMM4**3 Elective 4**
	BUM2123 Applied Culculus	**BMM1821** Mechanical Laboratory 2	**UHF11*1** Foreign Language Level 1	**BMM 2433** Electrical & Electronics Technology	**UHF21*1** Foreign Language Level 2	**BMM3633** Industrial Engineering		
	BMM1811 Mechanical Laboratory 1	**UQB2**1** Co. Curriculum 2	**BMM2612** Computer Aided Design	**BMM2623** Advanced Computer Aided Design	**BMM3643** Manufacturing Processes	**BMM3611** Manufacturing Processes Lab		
	UQB11** Co. Curriculum 1					**BMM3996** Industrial Training		
TOTAL CREDIT	**17**	**16**	**16**	**18**	**16**	**24**	**14**	**14**
TOTAL CREDIT FOR GRADUATION	**135**							

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

COURSE SYNOPSIS FOR DEGREE PROGRAMME 2020/2021

BACHELOR OF MECHANICAL ENGINEERING AND BACHELOR OF MECHANICAL ENGINEERING (AUTOMOTIVE)

BMM1011
Introduction to Engineering
Credit Hour: 1
Prerequisite: None

Synopsis

Introduction to Engineering introduces students to the range of engineering disciplines, emerging technologies and the engineering method of problem-solving, as well as sustainability and other issues associated with the practice of engineering. This introduction is made through a mix of lectures, group-based activities, site visits, and presentations from practising engineers. Since a key attribute of successful professional engineers is the ability to communicate effectively, the course focuses on improving core engineering communication skills.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply sustainable knowledge and emerging technologies to meet engineering tasks' objectives.
CO2: Value the responsibilities associated with engineering scope of works toward societal, health, safety, legal and cultural needs.

BMM1313
Computer Programming
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces input and output, variables, constants, arithmetic operations and mathematical functions, user-defined functions, selection making decision and repetitive construct, and array data structure. The programming language used for the course is C language.

Course Outcome

By the end of semester, students should be able to:

CO1: Create C programs using variables, constants declarations and arithmetic operations and mathematics function and selection making decision construct and loops.
CO2: Create C programs using user-defined functions and numeric arrays.
CO3: Develop C programs via team work to solve engineering problems

BMM1563
Statics
Credit Hour: 3
Prerequisite: None

Synopsis

An introduction to solving engineering static problem, involving: force vector, equilibrium of particle and rigid body, friction effect on rigid body equilibrium, structural analysis, frame and machines, centroids, center of gravity and moment of inertia.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyze equilibrium of particle and rigid body.
CO2: Analyze equilibrium of rigid body involve friction and structural analysis
CO3: Evaluate centroids and moment of Inertia, of composite cross-sectional area.
CO4: Demonstrate the solution of the problems.

BMM1523
Engineering Materials
Credit Hour: 3
Prerequisite: None

Synopsis

This course is an introduction to materials science and engineering. Students are expected to have understanding on crystal structure, mechanical and physical properties of materials, phase diagrams, phase transformation and strengthening mechanism of metal alloys, also application and processing of metals, ceramics, polymers and composites.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify the material structure, properties and their application..
CO2: Analyse the phase diagram, phase transformations and the strengthening mechanisms for metal alloys.
CO3: Illustrate the processing techniques for selected material.

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CO4: Investigate the influence of material characteristics towards environmental and sustainability.

BMM1811
Mechanical Laboratory 1
Credit Hour: 1
Prerequisite: None

Synopsis

This course introduces students with safe working habits, identify common materials used in metal fabrication, reading blueprints, identification, care & use basic measuring instruments, layout methods and basic hand tools. Emphasis is placed on operation of metrology, benchwork and lathe project.

Course Outcome

By the end of semester, students should be able to:

CO1: Describes the lathe machine, tools and procedures.
CO2: Demonstrates the appropriate techniques for basic measuring instrument.
CO3: Practice safety for the mechanical laboratory activities.
CO4: Interprets the mechanical laboratory works in a presentation.

BMM1821
Mechanical Laboratory 2
Credit Hour: 1
Prerequisite: None

Synopsis

This course introduces student basic application of the dial indicator, gauge block, gauges, measuring instruments, milling machines and processes, and surface grinding machines and processes.

Course Outcome

By the end of semester, students should be able to:

CO1: Describes the milling machine, tools and procedures.
CO2: Demonstrates the appropriate techniques for basic measuring instrument.
CO3: Practice safety for the mechanical laboratory activities.
CO4: Interprets the mechanical laboratory works in a presentation.

BMM1511
Engineering Mechanics Lab 1
Credit Hour: 1
Prerequisite: BMM1523 (Engineering Materials) and BMM1563 (Statics)

Synopsis

This lab introduces the engineering materials and statics principles through practical experiments. The covered topics for engineering materials experiments comprise steel microstructure microscopy, Vickers hardness test, rapid quenching and tempering of plain carbon steel, creep test and impact test. The statics experiments covered are forces resolutions in basic roof truss and crane jib, moments application in bell crank lever, precision friction measurement and friction forces on an inclined plane.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify mechanical properties of materials such as: hardness, tensile strength, creep responses at different temperature, toughness, friction coefficient, impact test and microstructure of materials.
CO2: Assemble tools to construct the experiment based on labsheets.
CO3: Organize the work within team members to analyze distribution of forces in simple girder structure and central force system. Investigate lever principle and application of moment on a crank with varied transmission ratio. Illustrate and analyze property and structural changes of several plain carbon and low alloy steels at different heat treatment.

BMM1533
Strength of Materials 1
Credit Hour: 3
Prerequisite: BMM1563 Statics

Synopsis

This course introduces the concept of stress, stress and strain under axial loading, torsion, pure bending, analysis and design of beams for bending, shearing stresses in beam and thin-walled members.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyze stress/strain problems in structural members under axial loadings.

CO2: Analyze the circular member problems which are subjected to torques.
CO3: Analyze the stresses and strains problems in members subjected to pure bending and transverse loading.
CO4: Analyze and design of beams for bending.

BMM1553
Dynamics
Credit Hour: 3
Prerequisite: BMM1563 Statics

Synopsis

This course introduces kinematics (motion of rigid body) inclusive of absolute and relative motion (displacement, velocity and acceleration) and dynamics (forces, work, energy, inertia and momentum).

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse dynamics problems involving kinematics (motion of rigid body) inclusive of absolute and relative motion (displacement, velocity and acceleration).
CO2: Analyse dynamics problems involving kinetics of rigid bodies inclusive forces based from Newton's Second Law.
CO3: Analyse kinetics of rigid body involving work, energy and momentum problem using Working Model 2D.

BMM2433
Electrical & Electronics Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces fundamental of electric circuit, circuit network analysis, inductance, capacitance, magnetic field and DC motor. The electronics technology covers diodes, bipolar junction transistor (BJT), operational amplifiers and digital logic circuits.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse circuit network for the resistance in series and parallel, voltage and current divider, Kirchhoff's Law.
CO2: Conduct analysis on a transformer, generator and DC motor. Analyse circuit of Op-amp, diode and BJT. Finally, simplification of a logic circuit by Boolean algebra and Karnaugh Map.
CO3: Demonstrate appropriate technique in conducting experiment on various analogue circuits while maintaining safety and awareness in the laboratory.
CO4: Proposing a solution to address a simple electrical and electronic problem.

BMM2521
Engineering Mechanics Laboratory 2
Credit Hour: 1
Prerequisite: BMM1533 Strength of Materials and BMM1553 Dynamics

Synopsis

This lab course introduces students to basic properties of material and kinetics and kinematics of particles and rigid bodies through a series of experiment. Students will conduct experiment of tensile, compression, torsion, fatigue, bending moment, shearing stress, transformation of stress and strain in material lab. Experiment on dynamic aspect includes inertia in rotational motion and rolling disc on an incline plane. Students will learn experimental technique, data collection, analysis of results and presentations of results.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify the common properties of material under tension, compression, torsion, fatigue, bending moment, shearing force, free fall, accelerating principle, kinematic of rigid body on incline planes through experiments.
CO2: Assemble tools to construct the experiment based on lab-sheets.
CO3: Organize the work within team members to analyze the purpose of experimental task.

BMM2533
Fluid Mechanics 1
Credit Hour: 3
Prerequisite: None

Synopsis

The objective of the course is to introduces knowledge and understanding about principle, properties and basic methods of fluid mechanics, and provide some understanding and analysis of some problems related to fluid mechanics. The subject covers topics such as concept of pressure and flow with its application, stability of floating bodies, and fluid in motion analysis, fluid momentum analysis, flow measurement devices,

fluid friction in piping system and dimensional analysis. The students are also expected to do mini project dealing with problem regarding the course outcomes

Course Outcome

By the end of semester, students should be able to:

CO1: relate the basic principles and applications of various fluid condition.
CO2: analyse problem in Fluid Statics and Fluid Dynamics.
CO3: analyse problem in Pipes flow, Flow measurement and Dimensional Analysis.
CO4: Justify the construction of an engineering problem accurately based on fundamental of fluid mechanics.

BMM2543
Fluid Mechanics 2
Credit Hour: 3
Prerequisite: BMM2533 Fluid Mechanics 1

Synopsis

This course provides the students with the principal concepts and methods of fluid mechanics. The topics covered include flow over immersed bodies, boundary layer analysis, compressible fluids flow, and application in pumps and turbines. Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse and describe the basic principles and applications of various flows.
CO2: Analyse problems related to external flow, boundary layer, and compressible flow using governing equations and correlation.
CO3: Evaluate problems related to pumps and turbine systems.
CO4: Arrange as effective team member of a team to solve problems related to fluid mechanics.

BMM2583
Strength of Materials 2
Credit Hour: 3
Prerequisite: BMM1533 Strength of Materials 1

Synopsis

This course introduces students to establish understanding in solid body mechanics including analysing shearing stresses in beams and thin-walled members, understanding transformation of stress and strain state, calculating stresses under combined loading, and analysing effect of force to the deflection of beams and buckling of columns.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse shearing stresses in beams and thin-walled members and transformations of stress and strain.
CO2: Evaluate the designed calculation based on state of stresses under combined loadings.
CO3: Analyse deflection and slope of a beam under transverse loading by using direct determination, singularity function, method of superposition and moment-area theorems.
CO4: Analyse stability of column by deriving Euler's formula for centric loading and Secant formula for eccentrically loading.

BMM2612
Computer Aided Design
Credit Hour: 3
Prerequisite: None

Synopsis

Computer Aided Design provides comprehensive introduction to Computer-Aided Design software. It is an introductory level where the students will learn the basics of technical drawing and use the software to create two-dimensional design in engineering. Students shall be able to demonstrate competency in sketching a model and using certain standard features available in the CAD environment for creating, manipulating and modifying assigned objects or elements. Students shall be able to change object properties and to undertake printing or plotting activity associated with the delivery outputs.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse the fundamentals of engineering drawing for designing a mechanical parts requirement.
CO2: Analyse the engineering drawing to construct a design according to standards.
CO3: Construct mechanical drawing using engineering norms and CAD software to produce objects and elements.

BMM2613
Advanced Computer Aided Design
Credit Hour: 3
Prerequisite: BMM2612 Computer Aided Design

Synopsis

Advanced Computer Aided Design combines theoretical approaches with advanced tools in geometric modelling and parametric design for engineering design applications. The students shall be able to demonstrate the impact of computer aided design (CAD) in engineering design and analysis, build up techniques and use advanced tools in 3D shape modelling and parametric design for real-world engineering problems. Through the course the students shall also be able to execute comprehensive and professional engineering projects. The interdisciplinary nature of geometric modelling and engineering design is addressed through the hands-on nature of the course work.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse the fundamentals of engineering drawing and interpret main features and specification of 2D engineering drawing.
CO2: Analyse and interpret main features and specifications of 3D solid model using CAD software
CO3: Prepare and organise 3D solid models & assembly of mechanical parts.

BMM 2673
Thermodynamics
Credit Hour: 3
Prerequisite: None

Synopsis

This course focuses on the application of thermodynamics fundamentals in various engineering system including properties of pure substance, perpetual motion machine, first law, second law and entropy.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse and apply Thermodynamics concepts including perpetual motion machine and statements of Thermodynamics law in general energy analysis.
CO2: Analyse properties of pure, simple compressible substances and ideal gases from property tables and equations.
CO3: Analyse the concept of 1st law in close and open system, 2nd law of thermodynamics and solve related engineering thermodynamics applications.
CO4: Perform the concept of thermodynamics law related to the engineering thermodynamics applications through presentation.

BMM2683
Applied Thermodynamics
Credit Hour: 3
Prerequisite: BMM2673 Thermodynamics

Synopsis

This course focuses on fundamental, application and evaluation of various engineering thermodynamics systems. The course covers gas and vapour power cycles, refrigeration and heat pump, air conditioning system, and the concepts of chemical reactions in combustion process.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain concisely the basic of thermodynamics power cycles for gas and vapour, and vapour-compression refrigeration cycles supported with knowledge of law of thermodynamics and engineering consideration.
CO2: Evaluate thermodynamic parameters in applied problems which related to thermodynamics processes in gas and vapour power cycles, vapour-compression refrigeration cycles, air conditioning, and combustion.
CO3: Evaluate the performance of gas power cycles, vapour power cycles, vapour-compression refrigeration cycles and air conditioning based on thermodynamics principles.
CO4: Demonstrate the work effectively in a team in solving applied problems related to a thermodynamics processes of gas and vapour power cycles, vapour-compression refrigeration cycles, and air conditioning based on thermodynamics principles.

BMM3023
Engineering Management and Safety
Credit Hour: 3
Prerequisite: None

Synopsis

This course covers the basic management knowledge, safety and engineering economy. The

management part will examine key issues in project management and organization. OSHA 1994, Factories and Machinery Act 1967, and basic principles of accident prevention and occupational health will be covered in safety part. In engineering economy, students are exposed to engineering economic principles and method of engineering economic analysis. At the end, student will manage an engineering project, implement an effective safety program and also perform engineering economic analysis.

Course Outcome

By the end of semester, students should be able to:

CO1: Organize the project engineering characteristics, life cycle and its importance, project integrated approach, portfolio management and skill.
CO2: Interpret and differentiate the strategic project management process steps, financial and non-financial portfolio criteria
CO3: Perform, develop, apply and analyze various organization structure, project frameworks and techniques of strategic plans of management, Work Breakdown Structure (WBS) and project estimation.
CO4: Verify and analyze methods for engineering economic principles and analysis.
CO5: Interpret accident prevention and occupational safety and health based on OSHA 1994 and Factories and Machineries Act 1967.

BMM3513
Heat Transfer
Credit Hour: 3
Prerequisite: BMM2563 Applied Thermodynamics

Synopsis

The basic modes of thermal energy transfer viz., conduction, convection and radiation are introduced with emphasis on understanding the fundamental concepts to be used in analysing and solving real-life problems. The applicability of 1-D heat conduction in various geometries, the validity of one dimensional heat conduction in fins, the distinction between steady and unsteady states, the concept of boundary layer, the analogy between fluid flow and convective heat transfer, the distinction between free and forced convection, the properties of materials which are responsible for energy transfer by radiation, the principles in the design of heat exchangers with emphasized on fundamental concepts and design methods.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse the concept of conduction, convection and radiation heat transfer through appropriate mathematical equation.
CO2: Formulate and Evaluate one-dimensional heat transfer for different geometries.
CO3: Summarise the problem in single phase free and forced convection heat transfer and simple radiation heat transfer.
CO4: Design heat Exchanger for application in Industries.

BMM3521
Engineering Fluid Mechanics Lab
Credit Hour: 1
Prerequisite: BMM2543 Fluid Mechanics 2

Synopsis

This course introduces to fundamental concepts of fluid mechanics experimentation, the virtual instrumentation and data acquisition requirements to subsequent data analysis techniques. The fields of study being emphasized include topics such as flow pattern over immersed bodies, fluid flow determination and validation of Bernoulli's theorem, friction losses in pipes, turbomachinery and pump performance analysis.

Course Outcome

By the end of semester, students should be able to:

CO1: Adapt appropriate fluid mechanics knowledge for the investigation of fluid mechanical behaviour through suitable experimental setup.
CO2: Evaluate the fluid mechanical behaviour by analysing and synthesising information obtained through experimental setup; and
CO3: Interpret the results obtained from the fluid mechanics experiments by means of writing effective reports with appropriate data analysis and data presentation.

BMM3531
Engineering Thermodynamics Lab
Credit Hour: 1
Prerequisite: BMM 2683 Applied Thermodynamics

Synopsis

This lab introduces practical applications in thermodynamics and heat transfer disciplines. It cover the areas of properties of pure substance, first

law and second law of thermodynamics, ideal gas law and perfect gas characteristics, gas compressors, refrigeration cycles, heat conduction, heat convection, as well as heat radiation.

Course Outcome

By the end of semester, students should be able to:

CO1: To implement thermodynamics and heat transfer knowledge for investigating the thermodynamics and heat transfer behavior through suitable experimental setup.
CO2: To evaluate the behavior of thermodynamics and heat transfer parameters by analyzing and systemizing parameters obtained from the experiment.
CO3: Demonstrate detailed experimental methods and present experiments to prove thermodynamics and heat transfer concepts.

BMM3533
Measurement & Instrumentation
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the principles of measurement, signal analysis and provides the students hands-on laboratory experience with a variety (*or selected*) transducers and instruments (including '*virtual instruments*'). Students also expose on how to write professional technical reports.

Course Outcome

By the end of semester, students should be able to:

CO1: explain in details the basic element in measurement and instrumentation system.
CO2: justify the appropriate/suitable basic of signal analysis in measuring analogue signal from transducers.
CO3: design the instrumentation system to acquire data from transducer and analyse the data in time and frequency domain.
CO4: integrate between physical demonstration and oral presentation to deliver project outcome.

BMM3553
Mechanical Vibrations
Credit Hour: 3
Prerequisite: BMM1553 Dynamics

Synopsis

This course introduces fundamental of vibration, un-damped vibration single degree of freedom (SDOF), damped vibration single degree of freedom (SDOF), two degree of freedom (2DOF) multi degree of freedom (MDOF) and some applications of vibrations in engineering.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate and explain the solutions to vibration problems of single degree of freedom systems based on basic dynamics characteristics.
CO2: Evaluate and explain the solutions to vibration problems that contain free and forced-vibration analysis of two and multi degree of freedom systems.
CO3: Design the vibration measurement by considering appropriate techniques, tools and methods.
CO4: Relate the vibration principles with actual vibration system.

BMM3563
Finite Element Methods
Credit Hour: 3
Prerequisite: BMM1533 Strength of Materials 1

Synopsis

This course covers the basics of Finite Element Method, some related mathematics and continuum mechanics, theory of Finite Element Method (FEM), application of FEM to solving solid mechanics, structural and scalar field problems, and finite element analysis of real world problems using FE software (s).

Course Outcome

By the end of semester, students should be able to:

CO1: Explain basics of FEM in mechanical engineering and its importance in industrial application.
CO2: Formulate and solve FE equations for structural problems, scalar field problems, and solid mechanics problems.
CO3: Set up an appropriate FE modelof real world problems and analyze the resulting system using FE software.

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

BMM3611
Manufacturing Processes Laboratory
Credit Hour: 1
Prerequisite: BMM3643 Manufacturing Processes

Synopsis

This lab provides hands-on experience for students to learn about manufacturing processes with emphasized on safety requirements, knowledge on engineering material application and processing tools/machines. At the end of this course, student activities during lab activities will be evaluated based on their technical report.

Course Outcome

By the end of semester, students should be able to:

CO1: Execute manufacturing process technique consist of injection moulding, sand casting, sheet metal forming, CNC and EDM machine and welding with standard operation procedure.
CO2: Apply ethical principles during operation such as dress code, code of practice, punctuality and recognize all ethical issues.

BMM3613
Automatic Control
Credit Hour: 3
Prerequisite: BMM 1553 Dynamics

Synopsis

This course introduces linear, time-invariant (LTI) control system modelling, analysis and design. The covered topics are frequency domain modelling of mechanical, electrical and electro-mechanical systems; time response analysis, frequency response analysis, stability analysis and steady-state analysis. Control system design and analysis using PID controller technique.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the basic control system concepts and illustrate the required control system into block design process.
CO2: Develop frequency domain transfer function of linear, time invariant (LTI) control systems for mechanical system
CO3: Synthesize the transient response, steady-state response and system stability of LTI control system compensators to achieve specified control system performances which is related to the real world problems by utilizing root-locus technique and PID

BMM3623
Mechanical Design
Credit Hour: 3
Prerequisite: BMM2583 Strength of Material 2

Synopsis

This course is an introduction to analysis of static and fatigue failure and design of machine elements/mechanical components. Students are exposed to design of machine elements/mechanical components including shafts, keys, springs, bolts and nuts, screws, welding, bearings, belts and chains, clutches and brakes.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the components to prevent failure due to static and dynamic service loads, and assess the suitable helical compression springs using table of parameters.
CO2: Evaluate the shafts for fatigue failure, and bolts, nuts and screws for static failure, as well as welding parameters in torsion and bending.
CO3: Evaluate bearings and flexible elements including brakes, clutches, belts and pulleys, and assess gears based on given parameters to predict wear and bending.
CO4: Show the ability to explore and expand various new information and complete required work related to welding cases in torsion and bending and assessment of gears for wear and bending.

BMM3633
Industrial Engineering
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces Industrial engineering, productivity, total quality management lean manufacturing, work study, human factors engineering, production planning and control, inventory management and engineering management.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate best practices for the attainment of total quality management using QC techniques.
CO2: Support production planning through total quality management, productivity measurement and work study.
CO3: Evaluate lean manufacturing tools, techniques and human factors engineering.
CO4: Evaluate economy engineering through production planning, control, inventory management and engineering management.
CO5: Adapt industrial engineering knowledge into selected case study.

BMM3643
Manufacturing Processes
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces students to manufacturing processes used for converting raw materials into finished products. Various processes, machinery, and operations will be examined with emphasis placed on understanding engineering materials and processing parameters that influence design considerations, product quality, and production costs. Sustainable manufacturing process will be discussed in student project presentation.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate different types of metal & polymer solidification processes.
CO2: Interpret forming processes for bulk metal, sheet metal and powder metallurgy.
CO3: Justify major types of material removal process, joining process and surface treatments.
CO4: Justify a process flow to manufacture a conceptual product by considering sustainable manufacturing process.

BMM3601
Integrated Design Project 1
Credit Hour: 1
Prerequisite: BMM3623 Mechanical Design
Synopsis

Integrated Design Project 1 prepares a detailed comprehensive design project considering the different stages of their design, manufacturing and assembly. Students is required to put into considerations the project management, communication, documentation, working in teams, design methodology in their proposals. Design of mechanical engineering systems components, including problem definition, analysis, and synthesis, and develop a computational as well as the physical model of their design.

Course Outcome

By the end of semester, students should be able to:

CO1: Propose a complex mechanical system with optimised selection of components and design using engineering drawing for meeting the requirements of a sustainable system.
CO2: Evaluate a complex mechanical system and components concept design by developing concept combination and improvement, concept selection, screening and ranking for further refinement and analysis.

BMM3996
Industrial Training
Credit Hour: 6
Prerequisite: Minimum 70 credit taken

Synopsis

This course introduces students to industrial training, expose them to professional skills and experience in the aspect of mechanical engineering field. The exposure will help to produce an excellent, responsible with good ethical for their personal development.

Course Outcome

By the end of semester, students should be able to:

CO1: Practice basic professional engineering skills at industry level; relate the theory that had been learned when the students involve in problem solving in industry.
CO2: Identify, solve and reports the practical problems that exist.
CO3: Analyse and evaluate problems area and design solution planning for industrial project.
CO4: Build up interpersonal skill to be an excellent, motivated and responsible to the creator.
CO5: Practice and apply ethical principles professionally in industry.

BMM4032
Engineer and Society
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces the engineering profession, local industries sector, issues in local industries, ethics and public responsibility, engineer and law, and contract law.

Course Outcome

By the end of semester, students should be able to:

CO1: Demonstrates understanding in engineering profession and code of ethics.
CO2: Reports the issues in local industries, working ethics and public responsibilities
CO3: Explain the law which governs the engineering profession

BMM4603
Integrated Design Project 2
Credit Hour: 3
Prerequisite: BMM3601 Integrated Design Project 1

Synopsis

Integrated Design Project challenges students to apply the knowledge and skills they learned throughout their degree to real-world problems. Application of the design process to solve an engineering problem which includes interdisciplinary parameters such as human factors, engineering economy, safety, environmental, and societal aspects of their design, etc. The students work in small teams under the close supervision of faculty members. Each team produces detailed drawings, comprehensive specifications, a presentation, and a prototype of the proposed design. They also write design reports and prepare posters describing their work. All reports are expected to meet professional standards.

Course Outcome

By the end of semester, students should be able to:

CO1: Construct and coordinates engineering materials for an engineering application and its design by demonstrating relevant free body diagram with static, dynamic, fracture, fatigue, thermodynamic, fluid analysis.
CO2: Arrange, complete, integrates and modifies design fabrication or model by relevant manufacturing technique, process, assemblies and testing together with proper system control (automation, sensors, actuation, pneumatic, hydraulic or PLC control) and system maintenance by coordinates knowledge and understanding of engineering and management principles and apply these as a member and leader in a team, to manage projects and in multidisciplinary environments.
CO3: Demonstrate a mechanical system to accommodate engineering economic analysis (break even calculation, return of investment, internal rate of return and present worth/ net present value) for marketing purpose and engineering management.
CO4: Construct and coordinate the design assembly together with design for static and dynamic strength, factor of safety, design of fastener and connections and, design of load-carrying members and proposed and applying it either by innovating a new design/ method using conventional or modern engineering model creation IT tool.

Elective Subjects offered for Mechanical Engineering (BMM)

BMM4693	Biomechanics
BMM4703	Hydraulics and Pneumatics
BMM4723	Mechanism Design
BMM4733	Power Plant Technology
BMM4763	Fatigue Design and Analysis
BMM4783	Computational Fluid Dynamics (CFD)
BMM4793	Welding and Joining Technology
BMM4803	Corrosion Science and Engineering
BMM4813	Ergonomics
BMM4823	Production Planning Control
BMM4833	Quality Engineering
BMM4843	Plastics Injection Technology
BMM4853	Air Conditioning and Refrigeration
BMM4893	Mechanics of Composite Materials

*The above information are subjected to amendment of the Senate from time to time.

BMM Elective courses:

BMM4693
Biomechanics
Credit Hour: 3
Prerequisite: BMM1533 Strength of Materials and BMM1553 Dynamics

Synopsis

This course introduces the principles and application of biomechanics, statics, dynamics, kinetics and identifies instrumentation used for measuring kinetics and kinematics quantities. Concept and theories of human skeletal, human upper and lower extremities and human spine from a biomechanical perspective.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse the biomechanics concepts on human skeletal, human upper and lower extremities, human spine, cardiovascular and neurovascular system from a biomechanical perspective.
CO2: Investigate the human system and any types of mechanical loading on the human body by qualitative and quantitative approaches.
CO3: Evaluate the human biomechanics system to perform specific task.

BMM4703
Hydraulics and Pneumatics
Credit Hour: 3
Prerequisite: BMM2543 Fluid Mechanics 2

Synopsis

This course introduces hydraulic and pneumatic systems, including the theoretical knowledge, components and the circuit design. Beside the basic hydraulic and pneumatic system, this course also introduces the electro fluid power system, as well as programmable logic controller (PLC) to control the system.

Course Outcome

By the end of semester, students should be able to:

CO1: Assess basic and electro-hydraulic systems for optimum design.
CO2: Evaluate advanced pneumatic and Programmable Logic Controller for fluid power system.
CO3: Appraise the hydraulic and pneumatic system using different control system.
CO4: Recognize the needs for using different control system for hydraulic and pneumatic.

BMM4723
Mechanism Design
Credit Hour: 3
Prerequisite: BMM1553 Dynamics and BMM3623 Mechanical Design

Synopsis

This course introduces the fundamental and design of mechanism. Theory of mechanism will be carried out in series of lectures and analysis and design of mechanism will be carried out in integrated project. Topics that will be covered are mechanisms and kinematics, vector and position analysis, velocity analysis, acceleration analysis and cam design.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify mechanism and design mechanism parameters related to motion, degree of freedom and analyze the position of the links in a mechanism.
CO2: Analyze the velocities and accelerations of links and points on mechanisms.
CO3: Design and construct the cam profile/mechanism and design mechanisms system using synthesis and analysis method.
CO4: Use related computer programs to design, model and analyze mechanisms.
CO5: Present technical work in a written report

BMM4733
Power Plant Technology
Credit Hour: 3
Prerequisite: BMM2683 Applied Thermodynamics , BMM2543 Fluid Mechanics 2

Synopsis

This course discusses power plant systems such as steam turbines, gas turbines, combined cycle power plants and sustainable energy power systems. This course also covers fuels and combustions, economics of power generation, and environmental issues on power generation.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate conventional power plants based on thermodynamics principle.
CO2: Evaluate fuels and combustions for steam cycle power plants based on air-fuel cycle.
CO3: Evaluate environmental problems and sustainable power generation systems based on efficiency and environment perspective.
CO4: Evaluate sustainable power generation systems based on efficiency, economic, environment performance.

BMM4763
Fatigue Design and Analysis
Credit Hour: 3
Prerequisite: BMM3563 Finite Element Analysis

Synopsis

Introduction to factors affecting fatigue behaviour and characteristics of design approach. Study on cycle counting techniques. Fatigue design methods including stress-life, strain-life and Linear elastic fracture mechanics methods under constant and variable amplitude loadings.

Course Outcome

By the end of semester, students should be able to:

CO1: Implement fatigue design criteria.
CO2: Evaluate a component under fatigue loadings.
CO3: Construct Finite Element Analysis for fatigue design.
CO4: Show their ability to find new information to solve fatigue problem in engineering application.

BMM4783
Computational Fluid Dynamics (CFD)
Credit Hour: 3
Prerequisite: BMM2543 Fluid Mechanics 2, BMM1313 Computer Programming

Synopsis

This course aims to introduce the fundamental and application of simulation of fluid mechanics and heat transfer phenomenon and solving thermo-fluids problem via computational method. Holistic approaches of programming and commercial software are essential towards solving, analysing and evaluating the results of thermo-fluid problem-based. It focuses on solving of two and three dimensional fluid flow and heat transfer problems utilize commercial softwares.

Course Outcome

By the end of semester, students should be able to:
CO1: Interpret the governing equations in thermo-fluid problems.
CO2: evaluate basic discretization methods to solve thermo-fluid problems.
CO3: explain detail guidelines for designing CFD simulation and perform error analysis.
CO4: evaluate thermo-fluid problems using modern simulation tools.
CO5: function as effective team member of a team to solve problems related to CFD.

BMM4793
Welding and Joining Technology
Credit Hour: 3
Prerequisite: BMM3643 Manufacturing Processes and BMM2583 Strength of Materials 2

Synopsis

This course introduces about welding & joining technology. The topic includes the overview of welding processes, fusion welding, arc physics, solid state welding, soldering, brazing as well as welding design, welding defects and its countermeasure. It also includes quality management system in welding and defect detection technology.

Course Outcome

By the end of semester, students should be able to:

CO1: Compare various processes of fusion welding and contrast various joining processes of solid state joining, brazing, soldering and modern joining technique.
CO2: Interpret welded structure and evaluate the welding strength.
CO3: Evaluate welding metallurgy and defects of welded structure.
CO4: Explain the quality management system, categorise welding defect repair and defect detection technique.

BMM4803
Corrosion Science and Engineering
Credit Hour: 3
Prerequisite: None

Synopsis

The course is aimed to investigate the fundamental causes of corrosion problems and materials failures. Emphasis on studying electrochemical reactions of corrosion process, material selections and corrosion protections. In the laboratory, students involve with experiments to evaluate corrosion reactions, environmental failure, and basic methods for protection of materials.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate specifically the fundamental concepts of electrochemistry of aqueous corrosion process.

CO2: Describe corrosion forms and their mechanism for different corrosive environments.
CO3: Justify corrosion test and methods for estimating corrosion failures in industrial facilities under several environments conditions.
CO4: Evaluate material selection and corrosion protections systems by using advance tools.

BMM4813
Ergonomics
Credit Hour: 3
Prerequisite: BMM1563 Statics

Synopsis

This course introduces students to ergonomics principles and their application in the design of work, equipment and the workplace. Consideration is given to musculoskeletal disorders, manual handling, and ergonomics aspects of the workplace.

Course Outcome

By the end of semester, students should be able to:

CO1: Understand and apply ergonomic principles to the creation of safer, healthier and more efficient and effective activities in the workplace.
CO2: Understand the causes of upper limb disorders and how to reduce them.
CO3: Apply ergonomic risk assessments and appropriate control measures.
CO4: Analyse workplace layout and equipment design.
CO5: Evaluate workplace aspects of good ergonomic design.

BMM4823
Production Planning Control
Credit Hour: 3
Prerequisite: BMM3633 Industrial Engineering

Synopsis

This course introduces production planning and control, forecasting, aggregate planning, production scheduling, Just-in-Time production, inventory management, material requirements planning. Simulation on production operation using Witness software is assigned.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate forecasting method using qualitative and quantitative methods.
CO2: Evaluate the aggregate planning using level, chase and transportation methods.
CO3: Propose the best solution using Lean manufacturing and Material Requirement Planning.
CO4: Arrange a new production layout by using Witness software.

BMM4833
Quality Engineering
Credit Hour: 3
Prerequisite: BMM3633 Industrial Engineering

Synopsis

This course introduces students to fundamentals of quality management and statistical quality improvement concepts. A practical state-of-the-art approach is stressed to ensure sufficient theory is presented to develop robust understandings on quality principles to monitor, control, improve product and processes.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe and apply the fundamentals of quality, total quality management, six sigma and basic quality tools.
CO2: Summarize the findings from frequency distribution, central tendency, dispersion, population of data, probability, sampling, life history of test data and control charts.
CO3: Display effective leadership and teamworking ability in completing the report and presentation.

BMM4843
Plastic Injection Technology
Credit Hour: 3
Prerequisite: BMM1811 Mechanical Technology Lab 1, BMM1821 Mechanical Lab 2, BMM2613 Advanced Computer Aided Design

Synopsis:

This course is an introduction to the plastic injection mould design for producing thermoplastic materials. It focuses on the basic of plastic injection mould and its' machine, proper selection of thermoplastic materials, calculation and design of mould based on the proposed plastic product design. It uses CAD software for designing and modelling of the mould and uses CAE Moldflow simulation tool to optimize the correlation of the mould design with the injection moulding process. Designed mould would be

fabricated and plastic products are produced by injecting the fabricated mould with plastic injection moulding machine.

Course Outcome:

By the end of semester, students should be able to:

CO1: Describe and familiar the basic of mould structure.
CO2: Compare suitable type of mould and plastic material.
CO3: Evaluate the correlation between mould design and injection moulding process.
CO4: Explain the design, modeling, fabrication, injection pressure, and mould suitability to produce plastic products.

BMM4853
Air Conditioning And Refrigeration
Credit Hour: 3
Prerequisite: BMM2683 Applied Thermodynamics

Synopsis

The course content covers the topics such as basic heat transfer, and the working fluid thermodynamics, vapour compression and absorption system of refrigeration, psychrometric charts and its use, cooling load calculations, study of air conditioning components, ducting and piping, pumps and fans and blowers, cooling coils and dehumidification process, expansion valves, evaporation and condensation process, temperature control systems; noise and vibration controls in air conditioning. The practical project work will include design and calculate the cooling load requirement of a building air conditioning system using PBL methodology.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the various concept of air conditioning system and components for commercial system in building.
CO2: Evaluate the heat transfer and moist air properties and mixtures using psychrometric chart in vapour compression system.
CO3: Evaluate various cooling load calculation problems for designed building air conditioning.
CO4: Performs well as a member or leader in diverse team.

BMM4863
Computational Modelling for Biomemchanical Engineering
Credit Hour: 3
Prerequisite: BMM3563 Finite Element Method

Synopsis

This course focuses on the practical aspects of implementing and solving various models commonly used in biomechanical engineering using computational simulations. Areas to be covered include systems of ODE, PDE, diffusion models, electrical stimulation in excitable tissues, continuum solid and fluid biomechanics, and multiphysics modelling. An overview of the latest trend in modelling in biomechanical engineering, including patient-specific modelling, growth and remodelling, and multiscale modelling will also be introduced.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the computational model solution for a range of biomechanical engineering problems
CO2: Design the solution for biomechanical engineering problems from a range of computational modelling techniques.
CO3: Construct the solution for a biomechanical model using computational modelling analysis tools.
CO4: Integrate new biomechanical modelling information into the existing mechanical engineering knowledge through lifelong learning

BMM4893
Mechanics of Composite Materials
Credit Hour: 3
Prerequisite: -

Synopsis

This course introduces students to current views and theories in polymer based composite materials, on the types of materials, production methods, quality assurance, failure analysis, test methods and the mechanics of lamina and laminated composites.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain different types of composite materials and production methods to produce polymer matrix composites.

CO2: Evaluate the main properties of a lamina and the laminated of composite materials.
CO3: Compare the failure modes of composites and evaluate different types of failure criterions in laminated composites, and composite materials in the future.
CO4: Perform mechanical test/simulation on laminated composites.
CO5: Communicate effectively on engineering problem solving activities

BMM4912
Final Year Project 1
Credit Hour: 2
Prerequisite: Refer to PSM handbook (Students should have passed more than 80 Credit hours)

Synopsis

The final year project focuses on the real professional approach to engineering studies. Students will utilise their engineering knowledge and technical skill from the previous training to solve engineering and for integration of subject areas is strongly encouraged throughout the program.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate complex problems and summarized the specific literature review according to the project niche area with standard citation format.
CO2: Design innovative solving plans and methodology to evaluate engineering problems with the consideration of standards, limitations, professional ethical principles.
CO3: Demonstrate appropriate measurements, techniques and data validation in solving the engineering problem with proper safety awareness and efficiency
CO4: Demonstrates effective communication with supervisor, laboratory, project members and panels throughout the program using modern tools.
CO5: Display the constraints and, niche and potential of engineering research topic for continuous improvement, innovation for sustainability achievement.

BMM4924
Final Year Project 2
Credit Hour: 4
Prerequisite: Refer to PSM handbook (Has passed more than 80 Credit hours)

Synopsis

The final year project focuses on the real professional approach to engineering studies. Students will utilise their engineering knowledge and technical skill from the previous training to solve engineering and for integration of subject areas is strongly encouraged throughout the program.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate complex problems and summarized the specific literature review according to the project niche area with standard citation format.
CO2: Design innovative solving plans and methodology to evaluate engineering problems with the consideration of standards, limitations, professional ethical principles.
CO3: Demonstrate appropriate measurements, techniques and data validation in solving the engineering problem with proper safety awareness and efficiency.
CO4: Demonstrates effective communication with supervisor, laboratory, project members and panels throughout the program using modern tools.
CO5: Display the constraints and, niche and potential of engineering research topic for continuous improvement, innovation for sustainability achievement.

BMA COURSES

BMA2312
Introduction to Automotive Engineering
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces workshop safety, the workings of automotive engines and the supporting systems, the workings of the automotive electrical, electronic and HVAC systems, the operation of the drive train, and the whole automotive chassis.

Course Outcome

By the end of semester, students should be able to:

CO1: Dress safely for the workshop, behave safely in the workshop, recognize the importance of keeping the workshop clean and tidy, and demonstrate an awareness of the workshop safety rules written in the safety contract.

CO2: Understand the working principles of automotive engines and their supporting systems, automotive electrical and electronic systems, automotive HVAC, drivetrain, the chassis system and body.
CO3: Conduct investigation into complex problems using experimental demonstration- based knowledge.

BMM1543
Strength of Materials
Credit Hour: 3
Prerequisite: BMM1563 Statics

Synopsis

This course introduces the concept of stress, stress and strain under axial loading, torsion, pure bending, analysis and design of beams for bending, shearing stresses in beam and thin-walled members.

Course Outcome

By the end of semester, students should be able to:
CO1: Analyze stress/strain problems in structural members under axial loadings.
CO2: Analyze the circular member problems which are subjected to torques.
CO3: Analyze the stresses and strains problems in members subjected to pure bending and transverse loading.
CO4: Analyze and design of beams for bending.

BMA2523
Internal Combustion Engine
Credit Hour: 3
Prerequisite: BMM2673 Thermodynamics

Synopsis

This course provides the foundation understanding on the fundamental of internal combustion engine which including design, operating parameters, thermo-chemistry reaction for various combustion cycles, emission formation, effect to environment and its control method. By accomplish significant projects such as component assembly, flow, performance, emission test and etc, student own a platform to build up professional techniques to design and conduct validating experiment.

Course Outcome

By the end of semester, students should be able to:

CO1: Describes the engine performance and the effect of design towards parametric changes.
CO2: Analyse the engine performance using the fundamental principles of thermodynamic.
CO3: Evaluate the engine performance using various thermodynamic cycles for ideal engines analysis.
CO4: Explains the engine performance using detail analysis and differentiate the normal, abnormal combustion, and the effect of operational parametric changes on exhaust pollutant emissions and combine the engine types, instrumentation and conduct the actual analysis of engines.

BMA2623
Automotive Design & Styling
Credit Hour: 3
Prerequisite: BMM2612 Computer Aided Design

Synopsis

This course introduces fundamental techniques of vehicle styling and the components associated such as sketching, rendering, surfacing, as well as model making. During the course students are exposed to techniques in automobile styling design through basic conceptual sketches, finished rendering, 2D and 3D graphics and clay model. This course also exposes students to automotive product planning, automotive packaging, engineering design, homologation, and automotive manufacturing and assembly.

Course Outcome

By the end of semester, students should be able to:

CO1: Modelling the 3D automotive parts.
CO2: Design the project flow and product management plan detail for the automotive related component, system, vehicle design within a development period.
CO3: Identify the design requirements, parameters of automotive related product development and generate functioning model using 3D modelling tools, sketches and rendering.
CO4: Analyse the performance and characteristics of automotive related components systems using simulation tools using presentation equipment, including concept, sketching, styling, rendering and scaled model.

BMM3511
Engineering Thermo-fluids Lab
Credit Hour: 1
Prerequisite: BMM2673 Thermodynamics & BMM2543 Fluids Mechanics 2

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

Synopsis

This lab introduces the students to fundamental concepts of thermo-fluids, and heat transfer experimentation, from the virtual instrumentation and data acquisition requirements to subsequent data analysis techniques. It cover the areas of properties of first law and second law of thermodynamics, ideal gas law and perfect gas characteristics, flow patterns over different immersed bodies, fluid flow determination and validation of Bernoulli's theorem, friction losses in pipes, heat conduction and heat convection.

Course Outcome

By the end of semester, students should be able to:

CO1: perform hands-on experiments, analyze, and interpret the experimental data in Thermo-fluid.
CO2: generate experimental data for relatively simple thermo-fluid problems and analyze the information.
CO3: devise detailed experimental data collection method by communicating effectively with their peers and present the results in writing through detailed Professional reports.

BMA3623
Engine Design
Credit Hour: 3
Prerequisite: BMM1543 Strength of Materials

Synopsis

This course extends the knowledge on mechanics of materials towards engine components design. The design of essential machine elements is demonstrated. The internal combustion engines kinematics and dynamics are analysed. The design of internal combustion engine components is examined. Finally, computer-aided engineering tools are utilised in analysing internal combustion engine components.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the kinematics and dynamics of internal combustion engines.
CO2: Design internal combustion engine components.
CO3: Manipulate computer-aided engineering tools for internal combustion engine components design and analyses.

BMA3601
Integrated Design Project 1
Credit Hour: 1
Prerequisite: BMA3623 Engine Design

Synopsis

Integrated Design Project 1 prepares a detailed comprehensive design project considering the different stages of their design, manufacturing and assembly. Students is required to put into considerations the project management, communication, documentation, working in teams, design methodology in their proposals. Design of mechanical engineering systems components, including problem definition, analysis, and synthesis, and develop a computational as well as the physical model of their design.

Course Outcome

By the end of semester, students should be able to:

CO1: Propose a complex mechanical system with optimised selection of components and design using engineering drawing for meeting the requirements of a sustainable system.
CO2: Evaluate a complex mechanical system and components concept design by developing concept combination and improvement, concept selection, screening and ranking for further refinement and analysis.

BMA4603
Integrated Design Project 2
Credit Hour: 3
Prerequisite: BMA3601 Integrated Design Project 1

Synopsis

Integrated Design Project challenges students to apply the knowledge and skills they learned throughout their degree to real-world problems. Application of the design process to solve an engineering problem which includes interdisciplinary parameters such as human factors, engineering economy, safety, environmental, and societal aspects of their design, etc. The students work in small teams under the close supervision of faculty members. Each team produces detailed drawings, comprehensive specifications, a presentation, and a prototype of the proposed design. They also write design reports and prepare posters describing their work. All reports are expected to meet professional standards.

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

Course Outcome

By the end of semester, students should be able to:

CO5: Construct and coordinates engineering materials for an engineering application and its design by demonstrating relevant free body diagram with static, dynamic, fracture, fatigue, thermodynamic, fluid analysis.
CO6: Arrange, complete, integrates and modifies design fabrication or model by relevant manufacturing technique, process, assemblies and testing together with proper system control (automation, sensors, actuation, pneumatic, hydraulic or PLC control) and system maintenance by coordinates knowledge and understanding of engineering and management principles and apply these as a member and leader in a team, to manage projects and in multidisciplinary environments.
CO7: Demonstrate a mechanical system to accommodate engineering economic analysis (break even calculation, return of investment, internal rate of return and present worth/ net present value) for marketing purpose and engineering management.
CO8: Construct and coordinate the design assembly together with design for static and dynamic strength, factor of safety, design of fastener and connections and, design of load-carrying members and proposed and applying it either by innovating a new design/ method using conventional or modern engineering model creation IT tool.

BMA4723
Vehicle Dynamics
Credit Hour: 3
Prerequisite: BMM1553 Dynamics

Synopsis

This course focuses on the fundamental of vehicle dynamics, vehicle acceleration and braking performance, mechanics of pneumatic tires, vehicle ride, cornering characteristics. suspension and steering system behaviour. By accomplish a series of laboratories such as car handling, acceleration, braking, double lane change and suspension performance, student are able to build up independent skill in design, conduct and validate experiment results.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse and formulate the fundamental of vehicle dynamics.
CO2: Analyse the performance characteristic of vehicle dynamics under various driving circumferences.
CO3: Calibrates all the sensors at the test car before perform the on-road experiment.
CO4: Explain the safety requirement when perform the on-road experiment and compose a report.

BMA4763
Vehicle Noise & Vibration
Credit Hour: 3
Prerequisite: BMM3553 Mechanical Vibration

Synopsis

This course introduces to automotive NVH, fundamental of noise, vehicle noise source, exterior and interior noise vehicle, vibration modal analysis, normal mode finite element analysis, experimental modal analysis and source of vehicle vibration.

Course Outcome

By the end of semester, students should be able to:

CO1: Formulate the solutions to vehicle noise problems by using noise source analysis.
CO2: Evaluate and design the solutions to automotive structural vibration by using normal mode and experimental modal analysis.
CO3: Demonstrate investigation on vehicle noise and vibration problems.
CO4: Effective in an investigative team to solve vehicle noise and vibration problems.

BMA Elective Courses

BMA4803 Automotive Advance Technology
BMA4813 Automotive Development Process
BMA4823 Energy Efficient Vehicle Vehicle
BMA4833 Automotive Electric and Electronics
BMA4843 Alternative Fuel
BMA4853 Diesel Engine Technology
BMA4863 Motorsports Engineering
BMA4873 Railway Technology

The information provided by College of Engineering are based on University's Regulation and endorsement until 14 May 2020

BMA4803
Automotive Advance Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course is the advance construction, development and operational analysis of the state-of-the-art vehicle system which including engine advance control system for higher efficiency, lower emission, advance suspension for excellent ride and comfort, advance driveline for spacious, precision, minimum slips control, advance material for lighter, cheaper and stronger component, chassis and body, advance energy powering system for renewable and sustainability future and advance vehicle mobility control.

Course Outcome

By the end of semester, students should be able to:

CO1: Compares the antilock braking, vehicle aerodynamics, tire tread design advances.
CO2: Combines electronically controlled anti-vibration engine mountings and transport refrigeration.
CO3: Differentiates electricity, alcohol, and hydrogen fuel cells, as well as advanced additives and oils, in environmentally sustainable transport.
CO4: Explain of engine diagnosis and troubleshooting of automotive engine control systems including digital storage oscilloscopes, fuel injection and ignition system diagnoses, five-gas exhaust analysis and emission testing. Generate Seat belts, brake lights, and air bags, of safer vehicles and fewer fatalities. Evaluate the automotive industry to make sure that they are reliable and prevent failures

BMA4813
Automotive Development Process
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the concept of automotive product development process. It covers the research and development process, stages of tooling process, production line process as well as the quality system used in automotive production line.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the research and development process of automotive product and its organization.
CO2: Compare the tooling process in products development based on parts function.
CO3: Evaluate the manufacturing process flow in car production line based on safety and human factors.
CO4: Identify the effect of manufacturing process on the quality of the production parts.

BMA4823
Energy Efficient Vehicle
Credit Hour: 3
Prerequisite : None

Synopsis

Energy Efficient Vehicle or EEV is a new concept of categorise automotive technology towards the low fuel consumption, alternative and sustainable automotive system. Under the EEV definition, there are multiple approaches, technology, alternative fuels, materials and etc. In this course, some foundation of automotive highlighted and followed by sustainability of different green technology, electrification and detail hybrid electric vehicle design, operation, construction and diagnosis.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the evolution of automotive electrification and technology sustainability.
CO2: Analyze the design of various energy efficient vehicle technology combination.
CO3: Summarize the architecture of different hybrid electric vehicle, safety design and influent of local policy & enforcement
CO4: Criticizes the construction and operation mechanism for hybrid electric vehicle low voltage and high voltage system thus analyze its performance under different fault code driving condition

BMA4833
Automotive Electric and Electronics
Credit Hour: 3
Prerequisite: BMM2433 Electrical & Electronics Technology

Synopsis

This course covers comprehensive overview in the area of automotive electrical and electronics and familiarises students with both analytical and computational approaches in evaluating and

designing vehicle electrical and electronics components and systems as well as innovative approach in automotive electronics systems.

Course Outcome

By the end of semester, students should be able to:

CO1: Appraise the fundamental theory in automotive electrical components.
CO2: Critically evaluate major automotive electronic system designs and performance.
CO3: Compare innovative vehicle electronic components, sub-systems and networking.
CO4: Manipulate embedded system for vehicle electronic systems and networking.

BMA4843
Alternative Fuel
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides the foundation understanding on the existing energy sources and renewable energy sources such as biodiesel, biomass from wastes or hydrogen and electricity. The alternative fuels contribute to the reduction of prices and dependence on fossil fuels. In addition, energy sources such as these could partially replace the use of what is considered as the major factor responsible for global warming and the main source of local environmental pollution. The course also discuss on the fundamental of alternative fuels which include on to create and utilize the alternative sources of the energy. The course will also to provides the understanding on the impacts of fossil fuels and the alternative fuels on the society and environment.

Course Outcome

By the end of semester, students should be able to:

CO1: To analyze the advantages on main source of energy.
CO2: To analyze the alternative source of energy and its potential.
CO3: To evaluate the performance of alternative fuel (liquid and gaseous) on the internal combustion engine
CO4: To evaluate the potential of electricity and hydrogen technology for vehicles.

BMA4853
Diesel Engine Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course focuses on the introduction of diesel engine technology. The topics include diesel engine cycle, fuel injection system, combustion and exhaust emission, auxiliary system and alternative fuels for diesel engine.

Course Outcome

By the end of semester, students should be able to:

CO1: Illustrates the diesel cycle and associated working principle of diesel engine
CO2: Analyse the diesel fuel injection system and management
CO3: Demonstrate the combustion phenomenon and exhaust emission from the diesel engine.
CO4: Categorize the various alternatives fuel for diesel engine

BMA4863
Motorsports Engineering
Credit Hour: 3
Prerequisite: None

Synopsis

This course focuses on the introduction to motorsports engineering, types of racing engines, advanced vehicle materials and structure, and manufacturing technique extant in this field. It also covers the modification as enhancement in motorsport system feature, racing theories and strategies, regulation and safety in motorsports engineering.

Course Outcome

By the end of semester, students should be able to:

CO1: Appraise the fundamental of motorsports engineering in the basis of racing theories, strategies, regulations, and safety. (C)
CO2: Evaluate the advancement of motorsport in the aspect of advanced materials and structure usage and modification techniques as well as manufacturing techniques utilize in the production of components and parts for motorsports. (C)
CO3: Perfom the developed responds effectively to unexpected experiences, modify instruction to meet the requirements in performing the technique teaches (P).
CO4: Carry out and display good teamwork spirit and discipline in group activities (A)

BMA4873
Railway Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides an overview on railway technology including permanent way/track, rolling stocks, signalling and train control, electrification system and railway communication and information technology systems. The current issues, challenges and future technologies are also covered in this course.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate knowledge on the railway technology.
CO2: Summarize available technology including permanent way/track, rolling stocks, signalling and train control, electrification system and railway communication and information technology systems.
CO3: Evaluate the complex solutions in railway engineering technology.
CO4: Identify the problems in railway engineering technology and solve the problem effectively.

FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY

FACULTY OF CHEMICAL & NATURAL RESOURCES ENGINEERING

INTRODUCTION

The Faculty of Chemical and Process Engineering Technology (FTKKP) of UMP was set up in 2019 from Faculty of Chemical and Natural Resources Engineering (FKKSA), which was established in 2002 with the aim of providing engineering and engineering technology programmes in the field of chemical and natural resources engineering. The faculty is also tasked to embark on research and development activities, particularly in the area of fine and specialty chemicals, chemical process up-scaling and biotechnology and gas technology-related processes in order to generate expertise relevant to the needs of the industry. In light of the establishment of the East Coast Economic Region (ECER) and the empowerment of technical and vocational education and training (TVET), FTKKP is expected to play an important role to serve as a catalyst for the development of relevant activities through programmes such as technology transfer, staff exchange, training, consultancy and other services.

With a vision to be a leading centre in producing professionals in the area of chemical and natural resources engineering, with the emphasis on best industrial practices and applications, FTKKP offers five programmes covering multiple relevant areas. The main areas are chemical & process, pharmaceutical, petroleum, and oil & gas. The programmes implement a more practical-based curriculum. Students under these programmes are exposed to a more hands-on training throughout their study. FTKKP also has multiple connections with the relevant industries and institutions at the national and international levels.

The following are the undergraduate programmes offered in FTKKP.

PROGRAMMES OFFERED

a) Bachelor of Chemical Engineering Technology (Process) with Honours – Full time
b) Bachelor of Chemical Engineering Technology (Pharmaceutical) with Honours – Part time
c) Bachelor of Chemical Engineering Technology (Petroleum) with Honours – Full time
d) Bachelor of Technology in Oil and Gas Facilities Maintenance with Honours – Full time
e) Diploma in Chemical Engineering – Full time

CAREER OPPORTUNITIES

Bachelor of Chemical Engineering Technology (Process) with Honours
The graduates are equipped with skills in Chemical Engineering Technology and soft skills as an added value which allows them to build a career as chemical process engineering technologist, process technologist, operation & maintenance technologist,

product development technologist, project engineering technologist, consultant, researcher, academician, and entrepreneur.

Bachelor of Chemical Engineering Technology (Pharmaceutical) with Honours
The graduates are equipped with a thorough understanding of the technical aspects in pharmaceutical engineering technology. Graduates will also be prepared with professional skills to enhance employability.
Career information: Academician, regulatory affairs executive, quality control executive, quality assurance executive, production engineer, any industries that apply the use of cleanroom technology such as semiconductor & cosmetics, health industry, government services, academician, and entrepreneur.

Bachelor of Chemical Engineering Technology (Petroleum) with Honours
The graduates are equipped with skills in engineering technology (petroleum) and soft skills as an added value which allow them to build a career as petroleum technologist, reservoir technologist, petrol physician, drilling technologist, formation evaluator, process engineer, R & D technologist, safety officer consultant, contractor, academician, and entrepreneur.

Bachelor of Technology in Oil and Gas Facilities Maintenance with Honours
Career information: Oil & gas industry and petrochemical industry (maintenance & operation service executive, maintenance assistant engineer, plant operation assistant engineer, static assistant engineer, rotating assistant engineer, field assistant engineer, project executive)

Diploma in Chemical Engineering
Career information: Chemical & applied products, pharmaceuticals, energy, water, food & beverage, materials, oil & gas, process plant & equipment, biotechnology, business & management, consultancy

CURRICULUM STRUCTURE
BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (PHARMACEUTICAL) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	UHL2400 Fundamentals of English Language	UHL2412 English For Academic Communication	UHL2422 English For Technical Communication	UHL2432 English For Professional Communication	UHF21*1 Foreign Language 2	BTK3714 Final Year Project I	BTK4726 Final Year Project II	BTU4812 Industrial Training
	BUF1113 Basic Physics	BUM2113 Applied Mathematics	BUM2413 Applied Statistics	UHF11*1 Foreign Language 1	BTK3112 Project Management	BTF3833 OSH in Pharma Industry	BTF4663 System Validation	
	UHC1012 Falsafah dan Isu Semasa	UGE2002 Technopreneurship	UQ2**1 Co-Curriculum 2	UHC2022 Penghayatan Etika dan Peradaban	BTK3122 Engineering Economy	BTF3652 Contemporary Trends in Pharmaceutical Industry	BTF38**3 Elective 2	
	BUM1223 Calculus	BTK1123 Organic Chemistry	BTK1243 Fluid Mechanics	BTK2243 Material Science and Technology	BTK3274 Process Instrumentation and Control	BTF3243 Bioseparation Technology	BTF38*3 Elective 3	
	UQB1**1 Co-Curriculum 1	BTK2233 Electrical Technology in Chemical Industry	BTK2253 Mass Transfer	BTK2263 Heat Transfer	BTF1623 Manufacturing & Processing Technology	BTF3373 Quality Management System	BTK4112 Internship Preparation	
	UHS1022 Soft Skill	BTK2273 Computer Aided Design	BTK2284 Chemical Reactor Technology	BTK3214 Separation Process I	BTF1143 Pharmaceutical Waste Management	BTF38*3 Elective 1		
	BTK1512 Professional Practice and Ethics	BTK2223 Chemical Process Principles	BTF1213 Microbiology	BTF2232 Contamination Control and Clean Room Technology	BTF2153 Pharmaceutical Formulation Methods			
	BTK1113 Analytical Chemistry			BTF2632 Introduction to Good Manufacturing Practices				
	BTK2213 Computer Programming for Technologist							
	BTK1253 Thermodynamics							
TOTAL CREDIT PER SEMESTER	19	19	19	19	18	18	17	12
OVERALL TOTAL CREDIT FOR GRADUATION	141							

***This curriculum stucture is effective starting from Semester I, 2020/2021.**
UHL2400 - Only for students who obtained MUET Band 2.0 and below.
BUF1113 - Only for students who have not taken any Physic or equivalent courses during Matriculation, Diploma or STPM.

Bachelor of Chemical Engineering Technology (Process) with Honors

First Year		Second Year		Third Year		Fourth Year	
18	19	19	18	19	18	18	12
BTK1113	BTK1163	BTK1243	BTK2263	BTK3274	BTK3714	BTK4726	BTK4912 Industrial Training
Analytical Chemistry	Organic Chemistry	Fluid Mechanics	Heat Transfer	Process Instrumentation and Control	Final Year Project I	Final Year Project II	
BTK2213	BTK2233	BTK2253	BTK3214	BTK3273	BTK3233	BTK4224	
Computer Programming for Technologist	Electrical Technology in Chemical Industry	Mass Transfer	Separation Process I	Environmental & Sustainable Technology	Process Modelling and Simulation	Plant Troubleshooting and Maintenance	
BTK1253	BTK2273	BTK2284	BTK1263	BTK3263	BTK4214	BTK38*3	
Thermodynamics	Computer Aided Design	Chemical Reactor Technology	Static & Strength of Materials	Separation Process II	Plant Automation	Elective III	
BTK1152	BTK2223	BTK3243	BTK2243	BTK3224	BTK38*3	BTK38*3	
Professional Practice and Ethics	Chemical Process Principles	Chemical Plant Safety	Materials Science and Engineering	Plant Utilities	Elective I	Elective IV	
UHR1012	UGE2002	UHL2422	UHL2432	BTK3112	BTK38*3	BTK4112	
Islamic and Asian Civilisations	Technopreneurship	English for Technical Communication	English for Professional Communication	Project Management	Elective II	Internship Preparation	
BUM1223	UHL2412	BUM2413	UHM2022	BTK3122	UHF2021		
Calculus	English For Academic Communication	Applied Statistics	Ethnic Relations	Engineering Economics	Foreign Language II		
UQB1__1	BUM2113	UQ2__1	UHS2021	UHF1011			
Co-Curriculum I	Applied Mathematics	Co-Curriculum II	Soft Skills II	Foreign Language I			
UHS1011							
Soft Skills I							

Elective Courses
BTK3813
Petroleum Refining & Petrochemical Technology (E)
BTK3823
Bioprocess Technology (E)
BTK3843
Food Engineering Technology (E)
BTK3853
Oleo Chemical Technology (E)
BTK3873
Operation Management (E)
MKK1313
Chemical Product Design & Management (E)

FACULTY OF CHEMICAL & NATURAL RESOURCES ENGINEERING
CURRICULUM STRUCTURE
BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (PETROLEUM) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	UHL2400 Fundamentals Of English Language	BUM2113 Applied Mathematics	UHL2422 English for Technical Communication	UHL2432 English for Professional Communication	UHC2022 Penghayatan Etika Dan Peradaban	UHF2**1 Foreign Language Level 2	BTO38*3 Elective II	BTK4912 Industrial Training
	UHC1012 Falsafah Dan Isu Semasa1	UHL2412 English for Academic Communication	BUM2413 Applied Statistics	BTK2263 Heat Transfer	UHF1**1 Foreign Language Level 1	UHS1022 Soft Skils	BTO38*3 Elective III	
	BUM1223 Calculus	BTK1123 Organic Chemistry	UQ*2**1 Co-Curriculum II	BTK1263 Static & Strength of Materials	BTK3214 Separation Process I	BTK3274 Process Instrumentation and Control	BTO4114 Production & Transmission Technology	
	UQB1**1 Co-Curriculum I	BTK2233 Electrical Technology in Chemical Industry	BTK2284 Chemical Reactor Technology	BTK3214 Separation Process I	BTK3222 Project Management	BTK3714 Final Year Project I	BTK4716 Final Year Project II	
	BTK2213 Computer Programming for Technologist	BTK2273 Computer Aided Design	BTK1243 Fluid Mechanics	BTO1214 Geosciences & Petroleum Exploration	BTK3232 Engineering Economy	BTO 38*3 Elective I	BTK4812 Internship Preparation	
	BTK1152 Professional Practice and Ethics	BTK2223 Chemical Process Principles	BTK2253 Mass Transfer	BTO3143 SHE in Petroleum Industry	BTK3274 Process Instrumentation and Control	BTO3214 Well Drilling & Completion		
	BTK1113 Analytical Chemistry	UGE2002 Technopreneurship	BTO1133 Introduction to Petroleum Technology		BTO3114 Formation & Reservoir Technology	BTO4714 Petroleum Refining and Gas Processing		
	BTK1253 Thermodynamics				BTO3124 Environmental & Waste Technology			
TOTAL CREDIT PER SEMESTER	17	19	19	19	19	18	18	12
141	OVERALL TOTAL CREDIT FOR GRADUATION							

FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
BACHELOR OF TECHNOLOGY IN OIL AND GAS FACILITIES MAINTENANCE WITH HONOURS

YEAR	FIRST		SECOND		THIRD			FOURTH
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	SHORT SEM	FIRST
COURSES	BVF 1113 INTRODUCTION TO OIL & GAS FACILITIES	BVF1214 OIL & GAS TRANSPORTATION SYSTEM AND SERVICES	BVF2114 EQUIPMENT MAINTENANCE STRATEGY	BVF2233 LIFTING & RIGGING OPERATIONS AND MAINTENANCE	BVF3**3 GENERAL ELECTIVE	BVF3214 PLANT COMMISSIONING & SHUTDOWN	BVF3316 FINAL YEAR PROJECT 2	BVF4112 INDUSTRIAL TRAINING
	BVF 1123 ETHICS IN PROFESSION	BVF 1223 HSE IN OIL & GAS INDUSTRIES	BVF2124 FIELD INSTRUMENT DEVICES & CONTROL	BVF2**4 ELECTIVE 1	BVF3**4 ELECTIVE 3	BVF32*4 ELECTIVE 5		
	BVF1133 EMERGING TECHNOLOGIES IN OIL & GAS INDUSTRIES	BVF1234 WELDING AND INSPECTION	BVF2213 OIL & GAS PROJECT MANAGEMENT	BVF 2**4 ELECTIVE 2	BVF 3**4 ELECTIVE 4	BVF 32*4 ELECTIVE 6		
	BVF1143 TECHNICAL DRAWING & COMPUTER AIDED DESIGN	BVF1243 EQUIPMENT BASIC CARE	BVF2143 ASSET INTEGRITY MANAGEMENT	BVF2294 CAPSTONE TECHNOPRENEURSHIP 1	BVF3034 CAPSTONE TECHNOPRENEURSHIP 2	BVF3254 FINAL YEAR PROJECT 1		
	UQB1011 CO-CURICULUM I (BRIGED SISWA)	UQ*2**1 CO-CURICULUM II	UHL2452 ENGLISH FOR VOCATIONAL PURPOSES	UHF2111 MANDARIN LANGUAGE 2				
	UHS1022 SOFT SKILLS (KEMAHIRAN INSANIAH)	UHL2442 ESSENTIAL ENGLISH	UHF 1111 MANDARIN LANGUAGE 1					
	UHR 1012 ISLAMIC AND ASIAN CIVILISATIONS 1	UHC2022 PENGHAYATAN ETIKA DAN PERADABAN						
	UHC1012 FALSAFAH DAN ISU SEMASA							
TOTAL CREDIT	19	19	17	16	15	16	6	12
TOTAL CREDIT FOR GRADUATION	120 (DKM/DVM)							

FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
DIPLOMA IN CHEMICAL ENGINEERING

YEAR	SHORT SEM	FIRST		SECOND		THIRD
SEMESTER		FIRST	SECOND	FIRST	SECOND	FIRST
COURSES	UHC1012 Falsafah Dan Isu Semasa	UHL1412 Foundation English	UHL1422 English For Academic Skills	UGE1002 Asas Pembudayaan Keusahawanan	DKK2373 Fluid Mechanics	DKK3812 Industrial Training
	DUM1113 Basic Mathematics	DUK1113 General Chemistry I	UQB1011 Briged Siswa (Kokurikulum I)	UHC2022 Penghayatan Etika dan Peradaban	DKK2462 Plant Commissioning, Start-Up & Shut Down	
		DUF1113 Physics	DUM1123 Calculus	UHL1432 English For Occupational Communication	DKK2473 Plant Safety & Health	
		UHS1022 Soft Skills 2	DUK1123 General Chemistry II	DKK2333 Thermodynamics	DKK2483 Plant Utility	
		DKK1111 Introduction To Chemical Engineering	DKK1413 Material & Energy Balance	DKK2433 Chemical Reaction Engineering	DKK2443 Process Instrumentation & Control	
		DKK1352 Electrical Technology	DKK1493 Transport Processes	DKK2363 Engineering Mechanics	DKK2464 Unit Operations	
		DKK1781 Basic Science & Engineering Lab	DKK1761 Mass And Heat Transfer Lab	DKK2771 Chemical Reaction Lab		
		DKK1523 Computer Application & Engineering Graphics	DKK1771 Analytical Instrumental Lab	DKK2142 Plant Supervision		
				DKK2523 Environmental Engineering		
TOTAL CREDIT PER SEMESTER	5	17	17	21	18	12
90	OVERALL TOTAL CREDIT FOR GRADUATION					

*** The structure of curriculum presented here is effective from January 2020. The university however reserves the right to amend this structure in future for any improvement.**

CURRICULUM STRUCTURE

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (PHARMACEUTICAL) WITH HONOURS

BTK1512
Professional Practice and Ethics
Credit Hour: 2
Prerequisite : None

Synopsis

This subject introduce to the students about engineering technologist profession, behaviours, professionalism and ethics as professional. Those are very important in their careers as engineering technologist or technical executive as well as their services given to public or to the community. The topics in this subject are engineering technology overview, engineering technologist as a profession, engineering ethics, communication, management skill, philosophy of engineering, engineering contribution and innovation in engineering. This knowledge and skill might be required in their future career to ensure their services give a positive impact to the society. By completing this subject the student should understand the professional body involved in their careers and also understand how to obtain the professional membership in the future. In this subject also required the student to expose to the community/charity activities. The student required to propose their community service works by utilizing their knowledge/skill in sciences & technology.

Course Outcome

CO1: Explain the knowledge in societal, legal and environmental issues in the contexts of engineering technologist.
CO2: Describe the relation of philosophy in term of science, technology and engineering.
CO3: Demonstrate ethical competent, well performed and understand the engineering ethics philosophy.

BTK1113
Analytical Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

The syllabus covers the basic knowledge and application of sample and data handling, calibration techniques, data evaluation and quality of analysis in analytical laboratory. It also deals with separation techniques and its basic application such as GC and HPLC. The introduction to the theory and application of spectroscopic techniques used in chemical analysis such as UV-Vis and FT-IR are discussed. The student also will assigned in group to analyse a sample and prepare a report for the laboratory work.

Course Outcome

CO1:Describe the concepts of analytical chemistry and evaluate the analytical data.
CO2:Solve problem related to basic analytical chemistry concepts such as gravimetry and titration.
CO3: Explain the concept and application of analytical equipment such as GC, HPLC, UV-Vis and FTIR
CO4:Practically operate analytical equipment based on the theories learn in class.

BTK2213
Computer Programming for Technologist
Credit Hour: 3
Prerequisite: None

Synopsis

This module will introduce students to programming course that uses MATLAB to illustrate general concepts in computer science and programming. MATLAB is a special-purpose language that is an excellent choice for writing moderate-size programs that solve problems involving the manipulation of numbers. The design of the language makes it possible to write a powerful program in a few lines. Student will become familiar with general concepts in computer science, gain an understanding of the general concepts of programming, and able to apply the knowledge to troubleshoot/diagnose and maintain computer system involving related engineering equipment computer interfaces.

Course Outcome

CO1:Identify the programming platform environment, built-in functions, user defined functions, and etc for computer programming in application software.

CO2:Demonstrate basic programming concepts and skills needed for basic problem solving using application software.
CO3:Demonstrate the ability to execute a functional written computer program and apply it using graphical user interfaces (GUI) as an interactive

expressions.

BTK1253
Thermodynamic
Credit Hour: 3
Prerequisite: None

Synopsis

This subject is designed to introduce the basic concept in thermodynamics. Topics that will be covered in this subject include the properties of pure substances, thermodynamics system, the First Law of Thermodynamics for closed systems, open systems and their application in steady-flow and unsteady-flow processes, The Second Law of Thermodynamics, entropy, introduction to refrigeration, heat engine, and heat pump.

Course Outcome

CO1: Discover the state of properties from property diagram and obtaining data from property table.
CO2: Solve energy balance for both closed and open system using the First Law of Thermodynamics.
CO3: Analyze cyclic devices (heat engine, heat pump and refrigerator), steady flow devices and isentropic processes using the Second Law of Thermodynamics.
CO4: Demonstrate the relationship between thermodynamics behavior and properties via experimental work and laboratory report.

BTK1123
Organic Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses the fundamental theory of the properties, synthesis and organic reactions where use the functional group as framework as a basic level courses with an organic chemical content. It is also focuses on the key concepts of organic chemistry through a study of the reactions of selected nonfunctional and functional groups. Emphasis is placed on the underlying mechanistic pathways that are involved and the stereochemistry of the molecular structure is also considered.

Course Outcome

CO1: Explain the common organics structures, properties , synthesis and reactions of aliphatic hydrocarbons and alcohol groups.
CO2: Demonstrate the properties, chemicals reactions and steps of mechanism for the synthesis of aromatic hydrocarbons, carbonyl groups and amine
CO3: Construct the synthesis of organic compounds and identification of their functional groups
CO4: Present the compounds that have been synthesize and their applications in team

BTK2233
Electrical Technology in Chemical Industry
Credit Hour: 3
Prerequisite: None

Synopsis

This course is designed to introduce the fundamental of electrical system principles. The underlying principles that will be covered in this course include an introduction to an electrical system, basic laws (Ohm's law, Kirchhoff laws, current/voltage divider), circuit analysis and electrical hazards. Students are also exposed to the principle of transformer and discuss about typical equipment used in process industries. A part of that, student also needs to carry out a simple project in order to assess their understanding on the basic electrical principles and its applications.

Course Outcome

CO1: Describe the concepts of electrical system and its components as well as awareness on electrical hazards.
CO2: Analyze electrical circuit problems.
CO3: Describe the instrumentation elements for chemical processes.
CO4: Demonstrate the concepts of electrical principle using AC/DC electrical system.

BTK2273
Computer Aided Design
Credit Hour: 3
Prerequisite: None

Synopsis

This course is introducing the usage of CAD software, AUTOCAD. Students will be exposed and be familiar with the software environment and utilizing the basic and advanced tools to come out with a standard technical drawing especially in chemical engineering equipment.

Course Outcome

CO1: Ability to identify capabilities, limitations and procedures for CAD software.
CO2: Demonstrate knowledge of the usage of CAD software in general technical drawing.
CO3: Ability to use the CAD software in basic and advanced working tools mode for complex technical drawing.
CO4: Apply the CAD software tools in order to create technical drawings for the chemical engineering equipment.

BTK2223
Chemical Process Principles
Credit Hour: 3
Prerequisite: None

Synopsis

This course aims to equip students with basic chemical engineering principles such as different unit systems, unit conversion and process variables determination. This knowledge will then be applied extensively for material and energy balances for single or multiple unit operations of non-reactive and reactive chemical processes.

Course Outcome

CO1:Solve the variables and properties related to material and energy balance problems.
CO2:Analyze the material balance of process nonreactive and reactive systems.
CO3: Analyze the energy balance of process nonreactive and reactive systems.
CO4: Able to measure the concepts of mass and energy balance data obtained from the laboratory experiments.

BTK1243
Fluid Mechanics
Credit Hour: 3
Prerequisite: None

Synopsis

This module will introduce students to the principals of fluid mechanics. Students will apply these principles to the solution of engineering problems such as pipe sizing and the selection of system components such as valves and pumps. The module goal is to enable the student to develop the knowledge and analytical skills in solving practical problems of fluid mechanics, through applications to system design and performance studies.

Course Outcome

CO1:Apply the fluid principles, Bernoulli's equation, continuity equation, fluid properties in various applications.
CO2:Analyse the fluid systems in real pipe line systems and fluid machines.
CO3:Measure, determine, perform and interpret the parameters of fluid experiment as a group.

BTK2253
Mass Transfer
Credit Hour: 3
Prerequisite: None

Synopsis
The objective of this course is to provide students with the concepts and principles of mass transfer. This course will emphasize on the principles of the mass transfer in gases, liquids, biological solutions and gels, and solids. Subsequently, the principles of unsteady-state convective mass transfer will be covered at the end of the course. The students will be exposed to the procedure for general problem solving and its application on real system.

Course Outcome

CO1:Understand the concept of mass transfer in diffusion phenomena in gas, liquid, solid, biological solution and gel system.
CO2: Solve problems related to diffusion and convection mass transfer in steady/unsteady state system.
CO3: Relate the concept of mass transfer in problems related to unit operation/equipment.

BTK2284
Chemical Reactor Technology
Credit Hour: 4
Prerequisite: None

Synopsis

This course introduces the use of process variable, chemical kinetic principles, stoichiometry and conversion variable into the design equation of different types of reactors at ideal condition. The topics covered in this subject are kinetics of homogenous and heterogeneous reactions, classifications of chemical reactions in batch and continuous reactor, including the effects which significantly influence the reactor performance and the study of the real

scenario for non-ideal reactors in industries

Course Outcome

CO1: Apply chemistry, thermodynamics and chemical reaction fundamentals such as reactant limitation, mole balance, rate law and stoichiometry in chemical reactor design analysis.
CO2: Explain the factors that affect the performance of industrial reactor such as mixing and other limiting situation for both homogeneous and heterogeneous reactions.
CO3: Relate the use of conversion, selectivity and yield in chemical reactor design.
CO4: Predict the performance of different types of reactor based on experimental data using an appropriate model.
CO5: Display competency in running bench scale and pilot scale reactors.

BTF1213
Microbiology
Credit Hour: 3
Prerequisite: None

Synopsis

This course aims to provide the students with knowledge of the structure of prokaryotic and eukaryotic cells and biomolecules they are made from. The basic principle of microbiology, including organisms, growth and their industrial application.

Course Outcome

CO1: Compare the basic structures of prokaryotic and eukaryotic cells, the key components and their functions.
CO2: Explain the application of the cell and its operation in industrial biotechnology
CO3: Explain the basis for disinfection and sterilization processes and their applications in bio/pharmaceutical manufacturing.
CO4: Perform and report results of simple laboratory techniques related to aseptic technique, microbial isolation and identification, and simple microscopy technique.

BTP 1133
Material Science and Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course is designed to provide a knowledge on introductory science and properties of materials. The course emphasized on types of materials and the key factor on materials selection expecially for chemical process plant. Student will understand the properties of composite will varied depending on types of material and material formulation. Standard testing for material is included especially on mechanical properties.Experimental works related to material such as mechanical properties of polymer and metals corrosion are embeded in this course.

Course Outcome

CO1: Explain the elementary relationships between structure, properties and performance of materials that are essential for understanding the role of materials in the design of engineering technology systems.
CO2: Compare different type of material, material coded and standard material testing.
CO3: Relate the thermal, electric properties of material and corrosion with certain requirement of application.
CO4: Able to explain the performance of the tested material based on the experimental data.

BTK2263
Heat Transfer
Credit Hour: 3
Prerequisite: None

Synopsis

The objective of this course is to provide students with the concepts and principles of heat transfer. This course will emphasize on the principles of the heat transfer in steady state by conduction, convection and radiation. Students will be exposed for general problem solving and its application on heat exchanger. Three laboratory works on shell & tube heat exchanger and plate heat will be assigned to this subject. Subsequently, the principles of unsteady-state convective heat transfer will be covered at the end of the course.

Course Outcome

CO1: Solve problems related to the heat transfer principles and fundamentals in steady state and unsteady state.
CO2: Apply the concept of heat transfer in problems related to unit operation/ equipment (heat exchanger).
CO3: Analyze the principle of heat transfer individually and in team.

BTK3214
Separation Process I
Credit Hour: 3
Prerequisite: None

Synopsis

The objective of this course is to provide students with concepts of separation processes and unit operation in chemical engineering. It will cover the gas-liquid, vapor-liquid and liquid-liquid separation process. By completing the subject, students will understand the basic mechanisms, operations and basic design parameters of the selected unit operations such as evaporation, distillation, absorption, liquid extraction and leaching.

Course Outcome

CO1: Apply knowledge of chemical engineering fundamentals such as mass transfer, heat transfer, materials and energy balance to the major unit operation.
CO2: Determination of equipment specification and sizing.
CO3: Conduct laboratory scale separators by considering appropriate methodology and safety.

BTF2232
Contamination Control and Clean Room
Credit Hour: 2
Prerequisite: None

Synopsis

This module aims to provide the student with in-depth knowledge to understand and work clean room environment with clear concepts in contamination control

Course Outcome

CO1: Introduction and basic concepts of clean room and contamination control
CO2: Principles, problems and equipment related to clean room and contamination control
CO3: Ability to present as individuals in matters related to contamination control and cleanroom concepts
CO4: Defend with presentation in matters related to contamination control and cleanroom concepts

BTF2632
Introduction to Good Manufacturing Practices
Credit Hour: 2
Prerequisite: None

Synopsis

This course aims to provide the students with in-depth understanding of Good Manufacturing Practices with quality assurance in a pharmaceutical manufacturing industry. The course provides on understanding about quality control, quality assurance, validations, complaints, training and documentation in the pharmaceutical manufacturing industry.

Course Outcome

CO1: Explain the necessity and basics of GMP in pharmaceutical industry
CO2: Analyze the standard of GMP plant by considering quality control, quality assurance, validation and documentation
CO3: Demonstrate concern to the impact of Good Manufacturing Practice towards the issues in Pharmaceutical industry
CO4: Defend ideas with appropriate evidence from Pharmaceutical Inspection Co-operation Scheme (PICS) standards to maintain GMP standards in Pharmaceutical industry.

BTK3274
Process Instrumentation and Control
Credit Hour: 4
Prerequisite: None

Synopsis

Process Instrumentation and Control (PI&C) is the branch of engineering that deals with measurement and control. This course provides students with theoretical and practical training in measurement and control of process variables. Topics covered in this subject are introduction to process control, P&ID drawing, process control instrumentations and data transmission and representation.

Course Outcome

CO1: Explain the basic control system and different types of field instrumentations and its applications in process industries, as well as control systems.
CO2: Perform measurement of process variables using different types of field instrumentations.
CO3: Construct a complete P&ID including alarm system for a particular process or equipment.
CO4: Adapt team working and commitment behaviour.

BTF1623
Manufacturing & Processing Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course is designed to provide the student with an understanding of the equipment unit processes used in pharmaceutical industry and the organization of pharmaceutical manufacturing plant.

Course Outcome

CO1: Analyze major criteria in the manufacturing of pharmaceutical products including drug development, scale-up process and plant organization, management & utilities
CO2: Analyze the processes involved in drug synthesis, its recovery, formulation and filling
CO3: Demonstrate the sequence of steps in formulation & filling, product recovery and plant utilities operation.
CO4: Measure in-process quality control (IPQC) and operating parameters with regard to formulation & filling and plant utilities (i.e. HVAC, compressed air & PW)
CO5: Defend theories and prioritize time effectively to meet the needs of organization

BTF1143
Pharmaceutical Waste Management
Credit Hour: 3
Prerequisite: None

Synopsis

The primary objective of the course is to give students a foundation of knowledge and understanding of waste management. The course presents concept and techniques for testing and analysis of the waste. Practical experiments in the laboratory will also be conducted. Students will be exposed to the water & wastewater analysis, air pollution control and solid waste management

Course Outcome

CO1: Categorize different type of pollutants
CO2: Describe the detection techniques used in environmental quality management
CO3: Explain the principle and unit operation used for the treatment of pollutant
CO4: Demonstrate the evaluation and detection method used for treatment of water, wastewater, air and solid waste
CO5: Perform the environmental and sustainability code and practice to the society

BTF2153
Pharmaceutical Formulation Methods
Credit Hour: 3
Prerequisite: BTK1123 Organic Chemistry

Synopsis

This course aims to provide the student with an in-depth knowledge of formulation development, manufacture and process limitations of solid & liquid dosage forms, sustained release products, veterinary products, aerosols and topical products.

Course Outcome

CO1: Apply in detail the formulation aspects of pharmaceutical and veterinary dosage forms.
CO2: Analyze in detail the instrumentation and manufacturing aspects of pharmaceutical and veterinary dosage forms.
CO3: Ability to perform formulation development experiments
CO4: Ability to document and present as individuals in matters related to pharmaceutical formulations: process and limitation

BTK3714
Final Year Project I
Credit Hour: 4
Prerequisite: None

Synopsis

This course is designed to expose the students to a research/development project. They have to apply all the knowledge they have learned in the program to complete the research project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the project I, the

students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, preliminary results, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

Course Outcome

CO1: Propose the project proposal on a chosen/given topic in the relevant area.
CO2: Defend project proposal in formal oral presentation identifying key outcomes and conclusions
CO3: Function effectively as a member or leader in the diversified technical teams.
CO4: Demonstrate a professional ethics and responsibilities towards the project.
CO5: Propose financial and costing analysis.
CO6: Classify relevant information independently and demonstrate curiosity in exploring new information

BTF3833
OSH in Pharmaceutical Industry (Elective)
Credit Hour: 3
Prerequisite: None

Synopsis

This course intended to provide students with fundamental knowledge of safety and health in industry, particularly in pharmaceutical industry, as well as the law and regulation that one industry should comply to in order to ensure a safe workplace environment. Students will also be taught on hazards identification and the assessment of it through proper safety management.

Course Outcome

CO1: Differentiate legislative requirement, professional and ethical responsibility pertaining to safety and health in the pharmaceutical industry
CO2: Design health and safety programs to control and minimize occupational hazards using project management principles and processes
CO3: Demonstrate the ability to use the software to analyze and solve safety & health-related problem
CO4: Contribute and complete the given task in the given timeframe

BTP 3652
Contemporary Trends in Pharmaceutical Industry
Credit Hour: 2
Prerequisite: None

Synopsis

This module aims to provide the student with in-depth knowledge to understand the pharmaceutical business organization, regulatory parts and recent advanced technological applications.

Course Outcome

CO1: Organize new regulatory requirements to a pharmaceutical industry
CO2: Confirmation of new technical guides to manufacturing plant and equipment design management system
CO3: Express the effectiveness of new management systems to pharmaceutical manufacturing
CO4: Defend with presentation in matters related to interpretation and applications of new regulatory systems
CO5: Maintain the code of practice in report writing

BTP3243
Bioseparation Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course aims to provide the students with the theoretical and practical fundamentals of the technology of the biological product separation. The course focuses on providing understanding of bioseparation processes of four RIPP phases which are recovery, isolation, purification and polishing

Course Outcome

CO1: Apply the principles of each bioseparation technique to solve any related bioseparation problems
CO2: Analyze the operation and limitations of the protein separation techniques required for lab scale and industrial processing
CO3: Perform operational and analytical procedures with regard to bioseparation techniques
CO4: Develop the experimental method proposal and a review of literature through project organization and time efficiently

BTF3373
Quality Management System
Credit Hour: 3
Prerequisite: None

Synopsis

Quality management system in pharmaceutical industries, is an important subject because the drugs / or pharmaceutical products are directly delivered to the customers body system, thus identity, purity safety and ultimately appropriate quality of product are strongly essential.

Course Outcome

CO1: Evaluate the process of translating quality policy into processes, procedures, and instructions to achieve measurable objectives and requirements.
CO2: Generate the planned and methodical activities executed as part of a quality system to provide confidence that process, product, or service requirements for quality are being satisfied.
CO3: Express the act of monitoring, appraising, and correcting a process, product, or service to ensure requirements for quality are being satisfied.
CO4: Defend the process of analyzing performance and taking methodical, systemic actions to improve it.

BTK4726
Final Year Project II
Credit Hour: 6
Prerequisite: BTK3714 FYP I

Synopsis

This subject is the continuation of the subject Final Year Project I. In this subject, the students are required to collect and analyze data, propose solution, model the project, analyzing, conduct research, discussion and write the findings and conclusions. At the end of this semester, the students are required to produce a research project report and present it to faculty's evaluation panel.

Course Outcome

CO1: Analyze the research problem and construct the solution based on the knowledge of mathematics, sciences and engineering technology fundamentals.
CO2: Execute project according to the proposed research plan, schedule and estimated cost and solve the problems by using appropriate tools.
CO3: Discuss the findings within the scopes and objectives and write the technical paper based on the findings.
CO4: Defend the research outcomes of project in a formal oral presentation.
CO5: Demonstrate a professional ethics and responsibilities towards the project.
CO6: Engage in life-long learning enhancing individual's soft skill through research activities.
CO7: Function effectively as a member or leader in the diversified technical teams.
CO8: Manage project in multidisciplinary environments based on safety regulations.

BTP 4663
System Validations
Credit Hour: 3
Prerequisite: None

Synopsis

This module aims to provide students with insights about the processes of validation in pharmaceutical industry. Students will be familiarized with a concept of documented evidence that provides an assurance that a specific process, method or system will consistently produce to the required specification in accordance to accepted standards of Good Manufacturing Practice (GMP). This will provide the students with a good basic to construct validation protocols and implement them appropriately at the workplace.

Course Outcome

CO1: Evaluate the existing facilities, systems, equipment and processes in pharmaceutical industry to be validated
CO2: Generate validation plans, protocols and reports for validation process
CO3: Express with documentation in matters related to system validation in pharmaceutical industry
CO4: Defend the ideas of the selection validation process

BTK4912
Industrial Training
Credit Hour: 12
Prerequisite: Must pass all courses.

Synopsis

In Industrial Training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the fourth academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

Course Outcome

CO1: Initiate effort to apply acquired technical skill for problem solving in the industry.
CO2: Demonstrate a professional commitment and responsibilities at workplace.
CO3: Present the outcomes of industrial training in a formal oral presentation.
CO4: Conduct an analysis on one main issue discovered during industrial training.

BTF3813
Advanced Drug Delivery Systems (Elective)
Credit Hour: 3
Prerequisite: None

Synopsis

This course aims to provide the student with an in-depth knowledge of both theoretical and practical in formulation development, characterization and pharmacological applications of advanced drug delivery systems.

Course Outcome

CO1: Analyze the concepts of advanced drug delivery and its rationale, use of biodegradable polymers, targeted drug delivery and overview of existing marketed formulations with their pharmacological applications.
CO2: Design formulation development aspects of diverse pharmaceutical advanced drug delivery systems.
CO3: Perform formulation development of advanced drug delivery systems
CO4: Defend with documentation in matters related to advanced drug delivery systems: Formulation techniques, characterization & applications

BTF3823
Material Processes & Colloid Science (Elective)
Credit Hour: 3
Prerequisite: None

Synopsis

This course aims to introduce students the information about surface, interface, surfactants, types and mechanism involved in colloids and rheological properties of the colloidal systems to formulate a stable colloidal dosage forms such as emulsion, suspension, ointment, cream etc.

Course Outcome

CO1: Outline the properties of colloids and technical surfaces
CO2: Analyze the rheology and formulation of pharmaceutical colloidal dosage forms
CO3: Design the formulation and evaluation of colloidal systems experiments
CO4: Demonstrate and defend with presentation related to materials processes and colloidal science

BTF3843
Utilities Requirement for Pharmaceutical Industry (Elective)
Credit Hour: 3
Prerequisite: None

Synopsis

This module aims to provide the student with the theoretical and practical fundamentals of water technology and Heating, Ventilation and Air Conditioning (HVAC) System. The chapters cover pharmaceutical water characteristics and quality. For engineering section, the students will learn about unit operations involved in producing pharmaceutical grade water. This module also covers the theoretical, application and operation of HVAC system.

Course Outcome

CO1: Analyse the biological and chemical impurities in pharmaceutical water
CO2: Analyse the main components and their purposes of water treatment and HVAC operations
CO3: Conceptualize the current status of equipment in pharmaceutical water generation and HVAC system for periodical maintenance
CO4: Operate the water system in producing purified water and HVAC system maintenance checking in generating high quality air for cleanroom purpose

BTF3853
Natural Product Development (Elective)
Credit Hour: 3
Prerequisite: None

Synopsis

This course highlights the steps and processes one should undergo in order to develop a natural product. Students will be introduced to the processes that begins from authentication, extraction, formulation and registration of products.

Course Outcome

CO1: Compare the chemical and analytical processes in establishing a prominent lead compound involve during the development of natural products.
CO2: Analyze the different types of analytical and experimental tests to be performed for natural product registration by the local Drug Authority.
CO3: Conceptualize the final dosage of natural products and its pharmacological effects on drug target.
CO4: Develop a natural product from a crude extract into any dosage forms by using appropriate techniques and methods

BTF3863
Natural Product Commercialization (Elective)
Credit Hour: 3
Prerequisite: None

Synopsis

This course describes the process required to commercialize nutraceutical products. Students will be introduced to processes that start from large-scale production, market research, intellectual property registration, commercialization path and feasibility analysis.

Course Outcome

CO1: Determine the characteristics of the corresponding products that are marketable and challenge in marketing the product.
CO2: Analyze a set of commercially valuable rights and route of commercialization
CO3: Develop the process of bringing research products to market.
CO4: Develop the product prototypes that are appropriate and meeting market expectations.

BTF3873
Pharmacology (Elective)
Credit Hour: 3
Prerequisite: None

Synopsis

This course aims to provide students with a comprehensive knowledge of fundamental Pharmacology; drug absorption, distribution, metabolism and excretion. Expose students with knowledge of mechanism of action and uses of the major classes of clinically important drugs currently used in medical practice. These include drugs affecting the autonomic nervous system; anesthetics and analgesics; drugs to treat the heart and diseases of the cardiovascular system; drugs that affect the immune system; drugs that affect the endocrine system and etc.

Course Outcome

CO1: Analyze the principles of pharmacokinetics that underlie the absorption, distribution, metabolism and elimination of drugs in the body.
CO2: Evaluate the scientific basis of drug-drug interactions within the body and the undesirable effects.
CO3: Outline the Pharmacology and the mechanism of action of the major class of clinically important drugs.
CO4: Express with documentation in matters related to clinical use and mechanism of actions of selected drugs.

BTF3883
Biopharmaceutics (Elective)
Credit Hour: 3
Prerequisite: None

Synopsis

This course aims to provide the students with in-depth understanding and applying the biopharmaceutics principles absorption, distribution, metabolism, excretion, bioavailability and pharmacokinetics to expand knowledge of drug action and the influence of physiological and chemical function of drug disposition.

Course Outcome

CO1: Analyze the principles of pharmacokinetics that underlie the absorption, distribution, metabolism and elimination of drugs in the body.
CO2: Evaluate the effects of physiological factors and variability of pharmacokinetics parameters towards drug disposition within body.

CO3: Outline the biopharmaceutics considerations and impacts of Quality Drug Products to pharmaceutical industry
CO4: Express ideas related to biopharmaceutics and pharmacokinetics.

BTF3893
Regulatory Affairs (Elective)
Credit Hour: 3
Prerequisite: BTF2632 Introduction to Good Manufacturing Pratices

Synopsis
This module aims to provide the student with a detailed understanding of the requirements of the Good manufacturing practice (GMPs), GMP guidelines around the globe, basic concepts of validation, management of validation program, validation in pharmaceuticals specifically and being introduced to the post-marketing issues.

Course Outcome

CO1: Describe and interpret the GxP guidelines and the legislation governing the manufacture of pharmaceutical products in Malaysia and ASEAN countries.
CO2: Outline the regulatory, product life cycle including raw material sourcing and validation
CO3: Express with documentation in the regulatory inspection and the significance of post-marketing issues in pharmaceutical industry.

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (PROCESS) WITH HONOURS

BTK1113
Analytical Chemistry

Synopsis

The syllabus covers the basic knowledge and application of sample and data handling, calibration techniques, data evaluation and quality of analysis in analytical laboratory. It also deals with separation techniques and its basic application such as GC and HPLC. The introduction to the theory and application of spectroscopic techniques used in chemical analysis such as UV-Vis and FT-IR are discussed. The student also will be assigned in group to analyze a sample and prepare a report for the laboratory work.

Course Outcomes

CO 01 Describe the concepts of analytical chemistry and evaluate the analytical data.
CO 02 Solve problem related to basic analytical chemistry concepts such as gravimetry and titration.

CO 03 Explain the concept and application of analytical equipment such as GC, HPLC, UV-Vis and FTIR
CO 04 Practically operate analytical equipment based on the theories learn in class

BTK1152
Professional Practice & Ethics

Synopsis

This subject introduces to the students about engineering technologist profession, behaviors, professionalism and ethics as professional. Those are very important in their careers as engineering technologist or technical executive as well as their services given to public or to the community. The topics in this subject are engineering technology overview, engineering technologist as a profession, engineering ethics, communication, management skill, philosophy of engineering, engineering contribution and innovation in engineering. This knowledge and skill might be required in their future career to ensure their services give a positive impact to the society. By completing this subject, the student should understand the professional body involved in their careers and also understand how to obtain the professional membership in the future. In this subject also required the student to expose to the community/charity activities. The student required to propose their community service works by utilizing their knowledge/skill in sciences & technology.

Course Outcomes

CO1 Explain the knowledge in societal, legal and environmental issues in the contexts of engineering technologist.
CO2 Describe the relation of philosophy in term of science, technology and engineering.
CO3 Demonstrate ethical competent, well performed and understand the engineering ethics philosophy

BTK2213
Computer Programming for Technologist

Synopsis

This module will introduce students to programming course that uses MATLAB to illustrate general concepts in computer science and programming. MATLAB is a special-purpose language that is an excellent choice for writing moderate-size programs that solve problems involving the manipulation of numbers. The design of the language makes it possible to write a powerful program in a few lines. Student will become familiar with general concepts in computer science, gain an understanding of the general concepts of programming, and able to apply the knowledge to troubleshoot/diagnose and maintain computer system involving related engineering equipment computer interfaces.

Course Outcomes

CO 01 Identify the programming platform environment, built-in functions, user defined functions for computer programming in application software.

CO 02 Demonstrate basic programming concepts and skills needed for basic problem-solving using application software.

CO 03 Demonstrate the ability to execute a functional written computer program and apply it using graphical user interfaces (GUI) as an interactive expression.

BTK1253
Thermodynamics

Synopsis

This subject is designed to introduce the basic concept in thermodynamics. Topics that will be covered in this subject include the properties of pure substances, thermodynamics system, the First Law of Thermodynamics for closed systems, open systems and their application in steady-flow and unsteady-flow processes, The Second Law of Thermodynamics, entropy, introduction to refrigeration, heat engine, and heat pump.

Course Outcomes

CO 01 Discover the state of properties from property diagram and obtaining data from property table.

CO 02 Solve energy balance for both closed and open system using the First Law of Thermodynamics.

CO 03 Analyze cyclic devices (heat engine, heat pump and refrigerator), steady flow devices and isentropic processes using the Second Law of Thermodynamics.

CO 04 Demonstrate the relationship between thermodynamics behavior and properties via experimental work and laboratory report.

BTK1163
Organic Chemistry

Synopsis

This course discusses the fundamental theory of the properties, synthesis and organic reactions where use the functional group as framework as a basic level courses with an organic chemical content. It is also focus on the key concepts of organic chemistry through a study of the reactions of selected non-functional and functional groups. Emphasis is placed on the underlying mechanistic pathways that are involved and the stereochemistry of the molecular structure is also considered.

Course Outcomes

CO 01 Explain the common organics structures, properties, synthesis and reactions of aliphatic hydrocarbons and alcohol groups.

CO 02 Demonstrate the properties, chemicals reactions and steps of mechanism for the synthesis of aromatic hydrocarbons, carbonyl groups and amine

CO 03 Construct the synthesis of organic compounds and identification of their functional groups

CO 04 Present the compounds that have been synthesize and their applications in team

BTK2233
Electrical Technology in Chemical Industries

Synopsis

This course is designed to introduce the fundamental of electrical system principles. The underlying principles that will be covered in this course include an introduction to an electrical system, basic laws (Ohm's law, Kirchhoff laws, current/voltage divider), circuit analysis and electrical hazards. Students are also exposed to the principle of transformer and discuss about typical equipment used in process industries. A part of that, student also needs to carry out a simple project in

order to assess their understanding on the basic electrical principles and its applications.

Course Outcomes

CO 01 Describe the concepts of electrical system and its components.
CO 02 Analyze electrical circuit problems.
CO 03 Analyze bridge circuit for instrumentation.
CO 04 Demonstrate the concepts of electrical principle using AC/DC electrical system and circuit simulator.

BTK2273
Computer Aided Design

Synopsis

This course is introducing the usage of CAD software, AUTOCAD. Students will be exposed and be familiar with the software environment and utilizing the basic and advanced tools to come out with a standard technical drawing especially in chemical engineering equipment.

Course Outcomes

CO 01 Ability to identify capabilities, limitations and procedures for CAD software.

CO 02 Ability to use the CAD software in basic and advanced working tools mode for complex technical drawing.
CO 03 Apply the CAD software tools in order to create technical 3D drawings for chemical engineering equipment.

BTK2223
Chemical Process Principles

Synopsis

This course aims to equip students with basic chemical engineering principles such as different unit systems, unit conversion and process variables determination. This knowledge will then be applied extensively for material and energy balances for single or multiple unit operations of non-reactive and reactive chemical processes. In addition, computer application using MS Excel to solve the material and energy balance also imbedded in this course.

Course Outcomes

CO 01 Solve the variables and properties related to material and energy balance problems
CO 02 Analyze the material balance of process nonreactive and reactive systems
CO 03 Analyze the energy balance of process nonreactive and reactive systems
CO 04 Able to measure the concepts of mass and energy balance data obtained from the laboratory experiments

BTK1243
Fluid Mechanics

Synopsis

This module will introduce students to the principals of fluid mechanics. Students will apply these principles to the solution of engineering problems such as pipe sizing and the selection of system components such as valves and pumps. The module goal is to enable the student to develop the knowledge and analytical skills in solving practical problems of fluid mechanics, through applications to system design and performance studies.

Course Outcomes

CO 01 Apply the fluid principles, Bernoulli's equation, continuity equation, fluid properties in various applications.
CO 02 Analyze the fluid systems in real pipeline systems and fluid machines.
CO 03 Determine the parameters of fluid experiment as a group.

BTK2253
Mass Transfer

Synopsis

The objective of this course is to provide students with the concepts and principles of mass transfer. This course will emphasize on the principles of the mass transfer in gases, liquids, biological solutions and gels, and solids. Subsequently, the principles of unsteady-state convective mass transfer will be covered at the end of the course. The students will be exposed to the procedure for general problem solving and its application on real system.

Course Outcomes

CO 01 Understand the concept of mass transfer in diffusion phenomena in gas, liquid, solid, biological solution and gel systems.
CO 02 Solve problems related to diffusion and convection mass transfer in steady/unsteady state system.
CO 03 Apply the concept of mass transfer in problems related to unit operation/equipment.

BTK2284
Chemical Reactor Technology

Synopsis

This subject covers the knowledge of the reaction kinetics and reactor design. The course introduces the basic design calculation and design of chemical reactors at the ideal conditions. The topics covered in this subject are kinetics of homogenous and heterogeneous reactions, chemical reactions in batch and continuous reactor, multiple reactions, including the effects which significantly influence the reactor performance and the study of the real scenario for non-ideal reactors in industries.

Course Outcomes

CO 01 Explain the fundamental principle of the operation of chemical reactors in brief towards the development of modern technology used in chemical industries.
CO 02 Relate the use of process variables, stoichiometry and conversion in chemical reactor technology specifications.
CO 03 Compare the performance of different types of reactors for different chemical process industries.
CO 04 Assess the performance of a non-ideal reactors based on experimental data
CO 05 Display competency in running bench scale and pilot scale reactors.

BTK3243
Chemical Plant Safety

Synopsis

This course is primarily to expose students with the fundamental concepts, practical aspects and applications of occupational safety and health (OSH) management in process industries. Among others, the students will be taught the OSH legislations that one industry should comply to in order to ensure a safe workplace environment. Students will also be taught on risk assessment through proper safety management, as well as analysing the cause and effects of industrial incidents and propose for improvement.

Course Outcomes

CO 01 Value fundamentals of technical safety and occupational health in process industries.
CO 02 Explain the various features of safety and health management and legislations.
CO 03 Evaluate OSH aspects in the design and operation of process industries and propose for improvement.

BTK1263
Static & Strength of Materials

Synopsis

This subject will introduce students with concept of statics and strength of materials and its application in related engineering field. The topics covered in this subject are static of particle, static of rigid body, distributed forces, analysis of structure, friction, stress and strain for axial forces, shear forces & bending moments in beam and torsion. Four laboratory works will be assigned in this subject. By completing the course, students will comprehend the basic mechanisms and applications of statics and strength of materials in related engineering field.

Course Outcomes

CO 01 Apply the basic concepts in statics to solve problems concerning resultant of forces acting on a particle and equilibrium of a particle.
CO 02 Analyze problems involving the equilibrium of a rigid and deformable bodies and use the fundamental principles in statics to solve them.
CO 03 Analyze the internal forces, moment and deformation in materials resulting from the axial stress and strain.
CO 04 Demonstrate the relationship between material behavior and properties via experimental work and laboratory report

BTK2243
Materials Science and Engineering

Synopsis

This course is designed to provide a knowledge on introductory science and properties of materials. The course emphasized on types of materials and the key factor on materials selection especially for chemical process plant. Student will understand the properties of composite will varied depending on types of material and material formulation. Standard testing for material is included especially on mechanical properties. Experimental works related to material such as mechanical properties of polymer and metals corrosion are embedded in this course.

Course Outcomes

CO 01 Explain the elementary relationships between structure, properties and performance of materials that are essential for understanding the role of materials in the design of engineering technology systems.
CO 02 Compare different type of material, material coded and standard material testing.
CO 03 Relate the thermal, electric properties of material and corrosion with certain requirement of application
CO 04 Able to evaluate the performance of the tested material based on the experimental data.

BTK2263
Heat Transfer

Synopsis

The objective of this course is to provide students with the concepts and principles of heat transfer. This course will emphasize on the principles of the heat transfer in steady state by conduction, convection and radiation. Students will be exposed for general problem solving and its application on heat exchanger. Three laboratory works on shell & tube heat exchanger and plate heat will be assigned to this subject. Subsequently, the principles of unsteady-state convective heat transfer will be covered at the end of the course.

Course Outcomes

CO 01 Solve problems related to the heat transfer principles and fundamentals in steady state and unsteady state
CO 02 Apply the concept of heat transfer in problems related to unit operation/ equipment (heat exchanger).

CO 03 Analyze the principle of heat transfer individually and in team

BTK3214
Separation Process I

Synopsis

The objective of this course is to provide students with concepts of separation processes and unit operation in chemical engineering. It will cover the gas-liquid, vapor-liquid and liquid-liquid separation process. By completing the subject, students will understand the basic mechanisms, operations and basic design parameters of the selected unit operations such as evaporation, distillation, absorption, liquid extraction and leaching.

Course Outcomes

CO 01 Apply knowledge of chemical engineering fundamentals such as mass transfer, heat transfer, materials and energy balance to the major unit operation.
CO 02 Determination of equipment specification and sizing
CO 03 Conduct laboratory scale separators by considering appropriate methodology and safety.

BTK3112
Project Management

Synopsis

This course deals with cost analysis in engineering decision-making, the management aspects and control of complex projects. Project management topics include knowledge on roles and responsibilities, planning, organization, time, cost, risk and quality management.

Course Outcomes

CO 01 Discuss the need of chemical engineering graduates when they have to make financial decisions as a team member or project manager
CO 02 Apply basic project management concepts and principles through case study.

BTK3122
Engineering Economics

Synopsis

This course deals with cost analysis in engineering decision-making, the management aspects and control of complex projects. Engineering economics topics include cost estimation, time value of money, interest formulas and equivalence calculations, measures of investment worth, depreciation and income tax analysis.

Course Outcomes

CO 01 Explain theoretical and conceptual basis on which the practice of engineering economics project analysis is built.
CO 02 Analyze the economic feasibility of a chemical plant, carried out by examining the capital cost and the manufacturing cost obtained from the cost estimation techniques.

BTK3224
Plant Utilities

Synopsis

A typical chemical plant requires adequate utilities to support a successful operation, such as water, steam, fuel, compressed air, HVAC and fire-fighting system. The important units operated to supply utilities include treatment systems, steam boilers, piping networks and generator. Students will learn the importance, function and mechanism of the utilities in the plant. In this course also the student will be carried out the laboratory. The amount of utilities is estimated based on the process condition setting and support required in the plant. This course will additionally offer the practical training to operate and trouble-shoot the unit operations that supply the utilities.

Course Outcomes

CO 01 Initiate effort to apply acquired technical skill for problem solving in the industry.
CO 02 Demonstrate a professional commitment and responsibilities at workplace.
CO 03 Present the outcomes of industrial training in a formal oral presentation.

BTK3273
Environmental & Sustainable Technology

Synopsis

This subject is designed to introduce to the students the principle of environmental technology and current environmental problems. Topics includes water pollution, wastewater quality management, wastewater treatment, air, noise, solid waste treatment and management. The techniques covered involved in environmental samples testing, and an ability to critically evaluate data from a sampling program. The student will learn how to develop an activity using various strategies to control, reduce and monitor all environmental problems.

Course Outcomes

CO 01 Identify the effect of pollutants on the environment (atmosphere, water, soil)
CO 02 Propose and review the choice of different environmental technical solutions in order to solve or minimize pollutions to air and water from industrial production processes.
CO 03 Analyze the methods involved in management of solid, air, and hazardous waste.
CO 04 Evaluate the impact of pollution to the surrounding environment and the society

BTK3263
Separation Process II

Synopsis

This course aims to introduce the principles of typical unit operations involved in chemical industries which are drying, adsorption, membrane separation process, crystallization and mechanical-physical separation. Students will be exposed to procedures, general problem solving, and applications related to the unit operations stated. Laboratory work will be performed involving selected processes where students will be given the experiment objectives to conduct the experiments in group basis. At the end of this course, it is expected that the students will understand the theories, principles, calculations and basic design parameters associated with every unit operation.

Course Outcomes

CO 01 Determine basic design parameters associated with drying, adsorption, membrane separation process, crystallization and mechanical-physical separation.
CO 02 Apply the concept and solve problems related to drying, adsorption, membrane separation process, crystallization and mechanical-physical separation.

CO 03 Ability to demonstrate the appropriate skills to operate the equipment related to drying, adsorption, membrane and crystallizer considering the safety and environment precautions.

BTK3274
Process Instrumentation and Control

Synopsis

Process Instrumentation and Control (PI&C) is needed in modern industrial processes for a business to remain profitable. It improves product quality, reduces plant emissions, minimizes human error, and reduces operating costs among

many other benefits. In this course students are introduced to the basic and application of PI&C. Topics that will be covered include introduction to process control, P&ID drawing, instrumentation devices and process safety systems as well as development of control systems using LabView. Students will be exposed to both theoretical and practical knowledge for better understanding of this course.

Course Outcomes

CO 01 Explain the basic control system and different types of field instrumentations and its applications in process industries, as well as control systems.
CO 02 Perform measurement of process variables using different types of field instrumentations.
CO 03 Construct a complete P&ID including alarm system for a particular process or equipment.
CO 04 Adapt team working and commitment behavior

BTK3714
Final Year Project I

Synopsis

This course is designed to expose the students to a research/development project. They have to apply all the knowledge they have learned in the program to complete the research project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the project I, the students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, preliminary results, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

Course Outcomes

CO 01 Propose the project proposal on a chosen/given topic in the relevant area
CO 02 Defend project proposal in formal oral presentation identifying key outcomes and conclusions
CO 03 Function effectively as a member or leader in the diversified technical teams
CO 04 Demonstrate a professional ethics and responsibilities towards the project
CO 05 Propose financial and costing analysis
CO 06 Classify relevant information independently and demonstrate curiosity in exploring new information

BTK3233
Process Modelling and Simulation

Synopsis

This course will introduce the usage of process simulation and flow sheeting software; Aspen Plus/Aspen HYSYS to students. This software will be used to simulate steady state chemical engineering and other related processes which includes gas, liquid and solid processing. This subject is important to prepare students for future usage of the advanced modelling tool in chemical engineering and other related fields involving process design and simulation.

Course Outcomes

CO 01 Develop flowsheet to model and simulate problems related to chemical engineering unit operations.
CO 02 Simulate steady-state chemical engineering processes which includes gas, liquid and solid processing.
CO 03 Perform sensitivity analysis and optimization of chemical engineering processes

BTK4214
Plant Automation

Synopsis
This subject is designed as an introduction to process automation. Topics that will be covered in this subject include introduction to automation system; development of empirical dynamic process model; feedback process control; controller design and tuning; the application of programmable logic controller (PLC), Supervisory control and data acquisition (SCADA) and distributed control system (DCS) in process automation.

Course Outcomes

CO 01 Construct empirical dynamics process model and describe the dynamics behavior.
CO 02 Analyze feedback process control, PID design and tuning.
CO 03 Practice process control and PID tuning using PLC and simulated process control.

BTK4726
Final Year Project II

Synopsis

This subject is the continuation of the subject FYP I. In this subject, the students are required to collect and analyze data, propose solution, model the project, analyzing, conduct research, discussion and write the findings and conclusions. At the end of this semester, the students are required to produce a research project report and present it to faculty's evaluation panel.

Course Outcomes

CO 01 Analyze the research problem and construct the solution based on the knowledge of mathematics, sciences and engineering technology fundamentals
CO 02 Execute project according to the proposed research plan, schedule and estimated cost and solve the problems by using appropriate tools
CO 03 Discuss the findings within the scopes and objectives and write the technical paper based on the findings
CO 04 Defend the research outcomes of project in a formal oral presentation
CO 05 Demonstrate a professional ethics and responsibilities towards the project
CO 06 Engage in life-long learning enhancing individual's soft skill through research activities
CO 07 Function effectively as a member or leader in the diversified technical teams
CO 08 Manage project in multidisciplinary environments based on safety regulations

BTK4224
Plant Troubleshooting and Maintenance

Synopsis

The aim of this course is to expose students with maintenance of industrial process plant. Student also will be exposed to the concept of process plant maintenance, standard operating procedures when carrying out maintenance and troubleshooting work. In addition, the mini project and case studies will have industrial involvement for students' exposure.

Course Outcomes

CO 01 Explain the concept of process plant maintenance and its strategies
CO 02 Evaluate the reliability of processing plant through various strategies to ensure smooth plant operations
CO 03 Assess the operations major process equipments and its common operating problems

BTK4112
Internship Preparation

Synopsis

This course intended to prepare students to industrial preparation and the environment of how the industry work. The safe work in place is being deliver here for the safety propose.

BTK4912
Industrial Training

Synopsis

In industrial training the students should gain insight into the industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo 10 weeks of industrial training during the end of the semester of the third academic year. The performance of each student during the periods of his/her Industrial training is evaluated jointly by the faculty staff, and the representatives from employer organizations. The student is required to maintain proper records and submit reports on the training received by him/her. The industrial training report should cover all periods of approved employment. The report document is expected to demonstrate development of practical and professional skills in Engineering through technical experience and application of theoretical knowledge. Development of skills in dealing with people, and communication skills are part of the subject objectives. The student should be able to present the report to university supervisor, as a complement to their degree.

Course Outcomes

CO 01 Initiate effort to apply acquired technical skill for problem solving in the industry.
CO 02 Demonstrate a professional commitment and responsibilities at workplace.
CO 03 Present the outcomes of industrial training in a formal oral presentation.
CO 04 Conduct an analysis on one main issue discovered during industrial training.

BTK3813
Petroleum Refining & Petrochemical Technology (E)

Synopsis

This course exposes the student to the refining and petrochemical industry. Besides, the student will also be able to identify and select the suitable equipment based upon specific condition and operation in refinery plant. After understanding the process and standard operating conditions, they will be able to draw a refinery and petrochemical process plant by using software or simulator such as ASPEN Plus, AutoCAD or Microsoft Visio.

Course Outcomes

CO 01 Identify refinery and petrochemical industry activities
CO 02 Explain the process operation of refinery and petrochemical plant
CO 03 Relate the implementation sustainable concept in the refinery and petrochemical industry
CO 04 Identify issues related to the refinery and petrochemical industry

BTK3823
Bioprocess Technology (E)

Synopsis

This subject introduces the basic concepts of bioreactor operational mode for bioprocessing industry, emphasize on the application of transport phenomena in bioreactor, scale up, monitoring and control of bioreactor. The topics include introduction of the unit operations that commonly employed to separate biological products. An idealized process of bioseparation consists of four phases which are the removal of insoluble

products, the isolation of desired biological products or concentration, the purification and lastly, polishing of biological products. The basic methods that will be covered in this course include filtration, centrifugation, cell disruption, precipitation, extraction, adsorption, and chromatography. In addition, an overview on the complete train of bioseparation will also be introduced.

Course Outcomes

CO 01 Identify different bioreactor operational modes for bioprocessing industry
CO 02 Explain the principles of the four phases involved in bioseparation

CO 03 Relate the implementation of sustainable concept to synthesize bioproduct compounds
CO 04 Identify issues related to the bioprocessing industry

BTK3843
Food Engineering Technology (E)

Synopsis

This course is designed to introduce the applications of certain unit operations in the processing of different types of food products. The principles and methods of dehydration, refrigeration and freezing, are discussed with emphasis on their applications in the processing of food products. The course will also provide an appreciation on the importance of food packaging, food safety and hygiene. Student also will be taught to identify the current problem in food industry. Plant site visit and case studies in food industries also will be done by student for exposure.

Course Outcomes

CO 01 Identify current status and future trends of food processing industry in Malaysia

CO 02 Explain the principles of dehydration, refrigeration and freezing in food products

CO 03 Relate the implementation sustainable concept in food processing industry

CO 04 Identify issues related to food production technology

BTK3853
Oleo Chemical Technology (E)

Synopsis

This course introduces the oleochemical industry operation. It covers some introduction to oils and fats compositions, vegetable oil/plant mill operations, plant oil refinery process, production of edible products, fatty acid and soap production, as well as biofuel derived from vegetable oil and fats. Various fats and oil analyses will be discussed. Various other oleochemical reactions, process sustainability, environment impact and waste management will be discussed based on specific applications.

Course Outcomes

CO 01 Identify important activities in oleochemical processing industry

CO 02 Explain the process operation in oleochemical industry.
CO 03 Relate the implementation of sustainable concept in the oleochemical processing industry

CO 04 Identify issues related to the oleochemical industry

BTK3873
Operation Management (E)

Synopsis

This course introduces the operation management. It covers some introduction to competitiveness, strategy & productivity, forecasting, product and service design, strategic capacity planning for product and services, process selection and facility layout, work design and measurement, location planning and analysis, management of quality, quality control,

MRP and ERP, inventory management, JIT and lean management, supply chain management, scheduling and project management.

Course Outcomes

CO 01 Identify the operation management concept and its importance

CO 02 Explain operation management concepts applied in chemical process industries

CO 03 Relate the implementation of operation management for a sustainable process

CO 04 Identify issues related to the implementation of operation management in the industry

MKK1313
Chemical Product Design & Management (E)

Synopsis

This course introduces the chemical product design and management. It includes the extension of chemical engineering design to encompass both process design and product design. The design approach is based on the four-step procedure for chemical product design such as needs, ideas, selection, and manufacturing. Several case studies in the chemical product design are presented with special emphasis on the specialty and fine chemicals.

Course Outcomes

CO1 Develop a sample based on chemical product design approach

CO2 Recognize the phases of the chemical product design and differences from industrial process chemistry

CO3 Identify the varieties of chemical products in the chemical product design (micro structured products and specialty chemicals

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (PETROLEUM) WITH HONOURS

BTK1163
Organic Chemistry
Credit : 3

Synopsis

This course discuss the fundamental theory of the properties, synthesis and organic reactions where use the functional group as framework as a basic level courses with an organic chemical content. This course focuses on the key concepts of organic chemistry through a study of the reactions selected nonfunctional aliphatic, alicyclic, cyclic and aromatic molecules. Particular emphasis is placed on the underlying mechanistic pathway that are involved and their stereo chemical consequences. The stereochemistry of the molecular structure is also considered.

Course Outcomes

CO1: Able to understand the common organics structures, properties and reactions of aliphatic and aromatic hydrocarbons, alkyl halides, alcohol groups, carbonyl groups and amines.
CO2: Formulate chemicals reactions and steps of mechanism for the synthesis and transformation of functional group.
CO3: Discuss the bonding properties of carbon which cause it to be present in such a large number and variety of important compounds.
CO4: Explain the common types of reactions mechanism and modern synthesis techniques.

BTK1152
Professional Practice and Ethics
Credit : 2

Synopsis

This subject introduces the students about personality particulars and behaviors. Those are very important in their careers as engineer technologist, as well as their services given by them to other people, especially their local community. The topics that will be included in this subject are the importance, professionalism, ethics, communication, management, contribution and philosophy of engineering technologidt that should be implemented in their work, to ensure their engineering services give positive impacts in social aspects. By completing this subject, students should practice themselves as competent and versatile professional engineers, at least to be respected and appreciated among their communities, societies and countries.

Course Outcomes

CO1 Explain knowledge of economic, industrial and social contexts of engineering technologist.
CO2 Describe the relation of philosophy in term of science, technology and engineering.
CO3 Demonstrate ethical competent, well-performed and well-servicing people in their career and to their communities and countries.

BTK1243
Fluid Mechanics
Credit : 3

Synopsis

The objective of this course is to introduce the concept and use of fluid mechanics, both static and dynamics fluid. The covered topics are fluid properties, fluid static and dynamics, Bernoulli's equation and applications, momentum equation and its application, analysis of flow in pipeline system and dimensional analysis.

Course Outcomes

CO1: Recognize and describe the fundamentals of fluid mechanics
CO2: Apply the concept of fluid mechanics to overcome chemical engineering problems
CO3: Analyze and find solutions to problems related to fluid mechanics

The information provided by Faculty of Chemical & Process Engineering Technology are based on University's Regulation and endorsement until

BTK1113
Analytical Chemistry
Credit : 3

Synopsis

The syllabus covers the basic knowledge and application of sample and data handling, calibration techniques and quality of analysis in analytical laboratory. It also deals with separation techniques and its basis application such as solid phase extraction, GC and HPLC. The introduction to the theory and application of spectroscopic techniques used in chemical analysis such as UV-Vis, FT-IR, MS and AAS are discussed. The combinations of above techniques with their advantages are covered in this course.

Course Outcomes

CO1: Explain and describe the theory and application of analytical chemistry.
CO2: Interpret and analyze the analytical data.
CO3: Solve the problems related to analytical chemistry.
CO4: Explain the concept and application of analytical equipment such as: GC, HPLC, FTIR, UV-Vis and AAS.

BTK1263
Static & Strength of Materials
Credit : 4

Synopsis

This course is an overview of the study and analysis of forces and loading conditions applied to structures and mechanical devices. An introduction to methods used to determine internal stresses present in machine parts when subjected to various loading conditions. Topics include: simple stresses, centroids, moments of inertia, torsion, shear and bending stresses. Upon completion, students should be able to analyze forces and the results of stresses and strains on structural components.

Course Outcomes

CO1 Establish an understanding of the fundamental concepts of mechanics of deformable solids; including static equilibrium, geometry of deformation, and material constitutive behavior.
CO2 Provide students with exposure to the systematic methods for solving engineering problems in solid mechanics.
CO3 Discuss the basic mechanical principles underlying modern approaches for design of various types of structural members subjected to axial load, torsion, bending, transverse shear, and combined loading.
CO4 Demonstrate use of critical thinking and problem solving techniques as applied to mechanical and structural systems.

BTO1133
Introduction to Petroleum Technology
Credit : 3

Synopsis

This course refers to the exploration, extraction and production of petroleum. It focuses on the methods, concepts and applications that are used in the various processes related to petroleum engineering. This course also briefly discusses the operation and equipment used in drilling, well completion and transportation of petroleum. On top of that, accidents related to petroleum engineering also will be covered.

Course Outcomes

CO1 Illustrate components related to petroleum Technology.
CO2 Define the processes involved in production of petroleum.
CO3 Relate industrial practices with components of petroleum technology.

BTK1253
Thermodynamics
Credit : 3

Synopsis

This course is designed to introduce basic concept in thermodynamic in a thorough way. Topics cover are properties of pure substances, thermodynamics system, heat

transfer through conduction, convection and radiation, the first law of thermodynamics for closed systems, open systems and their application in steady-flow and unsteady-flow processes, the second law of thermodynamics, entropy, introduction to refrigeration and steam power plant.

Course Outcomes

CO1: Discover the state of properties from property diagram and obtaining data from property table.
CO2: Solve energy balance (heat, mass and work) of a process for both closed and open system by using the first law of thermodynamics and the concept of entropy through its reversible and irreversible processes.
CO3: Analyze the thermal efficiency of heat engine, heat pump, and refrigerator and Carnot cycle using Second Law of Thermodynamics

BTK 2213
Computer programming for Technologist
Credit : 4

Synopsis

This module will introduce students to programming course that uses MATLAB to illustrate general concepts in computer science and programming. MATLAB is a special-purpose language that is an excellent choice for writing moderate-size programs that solve problems involving the manipulation of numbers. The design of the language makes it possible to write a powerful program in a few lines. Student will become familiar with general concepts in computer science, gain an understanding of the general concepts of programming, and able to apply the knowledge to troubleshoot/diagnose and maintain computer system involving related engineering equipment computer interfaces

Course Outcomes

CO1: Understand the programming platform environment, build in functions, user defined functions, and etc for computer programming in MATLAB.
CO2: Describes basic programming concepts and skills needed for basic problem solving using MATLAB software
CO3: Demonstrate the ability to execute a functional written computer program and apply it using graphical user interfaces (GUI) as an interactive expressions

BTK2223
Chemical Process Principles
Credit : 3

Synopsis

This course aims to equip students with basic chemical engineering principles such as different unit systems, unit conversion and process variables determination. This knowledge will then be applied extensively for material and energy balances for single or multiple unit operations of non-reactive and reactive chemical processes. In addition, computer application using MS Excel to solve the material and energy balance also imbedded in this course.

Course Outcomes

CO1 Solve the variables and properties related to material and energy balance problems.
CO2 Analyze and solve material balance of process nonreactive and reactive systems.
CO3 Analyze and solve energy balance of process nonreactive and reactive systems
CO4 Analyze and solve flow sheet for a pre-determined chemical processes

BTK2233
Electrical Technology in Chemical Industry
Credit : 3

Synopsis

This course is designed to introduce the fundamental of electrical system principles. The underlying principles that will be covered in this course include an introduction to an

electrical system, basic laws (Ohm's law, Kirchhoff laws, current/voltage divider), circuit analysis and electrical hazards. Students are also exposed to the principle of transformer and discuss about typical equipment used in process industries. A part of that, student also needs to carry out a simple project in order to assess their understanding on the basic electrical principles and its applications

Course Outcomes

CO1: Describe the concepts of electrical system and its components as well as awareness on electrical safety.
CO2: Analyze and solve electrical circuit problems.
CO3: Demonstrate the concepts of electrical principle and functional study of typical equipment used in process industries

BTK2253
Mass Transfer
Credit : 3

Synopsis

The objective of this course is to provide students with the concepts and principles of mass transfer. This course will emphasize on the principles of the mass transfer in gases, liquids, biological solutions and gels, and solids. Subsequently, the principles of unsteady-state convective mass transfer will be covered at the end of the course. The students will be exposed to the procedure for general problem solving and its application on real system

Course Outcomes

CO1 Understand, explain, discuss and solve problems of mass transfer in diffusion phenomena in gas, fluid and solid system
CO2 Apply fundamental understanding and solve problems related to diffusion and convection mass transfer in steady/unsteady state.
CO3 Relate the concept of mass transfer in problems related to unit operation/equipment.

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BTK2263
Heat Transfer
Credit : 3

Synopsis

This objective of this course is to provide students with the concepts and principles of heat transfer. This course will emphasize on the principles of the heat transfer in steady state by conduction, convection and radiation. Students will be exposed for general problem solving and its application on heat exchanger. Three laboratory works on shell & tube heat exchanger and plate heat will be assigned to this subject. Subsequently, the principles of unsteady-state convective heat transfer will be covered at the end of the course.

Course Outcomes

CO1 Understand, explain, discuss and solve problems related to the heat transfer principles and fundamentals in steady state.
CO2 Understand, explain, discuss and solve problems related to the heat transfer principles and fundamentals in unsteady-state.
CO3 Relate the concept of heat transfer in problems related to unit operation/ equipment (heat exchanger).

BTK2273
Computer Aided Design
Credit : 3

Synopsis

This course is introducing the usage of CAD software, AUTOCAD and Aspen Plus as a powerful engineering tool specialized in technical drawing and process simulation in chemical engineering applications. For AUTOCAD, student will be exposed and be familiar with the software environment and utilizing the basic and advanced tools to come out with a standard technical drawing especially in chemical engineering equipment. Meanwhile, for Aspen Plus, student will be exposed and be familiar with the software interfaces and apply the usage for selected chemical engineering processes

Course Outcomes

CO1: Ability to identify capabilities, limitations and procedures for CAD software.
CO2: Demonstrate knowledge of the usage of CAD software in general technical drawing and process simulation.
CO3: Ability to use the CAD software in basic and advanced working tools mode for complex technical drawing and basic process simulation..
CO4: Apply the CAD software tools in order to create technical drawings for the chemical engineering equipment and simulate selected chemical engineering processes

BTK2284
Chemical Reactor Technology
Credit : 4

Synopsis

This subject covers the knowledge of the reaction kinetics and reactor design. The course introduces the basic design calculation and design of chemical reactors at the ideal conditions. The topics covered in this subject are kinetics of homogenous and heterogeneous reactions, chemical reactions in batch and continuous reactor, multiple reactions, including the effects which significantly influence the reactor performance and the study of the real scenario for non-ideal reactors in industries

Course Outcomes

CO1 Apply chemistry, thermodynamics and chemical reaction fundamentals such as reactant limitation, mole balance, rate law and stoichiometry in reactor design
CO2 Explain the factors that affect the performance of industrial reactor such as diffusion, mixing and other limiting situation for both homogeneous and heterogeneous reactions
CO3 Design reactors based on desired conversions, selectivity and yield.
CO4 Predict the non-ideal reactor performance based on the residence time distribution data using an appropriate model.

BTK3214
Separation Process I
Credit : 4

Synopsis

The objective of this course is to provide students with concepts of separation processes and unit operation in chemical engineering. It will cover the gas-liquid, vapor-liquid and liquid-liquid separation process. By completing the subject, students will understand the basic mechanisms, operations and basic design parameters of the selected unit operations such as evaporation, distillation, absorption, liquid extraction and leaching.

Course Outcomes

CO1 Apply knowledge of chemical engineering fundamentals such as mass transfer, heat transfer, materials and energy balance to the solution of unit operation problems
CO2 Identify type of separation processes and analyze the unit operation problems to obtain number of stages and separator sizing.
CO3 Conduct and perform laboratory scale separators by considering appropriate methodology, safety and environment

BTO1214
Geosciences & Petroleum Exploration
Credit : 4

Synopsis

This course provides understanding and the importance of geoscience in petroleum exploration. It covers basic geology, formation of petroleum system, and techniques used in petroleum exploration. A case study also provides a good understanding and enhance the student's knowledge in this course.

Course Outcomes

CO1 Explain the fundamental concepts of petroleum geology such as basic rock types and basic geological principles controlling

the nature, occurrence and accumulation of petroleum.

CO2 Understand the main characteristics of petroleum geochemistry, petroleum reservoirs and resources.

CO3 Identify the fundamental terms, principles, and tools of petroleum geoscience.

CO4 Apply the knowledge of geoscience to solve the project/case study.

BTK3253
Process Management and Economics
Credit : 3

Synopsis

This course deals with cost analysis in engineering decision-making, the management aspects and control of complex projects. Engineering economics topics include cost estimation, time value of money, interest formulas and equivalence calculations, measures of investment worth, depreciation and income tax analysis. Engineering project management topics include knowledge on roles and responsibilities, planning, organization, time, cost, risk and quality management

Course Outcomes

CO1 Discuss the need of chemical engineering graduates when they have to make financial decisions as a team member or project manager.

CO2 Explain theoretical and conceptual basis on which the practice of engineering economics project analysis is built.

CO3 Apply basic project management concepts and principles through case study.

CO4 Analyze the economic feasibility of a chemical plant, carried out by examining the capital cost and the manufacturing cost obtained from the cost estimation techniques

BTO3143
SHE in Petroleum Industry
Credit : 3

Synopsis

This course is primarily to expose students with the fundamental concepts, practical aspects and applications of occupational safety and health (OSH) in process industries. Among others, the students will be taught the fundamental application and day-to-day aspects of OSH and at the same time, the management aspects of it. Local and international regulations related to SH&E such as OSHA and FMA will also be covered. Major accident's case studies and lesson learnt will also be discussed in details.

Course Outcomes

CO1: Value fundamentals of technical safety in process industries.

CO2: Explain the various features of OSH management and regulations. Explain the various features of OSH management and regulations

CO3: Evaluate OSH aspects in the design and operation of process industries

CO4: Review and analyze the cause and effects of industrial incidents and propose for improvement.

BTO3124
Environmental & Waste Technology
Credit : 4

Synopsis

This subject is designed to introduce to the students the principle of environmental technology and current environmental problems. Topics includes water pollution, wastewater quality management, wastewater treatment, air, noise, solid waste treatment and management. The techniques covered involved in environmental samples testing, and an ability to critically evaluate data from a sampling program**.** The student will learn how to develop an activity using various strategies to control, reduce and monitor all environmental problems**.**

The information provided by Faculty of Chemical & Process Engineering Technology are based on University's Regulation and endorsement until

Course Outcomes

CO1 Be able to identify and value the effect of the pollutants on the environment (atmosphere, water ,soil) and expose to environmental legislation & regulation practices in Malaysia
CO2 Propose and review the choice of different environmental technical solutions in order to solve or minimize pollutions to air and water from industrial production processes.
CO3 Analyze the concept and analytical methods involved in management of solid, air, water and hazardous waste

BTO3114
Formation & Reservoir Technology
Credit : 4

Synopsis

Reservoir description techniques using petrophysical and fluid properties; engineering methods to determine fluids in place, identifying production drive mechanisms, and forecast reservoir performance; implementation of pressure maintenance schemes and secondary recovery; formation evaluation. The course will be focusing more on practical application of science and engineering to a wide range of real-world reservoir engineering problems.

Course Outcomes

CO1 Understand the main terminology, concepts and techniques of reservoir engineering technology, petrophysical and fluid properties.
CO2 Analyse and evaluate single and multi-phase fluid flow, material balance, and forecasting.
CO3 Apply the fractional flow theory, strategies and displacement performance calculations to the primary, secondary and enhanced oil recovery.
CO4 Evaluate the reservoirs for potential hydrocarbons and to determine the value of those hydrocarbon reserves.

BTR3274
Process Instrumentation and Control
Credit : 4

Synopsis

Process Instrumentation and Control (PI&C) is needed in modern industrial processes for a business to remain profitable. It improves product quality, reduces plant emissions, minimizes human error, and reduces operating costs among many other benefits. In this course students are introduced to the basic and application of PI&C. Topics that will be covered include introduction to process control, P&ID drawing, instrumentation devices and process safety systems as well as development of control systems using LabView. Students will be exposed to both theoretical and practical knowledge for better understanding of this course.

Course Outcomes

CO1: Explain the basic concept of process instrumentation and control (I&C) and its symbols, identify different types of field instrumentations, control and safety systems, and explain its advantages and disadvantages as well as its applications in process industries
CO2: Demonstrate the ability to construct P&ID and evaluate suitable instruments for a particular process or equipment.
CO3: Construct a functional PI&C system through integration of systems engineering software i.e. LabView.

BTO3214
Well Drilling & Completion
Credit : 4

Synopsis

The course covers the fundamentals of drilling engineering and well completion. In the area of drilling; the following are covered: the drilling process; equipment and performance; well control procedures; fluid design; well casing design and cementing process; overview of drilling operations. Well Completions addresses: the course covers the fundamental principles of the design well completions, casing design in various loading condition with various downhole situations, cementing techniques, placement of casing,

liners and well tubing. Lectures also cover types of perforations, tubing string and its accessories, production packer and tubing sealing assemblies that should be installed in production wells to produce oil and gas safely to the surface and introduction to well stimulation. This course is conducted through lectures, group assignments and practical test.

Course Outcomes

CO1 Effectively describe petroleum well drilling and completion principles, including key features of various components, and use these descriptions in appropriate for design, analysis and evaluations.
CO2 Recognize, identify and analyse the problems involved during drilling operation, identify key design parameters, and estimate them appropriately; and solve the relevant problems through analysing, evaluating and synthesising information.
CO3 Ability to approach problems in a logical way (theory & practical), be able to formulate an optimum solution and decide what data / information is relevant from a range of sources, how these relate to each other and identify inconsistencies.
CO4 Ability to conduct related experiments and to work as a part of the team through successful completion of a group project.

BTO4714
Petroleum Refining and Gas Processing
Credit : 4

Synopsis

This course provides students with fundamental technologies of petroleum refining and gas processing. These two plants will produce fuels and feedstocks for chemical industries. For a refinery plant, it involves physical and chemical (thermal and catalytic) processing steps such as ADU, VDU, FCC, HC, HT and etc. For a gas processing plant, it comprises systems such as DHU, AGRU, LTSU and PRU, as to make the gas as per specifications. Additionally, theoretical knowledge will be enhanced by having ASPEN HYSYS process simulation and optimization in the computer laboratory. This course is conducted through lectures, assignments, computer simulations and presentations.

Course Outcomes

CO1: Describe the functions and overall value chain of petroleum refinery and gas processing plants.
CO2 Justify the necessities of each of the unit operation in a refinery plant and perform related calculations.
CO3 Justify the necessities of each of the unit operation in a gas processing plant and perform related calculations.
CO4 Evaluate and improve operational performance of refinery and gas processing plants using ASPEN HYSYS.

BTK3714
Final Year Project I
Credit : 4

Synopsis

This course is designed to expose the students to a research/development project. They have to apply all the knowledge they have learned in the program to complete the research project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the project I, the students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, preliminary results, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

Course Outcomes

CO1: To identify and analyse broadly-defined research problems using the principles of mathematics, natural sciences or engineering science.
CO2: To design and develop solutions based on broadly-defined research problems

CO3: To engage in independent and life-long learning in the broader context of technological change, enhance individual's soft skill and organization skills in research activities.
CO4: . To communicate effectively on research outcomes with the engineering community and society (oral/ written)

BTK4716
Final Year Project II
Credit : 6

Synopsis

This subject is the continuation of the subject FYP I. In this subject, the students are required to collect and analyze data, propose solution, model the project, analyzing, conduct research, discussion and write the findings and conclusions. At the end of this semester, the students are required to produce a research project report and present it to faculty's evaluation panel.

Course Outcomes

CO1: To apply knowledge of mathematics, natural sciences, engineering fundamentals or engineering specialization to the research problems.
CO2: To identify and analyse broadly-defined research problems using the principles of mathematics, natural sciences or engineering science.
CO3: To design and develop solutions based on broadly-defined research problems.
CO4: To conduct investigation on broadly-defined research problems including design of experiments, analysis and data interpretation, and conclusion.
CO5 To engage in independent and life-long learning in the broader context of technological change, enhance individual's soft skill and organization skills in research activities.
CO6 To communicate effectively on research outcomes with the engineering community and society (oral & written)

BTK4912
Industrial Training
Credit : 12

Synopsis

In industrial training the students should gain insight into the industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo 6 months of industrial training during the end of the semester of the third academic year. The performance of each student during the periods of his/her Industrial training is evaluated jointly by the faculty staff, and the representatives from employer organizations. The student is required to maintain proper records and submit reports on the training received by him/her. The industrial training report should cover all periods of approved employment. The report document is expected to demonstrate development of practical and professional skills in Engineering through technical experience and application of theoretical knowledge. Development of skills in dealing with people, and communication skills are part of the subject objectives. The student should be able to present the report to university supervisor, as a complement to their degree.

Course Outcomes

CO1 Display independency in actual working environment with minimal supervision
CO2 Display communication skill with different levels of staff in the organization
CO3 Present technical documents related to the work completed.

BACHELOR OF TECHNOLOGY IN OIL AND GAS FACILITIES MAINTENANCE WITH HONOURS

BVF1113
Introduction to Oil & Gas Facilities
Credit: 3

Synopsis

The objective of this module is to familiarize students with the overview of oil and gas (O&G) industry. The course will focus on the understanding of the purpose and operating principles of the existing facilities in upstream, midstream and downstream sectors. At the end of the course, student should be able to classify the common equipment categories which are static, rotating and, control and instrumentations.

Course Outcomes

CO1: Explain the physical principles and the gas equations in perfect or real condition.
CO2: Apply basic thermodynamics concept to solve the problem related to applied physical chemistry
CO3: Explain the structure of surfaces and the phenomena of adsorption isothermal surfaces chemical processes.

BVF1123
Ethics in Profession
Credit: 3

Synopsis

This subject gives an overview of technologist, the profession and its requirement in Malaysia scenario. Topics that will be included ethics, management and contribution of technologist also generic skills and study skills. Code & Standards for hand on consisted in this subject as preparation as a technologist student. Plant visit and seminar as an exposure to the real field of oil and gas technologist. the basic knowledge on the technopreneurship being introduce to prepare student the basic understanding on technoprenuer..

Course Outcomes

CO1: Able to understand the common organics structures, properties and reactions of aliphatic and aromatic hydrocarbons, alkyl halides, alcohol groups, carbonyl groups and amines.
CO2: Formulate chemicals reactions and steps of mechanism for the synthesis and transformation of functional group.
CO3: Discuss the bonding properties of carbon which cause it to be present in such a large number and variety of important compounds.
CO4: Explain the common types of reactions mechanism and modern synthesis techniques.

BVF1133
Emerging Technologies in Oil and Gas Industry
Credit: 3

Synopsis

The aim of this course is to expose the students how industrial revolution 4.0 is transforming the oil & gas sector by introducing various innovative and modern technologies which have the potential to reduce the financial and safety risks, hence improve operations, efficiency and revenues. The topics covered in this subject are the data analytics, cloud computing, wireless technologies, Industrial Internet of Things (IOT) and sensors, artificial intelligence, augmented/virtual reality for training, automation and 3-D printing. By completing this course, students will comprehend the idea of how industry 4.0 is transforming the oil and gas industry and also the modern technologies employed to achieve this industry 4.0.

Course Outcomes

CO1 Explain knowledge of economic, industrial and social contexts of engineering technologist.
CO2 Describe the relation of philosophy in term of science, technology and engineering.

CO3 Demonstrate ethical competent, well-performed and well-servicing people in their career and to their communities and countries.

BVF1143
Technical Drawing & CAD
Credit: 3

Synopsis

This course is introducing the usage of technical drawing as a standard and precise ways to communicate the engineering ideas. Student will learn about the technicalities in technical drawing and get familiar with a standardized drawing according to the international standard (ISO 128). Furthermore, various aspects such as projections, dimensioning and sectioning and etc in technical drawing will also be covered. Meanwhile the CAD software, specifically AutoCAD, specialized in technical drawing is also included as a tools to produce an accurate drawing. Student will be exposed and be familiar with the software environment and utilizing the basic and advanced tools to come out with a standard technical drawing / working drawing especially in oil and gas technology field. This course will also cover P&ID standard drawing using Microsoft Visio software

Course Outcomes

CO1 Demonstrate knowledge in technicalities of technical drawing for oil and gas related applications.
CO2 Demonstrate knowledge of the usage of CAD software in general technical drawing.
CO3 Apply the CAD software tools to create a working drawings relating to maintenance and services in oil and gas industries

BVF1214
Oil & Gas Transportation System & Services
Credit: 4

Synopsis

This course aims to provide technical knowledge and hands on exposure to student in related to oil & gas transportation systems and services. These include oil and gas pipeline technical services, technical engineering, fabrication, installation, testing and commissioning of piping system. Students will also be exposed on the requirements for installation, codes and standards used in technical services and installation system related to oil and gas activities. Other relevant topics such as procedures involved before executing any work or activities in oil and gas e.g. permit to work, job safety analysis (JSA), ATI & ATO also being introduced to students.

Course Outcomes

CO1: Explain the oil & gas transportation system services and perform related technical activities in oil & gas industry
CO2: Able to describe and perform the procedures involved in installation, fabrication, testing & commissioning activities in oil & gas transportation system
CO3: Able to describe and perform the correct procedure and work activities in oil & gas activities according to codes & standard and safety regulation

BVF1223
HSE in Oil and Gas Industries
Credit: 4

Synopsis

This course will provide the basic knowledge required for facilities maintenance in oil and gas industries. It is primarily to expose students with the fundamental concepts, practical aspects and applications of occupational safety and health (OSH) in maintenance activities. Among others, the students will be taught the fundamental application and day-to-day aspects of HSE for facilities maintenance. Local regulations related to HSE such as OSHA, FMA & EQA

will also be covered. Major accident's case studies and lesson learnt will also be discussed in details. We aspect student will be able to understand an inadequate maintenance and safety maintenance procedures have always been the major cause of catastrophic incidents in oil and gas industries. This course also aims to familiarize students with related legislations, Process Hazard Analysis (HIRARC), occupational health & environmental toxicology, IECEx, and process safety management & maintenance hazards as well.

Course Outcomes

CO1: Understand the scope of HSE in maintenance management and maintenance-related Process Safety Management (PSM)'s elements.
CO2: Evaluate HSE aspects in facilities maintenance
CO3: Explain the various features of HSE for maintenance management and related regulations.
CO4: Review and analyze the cause and effects of industrial incidents and propose for improvement on safety work procedures during maintenance

BVF1243
Equipment Basic Care
Credit: 4

Synopsis

This course provide student the knowledge of performing structured monitoring tasks based on an organized checklist and to carry out minor maintenance and repairs in order to prevent unpredicted breakdowns. This course also expose student to predict failure if data of equipment are gathered consistently and analyzed effectively. EBC focuses on the concepts of "Doing Basic Things Right" and proactively fixing any process or operation deviations, no matter how small they are.

Course Outcomes

CO1: Able to perform monitoring task based checklist
CO2: Able to perform minor maintenance and repairs in order to prevent unpredicted breakdowns
CO3: Able to predict failures and analyzed gathered data from the equipment

BVF2124
Field Instrument Devices & Control
Credit: 3

Synopsis

This course will give students knowledge and skills how to operate, calibrate, and maintain the working operation of field devices and instrumentation control of oil and gas industry covering temperature, pressure, and flowrate devices

Course Outcomes

CO1: To perform basic maintenance of the devices and instrumentation control
CO2: To understand the basic principles of field devices and instrumentation in oil and gas industry consisting of temperature, pressure and flowrate measurement devices
CO3: To select and operate the devices and instrumentation control for measurement and calibration

BVF2114
Equipment Maintenance Strategy
Credit: 3

Synopsis

The understanding of the strategy in conducting equipment maintenance in oil and gas need to be introduced to the student who will work closely with all the equipment in oil and gas industries. The best maintenance strategy for equipment and services need to be maintained and enhanced to have efficient process and reduce operating cost. This subject also will bring the understanding of the student on the planning and best decision

to be taken to increase the equipment performance and comply with the current practice in the oil and gas industries. Apart from this, student will also be exposed to the fundamental of Total Productive Maintenance (TPM) and an overview of risk-based inspection. The TPM will bring student to understand more about the concept for maintaining equipment while RBI is a systematic inspection methodology that will help student in identifying the type of potential failures and the probability of failure propagation.

Course Outcomes

CO1: Explain the maintenance procedures and planning
CO2: Discuss the failure development and the correct maintenance strategy
CO3: Explain the critical analysis strategy

BVF2233
Lifting & Rigging Operation and Maintenance
Credit: 3

Synopsis

Heavy material handling requiring the use of cranes or hoists is a potentially hazardous activity. To assure the safety of such operations, stringent controls for the use of such equipment, including below-the-hook components should be exercised, and the procurement, maintenance and inspection of all such equipment should be strictly controlled. This course is intended to provide student's the basic guidelines and apply safe practices & procedures to assure that all lifting and rigging operations are performed safely and in conformance with all applicable standards, as well as to minimize the risk of injury to personnel and damage to equipment and property.

BVF2133
Oil and Gas Project Management
Credit: 3

Synopsis

This subject will introduce the student the type of contract awarded to contractor in oil and gas industry. In this cases, contract awarded in the form of EPCC (engineering, procurement, construction and commissioning). Student will understand each phase in the EPCC contract, from preliminary works until hand over of the project to the client.

Course Outcomes

CO1: Explain the principles of project and project management
CO2: Describe the technical and managerial aspects of projects in the oil and gas industry

CO3: Apply the risk management techniques and evaluate the project risks within the oil and gas industry operations

BVF1234
Welding and Inspection
Credit: 3

Synopsis

The objectives of this course are to train students on welding techniques and inspection so that they can understand and identify the properties and processes associated with the different kinds of metalwork. Some common concepts taught in welding inspection courses includes types of welding, shielded metal, materials and equipment, methods and industry/testing standards.

Course Outcomes

CO1: Explain the concept and methods of welding inspection
CO2: Able to justify the suitable method of different welding materials and NDT to be applied for assigned case/project
CO3: Demonstrate the ability to use tool/equipment

for the inspection and testing of the given
components safely.
CO4: Able to perform basic inspection of welding
materials, identify defect and remove defect
based on current standard practice

BVF3214
Plant Commissioning and Shutdown
Credit: 3

Synopsis

The understanding of engineering practices in plant commissioning and start-up are essential for the practicing technicians. This class will provide the student with a thorough understanding of the fundamentals in commissioning and start-up of chemical plants from the view point and experience of industrialist. It will cover subjects such as plant inspection, instrument testing, leak testing, pressure testing, plant monitoring, commissioning hazards, permit to work, plant maintenance and shutdowns.

Course Outcomes

CO1 Describe the stages and phases involved in plant commissioning, start-up and shut-down
CO2 Explain the activities implemented during plant commissioning, start-up and shut-down
CO2 Apply the common engineering practices in each activity in the process and operation of plant commissioning, start-up and shut-down.
CO3 Analyze safety, health issues and the necessary actions to be taken for potential hazards during plant commissioning, start-up and shut-down.

BVF2143
Asset Integrity Management
Credit: 3

Synopsis

This course enables technologists to learn the fundamental of asset integrity in oil and gas industry. Technologist will be exposed to understand the material integrity as a key part in optimising engineering design and crucial to the long-term performance of equipment and facilities. Also selection of metals and non-metallic materials; corrosion mitigation and management of corrosion risks; and metallurgy.

Course Outcomes

CO1 Explain and identify type of corrosion and material degradation
CO2 Able to differentiate corrosion control and
protection in oil and gas industry
CO3 Propose and estimate life span of assets
degradation in general

BVF2234
Valve Operations, Maintenance & Troubleshooting
Credit: 3

Synopsis

This course exposed the students to acquire skill and knowledge on various type of Pipe and Fitting, Valves and Safety Valves, Strainer, Steam Trap and P&ID through theory and practical sessions. Hands on practical on valves maintenance and inspection will be done according to correct and safe working procedures.

Course Outcomes

CO1: Explain the type, construction, function and operation of valves and safety valves, strainer & steam trap and understand P&ID
CO2: Perform gasket making and pipe installation, valves and safety valves, strainer and steam trap maintenance
CO3: Perform hydrostatic testing on piping system, housekeeping on tools, equipment and work area

BVF2244
Heat Exchanger Operations, Maintenance and Troubleshooting
Credit: 4

Synopsis:

The course provides an insight into the principles, operations, maintenance and troubleshooting of heat exchangers through theory and practical sessions

BVF3134
Fired Vessel Operation & Maintenance Supervision
Credit: 4

Synopsis:

This course exposed the students to acquire skill and knowledge on various type of Pipe and Fitting, Valves and Safety Valves, Strainer, Steam Trap and P&ID through theory and practical sessions. Hands on practical on valves maintenance and inspection will be done according to correct and safe working procedures.

BVF3234
Unfired Pressure Vessel Operation, Maintenance & Troubleshooting
Credit: 4

Synopsis:

This course exposed the students to acquire skill and knowledge on various type of Pipe and Fitting, Valves and Safety Valves, Strainer, Steam Trap and P&ID through theory and practical sessions. Hands on practical on valves maintenance and inspection will be done according to correct and safe working procedures.

BVF3244
Piping and Flange Management
Credit: 4

Synopsis:

This course aims to provide technical knowledge and view to evaluate piping flange, fitting systems and services for oil and gas industry. These include oil and gas piping and flange fitting technical services, technical material, fabrication, installation, testing and commissioning. Students will also be exposed on the requirements for installation, codes and standards used in the technical services and installation of piping and flange fitting system of oil and gas. Other relevant topics such as welding, corrosion control, testing, housekeeping, work area and P&ID skills will also be introduced to the students.

BVF2214
Pump Operation and Maintenance Supervision
Credit: 4

Synopsis:

The fundamental aim of this course is to introduce one of the rotating equipments employed in the oil & gas industry which is pump. The topics cover in this course are introduction to pump, components and function, support systems as well as operation and basic maintenance. At the end of this course, students are expected to be able to explain and identify the components and function of pump as well as able to operate and maintain the pump.

BVF2224
Compressor Operation and Maintenance Supervision
Credit: 4

Synopsis:

The fundamental aim of this course is to introduce one of the rotating equipment's employed in the oil & gas industry which is compressor. The topics cover in this course are introduction to compressor, components and function, support systems as well as operation and basic maintenance. At the end of this course, students are expected to be able to explain and identify the components and function of compressor as well as able to operate and maintain the compressor.

BVF3114
Reciprocating Piston Engine Operation and Maintenance Supervision
Credit: 4

Synopsis:

The fundamental aim of this course is to introduce one of the rotating equipment's

employed in the oil & gas industry which is reciprocating piston engine. The topics cover in this course are introduction to reciprocating piston engine, components and function, support systems as well as operation and basic maintenance. At the end of this course, students are expected to be able to explain and identify the components and function of reciprocating piston engine as well as able to operate and maintain this type of engine.

BVF3124
Gas Turbine Operation and Maintenance Supervision
Credit: 4

Synopsis:

This course provides understanding of the concepts related to design, installation, operation and maintenance of rotating equipment focusing on gas turbine. The students will be exposed to hands on practical training and developed them into skilled and expert technologist in rotating equipment. This course also intent to empowers the students with knowledge of design and analysis if difficulty occurs in the industrial equipment by providing them with a balance intellectual and practical experiences

BVF3204
Steam Turbine Operation and Maintenance Supervision
Credit: 4

Synopsis:

This course provides understanding of the concepts related to design, installation, operation and maintenance of steam turbine. The students will be exposed to hands on practical training and developed them into skilled and steam turbine specialization. This course also intent to empowers the students with knowledge of design and analysis if difficulty occurs in the industrial equipment by providing them with a balance intellectual and practical experiences

BVF3224
Alignment and Condition Based Monitoring
Credit: 4

Synopsis:

This course provides understanding of the concepts related to installation, specification and monitoring of condition alignment on the facilities. The students will be exposed to hands on practical training and developed the monitoring the installation alignment condition of many facilities equipment. This course also intent to empowers the students with knowledge of design and analysis if difficulty occurs in the industrial equipment by providing them with a balance intellectual and practical experiences

BVF3144
Storage Tank Operation & Maintenance
Credit: 4

Synopsis:

This course provides understanding of the storage tank types, function and design which are commonly found in the industry. Codes and standards involves in designing a tank is summarized and each of the components of tank is explained in details. Storage tank inspection and maintenance will go a long way in making a tank safer to store products for longer periods of time.

DIPLOMA IN CHEMICAL ENGINEERING

DKK1111
Introduction to Chemical Engineering
Credit: 1
Prerequisite: None

Synopsis

This subject gives an overview of engineering, the profession and its requirement in Malaysia scenario. Topics that will be included ethics, management and contribution of engineering also generic skills and study skills. Student will participate in plant visit and seminar as an exposure to the current issues & technology in the real field of engineering and adapt to the current engineering situation in the industry.

Course Outcomes

CO1 Define engineering & identify different branches of engineering.
CO2 Explain engineering ethics, management and contribution.
CO3 Keep up to date the current technology & issue in the engineering field

DKK1352
Electrical Technology
Credit: 2
Prerequisite: None

Synopsis

This course is designed to introduce the fundamental of electrical system principles. The underlying principles that will be covered in this course include an introduction to an electrical system, electrical safety, basic laws (Ohm's law, Kirchhoff's laws, current/voltage divider, wye-delta transformation), direct current (d.c.) circuits, methods of analysis, circuit theorems, single phase series and parallel circuits, series and parallel combination of resistor, inductor and capacitor, power in AC circuits, multiphase systems, and also alternate current (a.c.) and direct current (d.c.) motors. A part of that, student also needs to carry out simple technical project to assess their understanding on the basic principles of electromagnetism and its applications

Course Outcomes

CO1 Describe the concepts of electrical system and its components as well as awareness on electrical safety.
CO2 Analyse and solve electric circuit problems both for direct and alternate currents.
CO3 Ability to implement the concepts of electromagnetism in students' project

DKK1781
Basics Science & Engineering Lab
Credit: 1
Prerequisite: None

Synopsis
In basic science and engineering laboratory, students are required to perform experimental works which covered the basis concept of physical and chemistry such as concepts of solubility and miscibility, gravimetric analysis, buffer effect, disassociation constant estimation, specific heat and reaction heat determination, pressure change analysis and hardness testing.

Course Outcomes

CO1 Apply the basic science and engineering theories in the corresponding experimental works
CO2 Apply the basic science and engineering concepts in solving problems and interpretation of experimental data.
CO3 Adapt the team working behaviour and commitment as a member while working on the group assignment.

DKK1523
Computer Applications & Engineering Graphics
Credit: 3
Prerequisite: None

Synopsis

This course will cover on computer software such as Microsoft Office, Excel and Visio. Other than that, engineering drawing and utilisation of AUTOCAD software.

Course Outcomes

CO1 Demonstrate knowledge of Microsoft excel:VBA applications in the chemical engineering equipment or related disciplines.
CO2 Apply Microsoft Visio in order to create technical drawings for the chemical engineering equipment and related disciplines.
CO3 Apply AutoCAD in order to create technical drawings for the chemical engineering equipment and related disciplines.

DKK1413
Material & Energy Balance
Credit: 3
Prerequisite: None

Synopsis

This course is designed to give students a foundation in the basics of chemical engineering. Students will learn basic chemical engineering principles such as different unit systems, unit conversion and process variables determination. This knowledge will then be applied extensively for material and energy balances for single or multiple unit operations of non-reactive and reactive chemical processes. In addition, problem solving techniques are introduced and many of the terms and considerations to be expanded in future classes are introduced.

Course Outcomes

CO1 Solve the basic chemical engineering calculations involving conversion of units, determination of process variables and single-phase system.
CO2 Solve material balance of processes in nonreactive and reactive system in single and multiple units
CO3 Solve energy balance of processes in nonreactive and reactive system

DKK1493
Transport Processes
Credit: 3
Prerequisite: None

Synopsis

In heat transfer, the principles of the heat transfer in steady state by conduction, convection and radiation will be emphasized. In mass transfer, the principles of the mass transfer in gases, liquids, biological solutions and gel and solids will be discussed. The students will be exposed to the procedure for general problem solving involving heat and mass transfer systems.

Course Outcomes

CO1 Explain the fundamental concepts of heat and mass transfer.
CO2 Apply the fundamental concept of heat and mass transfer mechanism to solve the problems
CO3 Analyse problems occur in unit operation equipment by using the fundamental concept of heat and mass transfer

DKK1761
Mass and Heat Transfer Lab
Credit: 1
Prerequisite: None

Synopsis

This laboratory course is offered to enhance student's understanding through experiments to observe the application of theories learn in Mass Transfer and Heat Transfer. Numbers of experiments have been designed such as shell and tube heat exchanger, plate heat exchanger, tray dryer, mass transfer coefficient apparatus, fixed and fluidized bed apparatus. In this lab, student will be given a main objective of each experiment and instructor will

explain about the work Instruction to run the experiment. Then, by working in their group student will run the experiment under supervision of the instructor. This will encourage student to be more creative and inculcate the critical thinking among the group member. Besides that, students will be exposed to industrial environment and safety precaution.

Course Outcomes

CO1 Apply fundamental theories of chemical unit operation
CO2 Operate common unit operation equipment which use in industries and be familiar to their components and function
CO3 Ability to communicate effectively and presenting the data

DKK1771
Analytical Instrumental Lab
Credit: 1
Prerequisite: None

Synopsis

In Analytical Instrument Lab, students conduct experiment which involves different types of analytical equipment. Students are given main objective of each experiment and instructor will explain about the standard operating procedure to run the experiment. Then, by working in their group student will conduct the experiment under supervision of the instructor. Students are encouraged to be creative and inculcate the critical thinking among the group member during the lab session. In overall, this lab consists of seven experiments which involves seven analytical equipment; Melting Point Apparatus, UV-Visible Absorption Spectroscopy, Fourier Transform Infrared Spectroscopy (FTIR), Refractometer, pH meter and Conductivity Meter and Thermogravimetric Analyzer (TGA).

Course Outcomes

CO1 Demonstrate theories applied in analytical chemistry theories in the corresponding experimental works.
CO2 Apply all the analytical chemistry knowledge in solving problems and interpretation of experimental data
CO3 Adapt the team working behaviour and commitment as a member while working on the group assignment.

DKK2333
Thermodynamics
Credit: 3
Prerequisite: None

Synopsis

This course covered the properties of pure substances, the first law of thermodynamics for the closed and open systems, the second law of thermodynamics, entropy and introduction to the refrigeration, heat engine and heat pump.

Course Outcomes

CO1 Apply and solve energy balance of a process by the First Law of Thermodynamics.
CO2 Apply and solve the problems related to the Second Law of Thermodynamics on ideal and irreversible processes.
CO3 Apply and solve the problems related to the refrigerator, heat engine and heat pump.

DKK2433
Chemical Reaction Engineering
Credit: 3
Prerequisite: None

Synopsis

In chemical reaction engineering, the student will learn the basic concept, design and calculation of various type of reactor in chemical process such as batch reactor, CSTR, and PFR. The topics covers in this subject are mole balances, conversion, reactor sizing, rate law, isothermal and non-isothermal reactor design, multiple reaction and catalyst.

Course Outcomes

CO1 Explain the fundamentals of chemical reaction engineering such as mole balance, rate law, and stoichiometry using concepts in reactor design.
CO2 Apply the concepts for the reactor operations using analytical skill.
CO3 Solve problems related to reactor operation.

DKK2363
Engineering Mechanics
Credit: 3
Prerequisite: None

Synopsis

This subject will introduce students with concept of statics and dynamics and its application in related engineering field. The topics covered in this subject are static of particle, static of rigid body, distributed forces, analysis of structure, friction, kinematics and kinetics of particles. By completing the course, students will comprehend the basic mechanisms and applications of statics and dynamics in related engineering field.

Course Outcomes

CO1 Apply the basic concepts in statics to solve problems concerning resultant of forces acting on a particle and equilibrium of a particle
CO2 Analyze problems involving the equilibrium of a rigid body and use the fundamental principles in statics to solve them Apply the fundamental concept of heat and mass transfer mechanism to solve the problems
CO3 Solve problems involving the kinematics and kinetics of a particle by applying the basic principles in dynamics

DKK2771
Chemical Reaction Engineering Lab
Credit: 1
Prerequisite: None

Synopsis

In Chemical Reaction Engineering lab, students are required to perform laboratory work in investigating the effect of pressure, mixing, temperature and different of acid types on solid liquid reaction and also to determine the heat of reaction in chemical reaction process. Continuous Stirred Tank Reactor (CSTR), Tubular Flow Reactor (TFR), Plug Flow Reactor (PFR) and batch reactor will be used in this experiment in order to expose students to the industrial environment.

Course Outcomes

CO1 Apply the engineering and chemical reaction concept to solve lab experiment problem.
CO2 Operate and demonstrate different type of reactors with different reactions
CO3 Able to work in group and commit with the date line.
CO4 Commit with all the lab rules and regulations

DKK2142
Plant Supervision
Credit: 2
Prerequisite: None

Synopsis

This course will cover foundation of supervision, planning & organizing skills, staffing skills and controlling skills. Besides that, it will also expose the students the real conditions and functions of supervisor and the supervisory concept-applied in the working culture.

Course Outcomes

CO1 State the foundation for effective supervision
CO2 Define the key concepts of planning, organizing, staffing and controlling.
CO3 Describe the methods for stimulating individual and group performance.
CO4 Describe the process for coping with workplace.

DKK2523
Environmental Engineering
Credit: 3
Prerequisite: None

Synopsis

This subject is designed to introduce to the students the principles, scientific assessment and engineering solutions to environmental problems affecting water, air and solid. Topics includes on the environmental concerns, legislation and regulation practices, wastewater quality management, wastewater treatment, outdoor air pollution, solid and hazardous waste disposal. It also includes the equipment selection and problem-solving technique to prevent the pollution through different processes and technologies.

Course Outcomes

CO1 Discuss compliance to environmental legislation & regulation practices in Malaysia.
CO2 Analyze and solve problems involving water and wastewater treatment.
CO3 Determine the concept involved in management of solid waste, hazardous waste and air pollution control Solve calculation problem related to Safety, Health and Environment

DKK2373
Fluid Mechanics
Credit: 3
Prerequisite: DKK2363 Engineering Mechanics

Synopsis

This course is an introduction to fluid mechanics, and emphasizes fundamental concepts and problem-solving techniques. Topics to be covered include fluid properties, fluid statics, fluid dynamics, control volume analysis and pipeline system.

Course Outcomes

CO1 State the foundation for effective supervision
CO2 Define the key concepts of planning, organizing, staffing and controlling.
CO3 Describe the methods for stimulating individual and group performance.
CO4 Describe the process for coping with workplace.

DKK2462
Plant Commissioning, Start-Up & Shut-Down
Credit: 2
Prerequisite: None

Synopsis

The understanding of engineering practices in plant commissioning and start-up are essential for the practicing technicians. This class will provide the student with a thorough understanding of the fundamentals in commissioning and start-up of chemical plants from the view point and experience of industrialist. It will cover subjects such as plant inspection, instrument testing, leak testing, pressure testing, plant monitoring, commissioning hazards, permit to work and plant maintenance and shutdowns.

Course Outcomes

CO1 Describe the stages and phases involved in plant commissioning, start-up and shut-down.
CO2 Explain the activities implemented during plant commissioning, start-up and shut-down.
CO3 Apply the best engineering practices in each activity in the process and operation of plant commissioning, start-up and shut-down.
CO4 Analyse safety and health issues and the action taken that need to be consider for any potential hazardous situation that may occur during plant commissioning, start-up and shut-down

DKK2473
Plant Safety & Health
Credit: 3
Prerequisite: None

Synopsis

This subject is primarily to expose students with the concepts, practical aspects and applications of safety and health (SH) and some basic of environmental concern in the chemical industries. The students will be taught the day-to-day and management aspects of SHE which includes local and international regulations such as OSHA, CIMAH, EQA and other related acts will be covered. Simple common case studies would be exemplified from local and abroad.

Course Outcomes

CO1 Explain the importance of Safety, Health and Environment (SHE) in chemical industries
CO2 Understand common international and local regulations regarding Safety, Health and Environment
CO3 Solve calculation problem related to Safety, Health and Environment

DKK2483
Plant Utility
Credit: 3
Prerequisite: None

Synopsis

This course designed to introduce the basic utilities system employed in the chemical related plants such as boiler, cooling tower, compressors, water and flare systems. In each module, the students will be introduced to the basic concept of theory, operations, industrial applications, and maintenance procedure and equipment safety. At the end of this course, students are expected to be able to elaborate, theorize and identify the utilities systems that are commonly employed in chemical industries

.

Course Outcomes

CO1 Explain the basic mechanisms, principles and applications of boiler, steam distribution and pump.
CO2 Explain the basic mechanisms, principles and applications of valve, cooling tower, compressor, water and flare systems
CO3 Demonstrate understanding of current engineering problems and good communication skills through case study presentation and analysis

DKK2443
Process Instrumentation & Control
Credit: 3
Prerequisite: None

Synopsis

This is an introductory level course about process control and instrumentation systems used in chemical industries. The topics that will be included in this subject are fundamentals and concepts of process control and instrumentation systems, working principle of various control system instruments like transmitters, control valves, various measuring instruments for flow, level, temperature, pressure and composition, data communication in computer process control, distributed control system (DCS) and alarm systems using both theory and practical methods.

Course Outcomes

CO1 Understand the basics of process control and instrumentation systems, process and instrumentation diagram (P&ID) used in chemical industries.
CO2 Describe the working principle of transmitters, control valves and various process measuring instruments.
CO3 Operate the process measuring instruments used in chemical processes.
CO4 Perform the control of various chemical processes using virtual simulator

CO5 Demonstrate feedback controllers, alarm,
data acquisition functions and process history view in a control system.

DKK2464
Unit Operations
Credit: 4
Prerequisite: DKK1413 Material & Energy Balance

Synopsis

This class will provide the student with a thorough understanding of the fundamentals in unit operations involved in chemical engineering process and industry including evaporation, drying, absorption, distillation and leaching. At the end of this course, students are expected to understand the basic mechanisms, principles, basic design parameters and applications of the selected unit operations and are able to solve chemical engineering problems related to them. To enhance operational knowledge in unit operations, the students will be exposed to the related experiments at such as evaporation, absorption, and distillation.

Course Outcomes

CO1 Explain and describe the basic mechanisms, principles and applications of distillation, absorption, evaporation, drying, leaching and extraction.
CO2 Determine basic design parameters associated with the unit operations.

CO3 Solve calculation related to the unit operations.
CO4 Apply the knowledge of unit operation in laboratory.

DKK3812
Industrial Training
Credit: 12
Prerequisite: None

Synopsis

In industrial training, the students should gain insight into the industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo 24 weeks of industrial training during the start of the semester of the third academic year. The performance of each student during the periods of his/her Industrial training is evaluated jointly by the faculty staff, and the representatives from employer organizations. The student is required to maintain proper records and submit reports on the training received by him/her. The industrial training report should cover all periods of approved training time. The report document is expected to demonstrate development of practical and professional skills in Engineering through technical experience and application of theoretical knowledge. Development of skills in dealing with people, and communication skills are part of the subject objectives. The student should be able to present the report to university supervisor, as a complement to their diploma.

Course Outcomes

CO1 Display independency in actual working environment with minimal supervision
CO2 Display communication skill with different levels of staff in the organization
CO3 Present technical documents related to the work completed
CO4 Practice positive attitude during the training

FACULTY OF CIVIL ENGINEERING TECHNOLOGY

FACULTY OF CIVIL ENGINEERING TECHNOLOGY

Background

Formerly known as Faculty of Civil Engineering & Earth Resources (FKASA), the name of Faculty of Civil Engineering Technology (FTKA) was officially used in July 2019. We humbly begin in 2002 specialised in engineering programs only but now venturing into engineering technology and technology programs to be in line with Ministry of Higher Education to strengthen TVET.

Spearing ahead with engineering technology, FTKA offers academic programs which are relevant to the need of the industry. At present, we offer three undergraduate academic programs - Bachelor of Engineering Technology (Infrastructure Management) with Honours, Bachelor of Engineering Technology (Energy & Environmental) with Honours and Diploma in Civil Engineering. As for postgraduate, we have our master and doctoral programs in various related fields.

PROGRAMMES OFFERED

FTKA offers academic programs which are relevant to the needs of the industry. At present, FTKA offers three undergraduate academic programs :

1. Diploma in Civil Engineering - DAA
2. Bachelor of Engineering Technology (Infrastructure Management) with Honours – BTC
3. Bachelor of Engineering Technology (Energy & Environmental) with Honours - BTV

PROGRAMS OUTCOME

1. Diploma in Civil Engineering - DAA

    1. Knowledge - apply knowledge of mathematics, science and engineering fundamentals to well-defined engineering procedures and practices;
    2. Problem Analysis - analyses well-defined engineering problems in their discipline with respect to operation and maintenance, including troubleshooting;
    3. Design/ Development of Solutions - conduct investigations and assist in the design of solutions for engineering systems;
    4. Modern Tool Usage - apply appropriate techniques, resources, and engineering tools to well-defined engineering activities, with an awareness of the limitations;
    5. The Engineer & Society - demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities;
    6. Environment & Sustainability - demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development;
    7. Ethics - demonstrate an understanding of professional ethics, responsibilities and norms of engineering practices;

8. Communication - communicate effectively with the engineering community and society at large;
9. Individual & Team Work - function effectively in a diverse technical team;
10. Life Long Learning - recognize the need for professional development and to engage in independent and lifelong learning.
11. Project Management & Finance - demonstrate an awareness of management, business practices and entrepreneurship;

2. Bachelor of Engineering Technology (Infrastructure Management) with Honours – BTC

At the end of the programme, graduates should be able to (adapted from the Sydney Accord):

1. Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to defined and applied engineering procedures, processes, systems or methodologies;
2. Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialization;
3. Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns;
4. Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources;
5. Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations;
6. Function effectively as individuals, and as members or leaders in diverse technical teams;
7. Communicate effectively with the engineering community and society at large;
8. Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities;
9. Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices;
10. Demonstrate an awareness of management, business practices and entrepreneurship;
11. Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development; and
12. Recognize the need for professional development and to engage in independent and lifelong learning.

3. Bachelor of Engineering Technology (Energy & Environmental) with Honours – BTV

1. Apply knowledge of mathematics, science, engineering fundamentals and engineering technology principles to define

and applied engineering technology procedures, processes, systems or methodologies in energy and environment area.

2. Solve broadly-defined engineering technology problems systematically to reach substantiated conclusions by using appropriate tools and techniques in energy and environment area.
3. Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns.
4. Plan and conduct experimental investigations of broadly-defined engineering technology problems by using data from relevant sources related to energy and environment area.
5. Select and apply appropriate techniques, resources and modern engineering technology tools, with an understanding of their limitations in energy and environment related area.
6. Function effectively as individuals, and as members or leaders in diverse technical teams.
7. Communicate effectively with the technical community and society at large.
8. Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities.
9. Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices.
10. Demonstrate an awareness of management, business practices and entrepreneurship in the field of energy and environment.
11. Demonstrate an understanding of the impact of technical practices, taking into account the need for sustainable development.
12. Recognize the need for professional development and to engage in independent and lifelong learning in the field of energy and environment.

CAREER OPPORTUNITIES

Graduates of UMP are equipped with skills in Civil Engineering Technology and soft skills as an added value which allows them to build a career as:

1. Diploma
   - Instructor
   - Assistant Civil Engineer
   - Assistant Project Manager
   - Site Supervisor
   - Civil & Structural Clerk-of-Works
   - Government sector

2. Bachelor of Engineering Technology (Infrastructure Management) is the gateway into many professions within the infrastructure management and construction industry.

- Building and construction technologist
- Infrastructure / building / facilities / construction manager
- Civil and Infrastructure Technologist
- Operation and Maintenance Officer
- Project Management and Scheduling
- Sales / Procurement
- Development and Testing
- Field / Site Engineer
- Project Engineer and Technical management

Employment opportunities may also exist within various infrastructure agencies:

- Local and government authorities
- Councils
- Ministries
- Firms and consulting companies
- Primary industry

3. Bachelor of Engineering Technology (Energy and Environmental) is the gateway to many professions in the area of energy and environmental industry.

- Environmental engineer / technologist
- Energy system designers
- Energy system auditors / managers / consultants
- System developers / operators
- Environmental coordinators
- Environmental management
- Environmental consultants
- Environmental law enforcement

Employment opportunities may also exist within:

- Waste management
- Agriculture and forestry industry
- Utility company
- Services industry
- Government sector
- Technopreneur

FACULTY OF CIVIL ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
BACHELOR OF ENGINEERING TECHNOLOGY (INFRASTRUCTURE MANAGEMENT) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	UHL2400 English For Technical Communication	UHL2412 English For Academic Communication	UHL2422 English For Technical Communication 2	UHL2432 English For Professional Communication	UHF11*1 Foreign Language Level 1	UHF21*1 Foreign Language Level 2	BET3522 Procurement For Infrastructural Project	BET4899 Industrial Training Attachment (18 weeks)
	UHC2022 Penghayatan Etika dan Peradaban	UHS1021 Soft Skills 1	UHC1012 Falsafah dan Isu Semasa	UHS2021 Soft Skills 2	UHE3122 Islamic Institutions	BET4042 Entrepreneurship for Technologists	BET4783 Final Year Project 2	BET4893 Industrial Training Report
	UQ*10*1 Co-Curriculum 1	BUM2413 Applied Statistics	UQ*20*1 Co-Curriculum 2	BET1263 Geology and Geomechanics	BET4222 Technologist in Society and Law	BET3683 Final Year Project 1	BET4774 Technology Design Project	
	BUM2123 Calculus	BET2343 Spatial Science Engineering	BUS2413 Applied Physics	BET2344 Infrastructural Planning (Studio 4)	BET3573 Engineering Management	BET3644 Infrastructural Management (Studio 6)	BET4**3 Elective 1 (Forensic investigation in Infrastructure)	
	BET1114 Infrastructural Exploration (Studio 1)	BET1213 Engineering Practice 1	BET2334 Project Scheduling	BET2422 Financial Management for Decision Making	BET 3582 Digital Construction Technology	BET3593 Quality Performance Management	BET4**3 Elective 2 (Advance Material Testing Technology)	
	BET1123 Introduction to Infrastructural Engineering	BET2373 Construction Engineering	BET2334 Infrastructural Project (Studio 3)	BET1113 Green Technology For Infrastructure Facilities	BET3563 Building Facilities & Maintenance	BET1613 Engineering Practice 3	BET4**3 Elective 3 (Introduction to Coastal Infrastructure)	
	BET1142 Introduction to Engineering Surveying	BET1474 Infrastructure Investigation (Studio 2)	BET3583 Urban Infrastructure	BET1413 Engineering Practice 2	BET2492 Construction Safety	BET3513 Conflict and Risk Management	BET4**3 Elective 4 (Advanced Project Planning)	
	BET2483 Problem Solving and Analysis		BET2573 Construction Methods		BET3522 Procurement For Infrastructural Project		BET4**3 Elective 5 (Engineering Management)	
TOTAL CREDIT	18	19	20	18	18	19	18	12
TOTAL CREDIT FOR GRADUATION	140							

The information provided by Faculty of Civil Engineering Technology are based on University's Regulation and endorsement until 12 March 2020

FACULTY OF CIVIL ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
BACHELOR OF ENGINEERING TECHNOLOGY (ENERGY & ENVIRONMENTAL) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	UHL2400 Fundamentals of English Language	UHL2412 English for Academic Communications	UHL2432 English for Professional Communication	UHL2422 English for Technical Communication	BTV3113 Wastewater Treatment Technology	BTV3143 Air Pollution Control Technology	UHS2011 Soft Skills II	BTV4812 Industrial Training
	UGE2002 Technopreneurship	UHF11*1 Foreign Languages Level 1	UHF21*1 Foreign Languages Level 2	BTM1124 Machine Production Process	BTV3233 Solid and Scheduled Waste Management	BTV3433 Engineering Economy	BTV4**3 Elective 1	
	UHS1021 Soft Skills I	UQ*2**1 Co-curriculum II	UHC2022 Penghayatan Etika dan Peradaban	BTM2234 Fluid Power Technology	BTV3224 Heating, Ventilating and Air Conditioning Technology	BTV3453 Energy Auditing	BTV4**3 Elective 2	
	UHC1012 Falsafah dan Isu Semasa	BUM1223 Calculus	BUM2113 Applied Mathematics	BTV2223 Environmental Management System	BTV3324 Design for Energy Efficiency and Green Materials	BTV3463 Energy Management	BTV4**3 Elective 3	
	UQB1**1 Co-curriculum I	BTE2313 Computer Programming	BTM1113 Basic Manufacturing Processes	BTV2314 Green Technology	BTV3424 Facilities Management Technology	BTV3473 Safety & Risk Management	BTV4826 Engineering Technology Senior Design Project II	
	BUM1113 Technical Mathematics	BTM1614 Computer Aided Drafting	BTV2123 Environmental Law, Policy & Economics	BTV3413 Industrial Quality Control		BTV3813 Engineering Technology Senior Design Project I		
	BTU1113 Physics	BTV1113 Environmental Technology	BTV2213 Thermodynamics					
	BTU1112 Physics Laboratory	BTV1112 Environmental Technology Lab	BTV3333 Biobased Fuels and Alternative Energy Applications					
	BTE1213 Electrical Fundamentals							
	BTE1212 Electrical Fundamentals Laboratory							
TOTAL CREDIT PER SEMESTER	**19**	**19**	**20**	**20**	**18**	**18**	**16**	**12**
OVERALL TOTAL CREDIT FOR GRADUATION	**142**							

The information provided by Faculty of Civil Engineering Technology are based on University's Regulation and endorsement until 12 March 2020

FACULTY OF CIVIL ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
DIPLOMA IN CIVIL ENGINEERING

YEAR	FIRST			SECOND		THIRD
SEMESTER	SHORT SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST
COURSES	UHL 1412 FOUNDATION ENGLISH	UHL 1422 ENGLISH FOR ACADEMIC SKILLS	UHL 1432 ENGLISH FOR OCCUPATIONAL COMMUNICATION	UHS 1021 SOFT SKILLS I	UHS 2021 SOFT SKILLS II	DAA 3912 INDUSTRIAL TRAINING
	UQB 1011 BRIGED SISWA	DUM 1123 CALCULUS	UHC1012 FALSAFAH DAN ISU SEMASA	DAA 1951 ENGINEERING LABORATORY I	UGE 1002 ASAS PEMBUDAYAAN KEUSAHAWANAN	
	DUM 1113 BASIC MATHEMATICS	DUF 1113 PHYSICS	UHC2022 PENGHAYATAN ETIKA DAN PERADABAN	DAA 2313 ENGINEERING SURVEYING	DAA 2951 ENGINEERING LABORATORY III	
		DUK 1113 GENERAL CHEMISTRY I	DUM 2113 TECHNICAL MATHEMATICS	DAA 2322 ENGINEERING SURVEYING FIELDWORK	DAA 2023 PROJECT MANAGEMENT	
		DAA 1032 ENGINEERING DRAWING	DAA 2931 ENGINEERING LABORATORY II	DAA 2123 THEORY OF STRUCTURES	DAA 2213 STRUCTURAL DESIGN I	
		DAA 1312 ENGINEERING MATERIALS	DAA 1212 COMPUTER PROGRAMMING	DAA 2513 SOIL MECHANICS AND GEOLOGY	DAA 2222 STRUCTURAL DESIGN II	
		DAA 1113 ENGINEERING MECHANICS	DAA 1123 MECHANICS OF MATERIALS	DAA 2612 ENVIRONMENTAL ENGINEERING	DAA 2523 GEOTECHNICAL ENGINEERING	
			DAA 1723 FLUID MECHANICS	DAA 2723 HYDRAULICS & HYDROLOGY	DAA 2413 TRAFFIC & HIGHWAY ENGINEERING	
TOTAL CREDIT	6	18	18	18	18	12
TOTAL CREDIT FOR GRADUATION	90					

COURSE STRUCTURE FOR BACHELOR OF ENGINEERING TECHNOLOGY (INFRASTRUCTURE MANAGEMENT) WITH HONOURS

CORE FACULTY

BUM2123
Applied Calculus
Credit: 3
Prerequisites: None

Synopsis

This course introduces Polar Coordinates and Vector, Vector-Valued Functions, Partial Derivatives, and Multiple Integrals. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems.

CO 2 Use appropriate software and tool to solve the graphical and computational problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.

CO 4 Relate and applied the concepts and methods studied into other courses.

BUM2413
Applied Statistics
Credit: 3
Prerequisites: None

Synopsis

This course discusses on statistical problem-solving methodology and descriptive statistics; sampling distribution and confidence interval; hypothesis testing; analysis of variance (ANOVA); goodness-of-fit test and contingency tables; regression and correlation including simple and multiple linear regressions. Statistical packages such as Microsoft Excel, SPSS, R Language, S Plus, EViews and Minitab shall be used in this course.

Course Outcome

CO 1 Analyse data using statistical theory and methodology, draw a conclusion and give a suggestion based on the data analysed.

CO 2 Perform statistical data analysis using available statistical packages including scientific calculator.

CO 3 Apply statistical concepts and methods to solve related problems in various disciplines.

CO 4 Formulate statistical model from a given data set.

BET1113
Green Technology for Infrastructure Facilities
Credit: 3
Prerequisites: None

Synopsis

This course will expose to the students the concept and application of green technology for construction especially in the area of infrastructural facilities. The subject topics encompasses introduction to the green technology, elements of green construction, economic analysis on green construction, green project requirement and application of green technology in infrastructure facilities such as road and highway, drainage, sewerage system, water reticulation and utilities.

Course Outcome

CO 1 Identify and describe the definition and the principle of green technology in construction especially for infrastructural facilities.

CO 2 Describe the engineering problems and solve the problem by applying the element of green technology

CO 3 Manage project or function as a resourceful individual while conducting a group project of infrastructural facilities

BUS1303
Applied Physics
Credit: 3
Prerequisites: None

Synopsis

This course is intended to expose the central ideas and principles of physics to students requiring a general background in physics. It covers unit and measurements, kinematics, forces and Newton's law of motion, statics equilibrium, work, energy and power, fluid mechanics, electricity and magnetism.

Course Outcome

CO 1 Apply basic Physics concepts and theories learned to solve problems covered in the syllabus in terms of physical principles and concepts.

CO 2 Explain solution of any related problems using the right principles and laws.

CO 3 Study and report the solutions of a given physical problem covered in the syllabus by a group activity

BET3583
Research Methodology
Credit: 3
Prerequisites: None

Synopsis

The course provides students with the ability to evaluate research literatures in order to determine the current state of knowledge. In addition, the course will instruct students in the principles of research to enable them to conduct research and prepare an original project in their professional area of interest.

Course Outcome

CO 1 **P**ropose and justify an appropriate research plan for particular research problem

CO 2 Choose and apply appropriate methodology for particular research problem

CO 3 Evaluate the outcome of a research project in terms of useable knowledge

CO4 Apply techniques for writing clear and well expressed technical papers and reports

CO5 Judgethe logical consistency of written material

BET4042
Enterpreneurship for Technologists
Credit: 2
Prerequisites: None

Synopsis

This subject is designed to provide students with the knowledge, skills, and abilities necessary to plan, finance, develop and operate a new business venture. Through the analysis of case studies on entrepreneurial ventures and writing their own business plan screening guide, students learn how to assess the attributes of entrepreneurs, determine the attractiveness of new venture opportunities, and gather the resources necessary to convert a viable opportunity into an entrepreneurial venture.

Course Outcome

CO 1 Explain the concept of entrepreneurship, its historical development and the role of entrepreneurship in economic development

CO 2 Analyse a new or growing venture from the perspective of an investor, a family-business successor, or an owner-manager

CO 3 Produce and present a business plan for a new or growing venture

CO4 Identify the important issues related to legal aspects of entrepreneurship

CORE PROGRAM

BET1114
Infrastructure Exploration (Studio 1)
Credit: 4
Prerequisites: None

Synopsis

This course will expose students to the fundamental elements of a good engineering approach to problem solving with strong reference to basic sciences and math skills as well as testing and evaluation ideas by building prototypes (it could be a product, a technique, a structure, a project, a method, paperwork or many other things depending on the problem). The learning approach of these subjects is a design driven curriculum with emphasis placed on skills such as team based design, communication skills (graphical, oral and written) and computer aided design tools.

Course Outcome

CO 1 Identify different types of drawings and reproduce drawings manually and by using AutoCAD.

CO 2 Apply basic skills in mathematics, sciences and engineering drawing including 2D solid modelling using CAD

CO 3 Examine the process involved in infrastructure design projects

CO 4 Collaborate on team based projects, solve inter team problems and develop communications skills

BET1123
Introduction to Infrastructure Engineering
Credit: 3
Prerequisites: None

Synopsis

The course covers on introduction to civil engineering, planning for civil engineering project, structural and infrastructural design, project BQ and cost estimation, project report and engineering drawing, IT as value added in project development and implementation.

Course Outcome

CO 1 Using available examples, sketches, phrases and pictures to demonstrate understanding about civil engineering

CO2 Applying planning principles to generate ideas for civil engineering projects

CO3 Executing conceptual design for structural and infrastructural projects

CO4 Choosing suitable IT tools as to aid design and documented project output

BET1142
Introduction to Engineering Surveying
Credit: 2
Prerequisites: None

Synopsis

This subject will expose to the students the role of survey engineering in their field. The subject topics encompasses introduction to the engineering surveying, surveying equipment, measurement unit, bearing/angle and distance measurement for horizontal control, coordinate system,

area & volume calculation, and the final setting out for construction work.

Course Outcome

CO 1 Identify and describe the definition and the principle of engineering survey including the engineering surveying roles in infrastructural works

CO2 Describe the procedure to perform horizontal and vertical control based on related provision

CO3 Understand the range of calculations that can be made with surveying data

BET1253
Introduction to Engineering Problem Solving
Credit: 3
Prerequisites: None

Synopsis

The course covers the principles in engineering problem solving including discuss and understand the following area engineering failure, procedure for analysis, propose practical remedial measures, prreliminary technical report, critical comments, research and finding, recomendation for the solution

Course Outcome

CO 1 Discuss engineering failure for different types of engineering problems

CO2 Apply different principle in analysis of engineering failure. Summarized and compare the differences between them.

CO3 Apply various analysis techniques to solve varitey of engineering failures.

CO4 Implement different remedial and rehabilitation techniques. Selection process base on tehnical as well as economic point of view.

CO5 Produce a preliminary technical report for the proposed solution.

BET1213
Engineering Practice 1
Credit: 3
Prerequisites: None

Synopsis

This course is the first of a series of Practice courses that are intended to enable students to acquire engineering and professional practice skills. Students will generally work in teams to assist with the building of group synergy such as team working and interactive thinking. The development of other professional practice skills, such as written and oral communication, is also encouraged in the engineering practice courses. In this introductory course, students will undertake practical work primarily in the areas of instrumentation and measurement, as well as the application of different lab equipment related to civil infrastructure. In addition, students will be introduced to the library and computing facilities of the University and are expected to utilize these resources in the compilation of their reports. All students will be introduced to the Workplace Health and Safety Act and will undertake a preliminary workplace health and safety exercise.

Course Outcome

CO 1 Demonstrate practical skills in handling civil infrastructure lab equipment.

CO2 Apply basic health and safety principles in workplace setting

CO3 Preparing technical reports that demonstrates use of library and computing facilities

CO4 Contribute as part of a team to complete a specific task in a specific time

CO5 Communicate the material/tasks assigned effectively to public (oral and written)

BET2343
Spatial Science Engineering
Credit: 3
Prerequisites: None
Synopsis

The course covers on introduction to spatial sceience engineering, google map as free online GIS, spatial investigation using GIS, mygis (Malaysia GIS) portal and arcgis online application.

Course Outcome

CO 1 Using available examples, sketches, phrases and pictures to demonstrate understanding about spatial science engineering

CO2 Exploring the application of google map for spatial science engineering tasks

CO3 Reviewing the application of local GIS for spatial science investigation

CO4 Choosing suitable IT tools as sustainable tool for conducting spatial science engineering

BET1474
Infrastructure Investigation (Studio 2)
Credit: 4
Prerequisites: None

Synopsis

The aims of the course are to developed students' professionalism and ethical responsibilities skills, effective communication abilities with other multidisciplinary professions, effective team working skill, awareness about sustainable environment, desires for lifelong learning, utilization of moderns tools and technologies and techno-preneurship skills using technical knowledge that have been learned to date. Although it is PBL in nature, lectures and e-learning sessions are conducted as to provide general guidance to the groups.

Course Outcome

CO 1 Manage project or function as a resourceful individual while observing the professional and ethical responsibilities

CO2 Communicate effectively in-team and with external parties as to share ideas or get feedbacks from the stakeholders

CO3 Plan and design/undertake projects as a group effort

BET2413
Project Scheduling
Credit: 3
Prerequisites: None

Synopsis

This course attempts to explain the importance of scheduling and estimating process in infrastructure project planning. The discussion will focus on approach and strategies in developing viable schedules and cost estimation which influences the success level of projects and organizations. Students will discover a number of sophisticated tools and technique that can be applied in managing time and costs effectively on every type of project. Selected project management tools/software will be introduced during the lab session to grant student with necessary knowledge and skills in dealing with stages of the project life cycle, how to work within organizational and cost constraints, manage resource and project team effectively.

Course Outcome

CO 1 Understand the importance of scheduling and estimation in ensuring a successful infrastructure project.

CO2 Understand the concepts of project planning and organization, budgeting and control, and project life cycles

CO3 Apply Precedence Diagram Method (PDM) in determining relationship between tasks

CO4 Use appropriate techniques for resource estimation for infrastructure project planning

CO5 Demonstrate the ability of using Project Management software in managing a project.

BET2334
Infrastructural Project (Studio 3)
Credit: 4
Prerequisites: None

Synopsis

The course is the continuation of Infrastructural Project (Studio 2) in which students conduct infrastructural design, project BQ and cost estimation, project report and engineering drawing for a selected study area with a selected theme. Although the project is in conducted in group, students are expected to demonstrate individual values in term CTPS, TPS, CS and LS.

Course Outcome

CO 1 Communicate efectively in a team and with external parties

CO2 Develop professional and ethical responsibilities

CO3 Select sustainable practices in the conduct of the project

CO4 Make appropriate references to the code of practice/guidelines

CO5 Demonstrate techniques/skills using modern engineering tools

BET2492
Construction Safety
Credit: 2
Prerequisites: None

Synopsis

This course is designed for persons who work in the construction industry. This course will provide all members with greater safety in construction field particularly referred to contruction safety awareness. It is also designed to increase their confidence in the action to take in case of any emergencies . The stages of construction and most of the building process within the life cycle of a building will be elaborated. All the relevant document and acts particularly relating to Malaysia scenario are among the important references that will be discussed along with the sequence of building construction. Building materials Students are expected to venture into a general safe working practices at construction site and able to supervise the total environment as a free accident area.

Course Outcome

CO 1 Recognize the local Act and regulations related to construction safety

CO2 Identify the hazardous materials, substances and unsafe practices at construction industry

CO3 Assess the level of risk and safety of work places compliance to the national safety regulation

CO4 Outline a proposal to enhance and increases a safer work practices in construction industries

BET2483
Problem Solving and Analysis
Credit: 3
Prerequisites: None

Synopsis

This course will increase a student's ability to work as part of an engineering team. It

presents a range of engineering theory and applications through engineering design concepts that are learnt within the context of solving a real world problem. This course focuses primarily on the use of statistical analysis to analyze data, propose solutions, solve problems and to evaluate possible solutions. In addition the student is required to further develop their computer skills (especially Excel) to analyze statistics, illustrate and present the results of their work.

Course Outcome

CO 1 Work as part of a multi-disciplinary and multi-cultural team to analyze, research, synthesize and evaluate solutions for defined engineering and surveying problems and systems

CO2 Contribute as part of a team working on defined engineering and surveying problems to develop engineering design solutions, value the views of other members and facilitate decision making in team situations to solve an engineering problem or complete a project

CO3 Undertake a program of self-directed independent learning to acquire the necessary learning within an allocated sub-discipline area to contribute to the team's solution of the set problem and should be communicated to other team members by means of mentoring during regular team meetings

CO4 Demonstrate the ability to apply appropriate Engineering, Mathematical and Statistical principles and techniques on an individual basis; to explain phenomena encountered in the set range of problems, utilizing the knowledge base gained from individual self-learning journey

CO5 Communicate findings in an appropriate technical format

BET1263
Geology and Geomechanics
Credit: 3
Prerequisites: None

Synopsis

This course provides an elementary introduction and the basic mechanics necessary for Geology and Geomechanics. The course aims to provide understanding the strength of rock and soil, exploring the stability of slopes, type of suitable shallow foundation and compressibility of soil. Those understanding from the nature of rock and soils as engineering materials that applies to engineering Practice.

Course Outcome

CO 1 Apply the knowledge of rock and soil characteristics in for geomechanic analysis and soil stabilization.

CO2 Acknowledge the geological background and the formation of soil.

CO3 Produce related diagram for slope stability analysis by using various methods.

CO4 Able to determine the principle of settlement under structures

CO5 Apply the strength parameters appropriate to a range of stability problems, and able to differentiate between total and effective stress approaches.

BET2344
Infrastructure Planning (Studio 4)
Credit: 4
Prerequisites: None

Synopsis

This course attempts to explain the fundamental aspects of management and planning skills necessary to plan and maintain infrastructure. Major aspects that are covered throughout the course includes major infrastructure in context, master planning, infrastructure project performance, prioritization of projects and services, environmental and social impacts as well as uncertainty and risks. Case studies and hands-on projects are introduced to students to further enhanced their knowledge in planning and managing infrastructure projects.

Course Outcome

CO 1 Understand the steps in planning infrastructure projects

CO2 Understand the needs of environmental, social, legal and institutional aspects in infrastructure planning

CO3 Differentiate different types of privitization elements and professional construction services in infrastructure projects

CO4 Apply the concept of infrastructure planning in project-based cases and scenarios

CO5 Demonstrate the ability of using Project Management software in managing a project.

BET2422
Financial Management for Decision Making
Credit: 2
Prerequisites: None

Synopsis

The application of financial management for decision making for project evaluation. Coverage includes decisions on cost estimate, revenue generation and feasibility study.

Course Outcome

CO 1 Apply basic economic analysis in estimating cost estimate

CO2 Analyse revenue generation of project based on market study

CO3 Evaluate project feasibility and viability

CO4 Produce a a sustainable procedure for making decision

BET2373
Construction Engineering
Credit: 3
Prerequisites: None

Synopsis

The construction sector is a major part of the civil infrastructure and building industries. Construction projects range in size from the small (such as the construction of a swimming pool or a subdivision) to the very large (such as the construction of a hydroelectric power scheme or a freeway). However, all projects share the common factors of utilizing workers, machines and materials, and of requiring organization and control. The graduate must, therefore, be familiar with the range of construction equipment and techniques in common use, and must be able to plan and direct construction works. The course covers the areas of construction techniques, construction management and concrete technology.

Course Outcome

CO 1 Examine the basic characteristics and use of equipment commonly used in civil infrastructure and building construction

CO2 Examine commonly used construction techniques of the engineering construction industry

CO3 Analyse and apply commonly used planning and control

techniques used in civil infrastructure and building construction

CO4 Evaluate the properties of, and analyse the interaction between, the principal component materials used in the production of concrete

CO5 Formulate concrete mix design and plans quality control procedures for production and placement of concrete

BET1413
Engineering Practice 2
Credit:3
Prerequisites: None

Synopsis

This course includes practice modules covering aspects of Geology and Geomechanics. Practice requirements for each module include laboratory work in a team environment, field excursions and the preparation of individual reports on these practice activities. The qeological field excursion provides the student with in-situ activity. Identification the significant of engineering properties on soil and rock was main focus in this course. Students will be required to carry out soil tests according to Malaysian Standards to gauge various engineering properties in geomechanics.

Course Outcome

CO 1 Identify the civil engineering significance of common geological structures and discuss the implication of weathering and landform development

CO2 Identify a range of minerals and rocks and applying their properties to resolve civil engineering examples and problems

CO3 Measure basic civil engineering properties of soils using standard testing procedures

CO4 Analyse and present experimental data to a suitable engineering standard.

CO5 Understand and analyse the concept of permeability, flow nets, consolidation of soil and settlement of Structure

BET3573
Building Facilities and Maintenance
Credit: 3
Prerequisites: None

Synopsis

The course is designed to provide students with knowledge in building facilities and maintenance in practice and their responsibilities towards the profession and the society. The course highlights the application of science and technology, issues of the impact of building facilities technology on development and environment, issues of technologist in the Malaysian context. Upon the completion of the course, students will have demonstrated an ability to apply the basic physical and engineering sciences and technology underlying the building facilities and building maintenance services systems in different kinds of applications. They will possess an understanding of the major building services systems and their integration into the architecture and structures.

Course Outcome

CO 1: An understanding of the facilities and building maintenance and their integration and coordination into the architecture and structures.

CO2: To apply the BFM concepts underlying the functions of facilities and building maintenance

CO3: To analyse a building facilities or a selected system

component of a specific building service system in a building according to and complying with the engineering policies, regulations, guidelines, manuals, standards and specifications.

BET4222
Technologist in Society and Law
Credit: 2
Prerequisites: None

Synopsis

This course combines Seminar and Introduction to Law courses in an integrated course that will be delivered by experienced faculty members and guest lecturers. It will cover topics such as ET career, ET code of ethics, accreditation of ET programmes, ET professional bodies, route to professional technologist, industry expectation of the ET graduates, women in ET, globalization of the ET profession, future roles and challenges of ET in society.

Course Outcome

CO 1 Be aware about career development in ET and care for the code of ethics

CO2 Be acknowledged about the required training and registration by be able to identify the relevant professional bodies and illustrate path of the route to Professional

CO3 Comply to industry expectation by be able to describe opportunities and challenges and show concern of the globalization of ET profession

CO4 Show continual desire or concern of future roles and challenges of ET by demonstrating and explain issues and give example of modern tools in ET practices

BET2573
Construction Methods
Credit: 3
Prerequisites: None

Synopsis

This course covers the preliminary works and site establishment activities associated with commencing a construction job. It also deals with foundations and soil stabilization techniques, the production and use of common construction materials and discusses some elements associated with the construction of major infrastructure facilities.

Course Outcome

CO 1 Determine the infrastructure requirements for a construction job and apply a knowledge of the job establishment process

CO2 Explain and apply the basic methods of foundation construction and soil stabilization

CO3 Differentiate the main elements involved in timber, steel and concrete structures

CO4 Select and justify appropriate protective treatments for different structures and explain the various treatment processes involved

CO5 Evaluate and differentiate between the commonly used methods and techniques for the construction of selected major infrastructure facilities.

BET3634
Infrastructural Design (Studio 5)
Credit: 4
Prerequisites: None

Synopsis

This course attempts to explain the fundamental aspects of design skills

necessary to construct the infrastructure. Major aspects that are covered throughout the course includes design one or two major infrastructure in context,preliminary design, project report and engineering drawing, environmental and social impacts as well as uncertainty and risks. Case studies and hands-on projects are introduced to students to further enhanced their knowledge in designing and constructing infrastructure projects.

Course Outcome

CO 1 Understand the steps in desingning infrastructure projects

CO2 Understand the needs of environmental, social, legal and institutional aspects in infrastructure designing

CO3 Differentiate different types of infrasturucture and typical design in infrastructure projects

CO4 Apply the design of infrastructure in project-based cases and scenarios

CO5 Demonstrate the ability of using computer program software in designing a project.

BET3683
Final Year Project 1
Credit: 3
Prerequisites: None

Synopsis

This course is designed to expose the students to a senior design project. They have to apply all the knowledge that they have learned in the programme to complete the senior design project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the senior design project I, the students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, expected result, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

Course Outcome

CO 1 Propose background study, problem statement, objective and scopes of the research

CO2 Practice positive attitude and ethics in research activities

CO3 Present the research proposal and cited latest publications on the subject

BET3644
Infrastructure Management (Studio 6)
Credit: 4
Prerequisites: None

Synopsis

The course is the continuation of Infrastructural Project (Studio 5) in which students conduct infrastructural design, project BQ and cost estimation, project report and engineering drawing for a selected town with a selected theme. Although the project is in conducted in group, students are expected to demonstrate individual values in term CTPS, TPS, CS and LS.

Course Outcome

CO 1 Communicate efectively in a team and with external parties

CO2 Develop professional and ethical responsibilities

CO3 Select sustainable practices in the conduct of the project

CO4 Make appropriate references to the code of practice/guidelines

CO5 Demonstrate techniques/skills using modern engineering tools

BET3593
Quality Performance Management
Credit: 3
Prerequisites: None

Synopsis

This course mainly covers several topics related to quality and performance management, namely different systems used for assessing quality of infrastructure projects, methods of assessing overall construction project performance as well as different techniques applied in establishing and maintaining quality of infrastructure projects. Case studies and project-based tasks are introduced to understand the application of quality and performance in infrastructure projects.

Course Outcome

CO 1 Understand the fundamental concept of quality and performance in infrastructure projects

CO2 Identify different types of quality management systems suitable for infrastructure projects

CO3 Analyze production planning, control and inventory management activities based on given cases.

CO4 Evaluate solutions for a given cases based on total quality management systems, quality control concept ISO 17001.

BET1613
Engineering Practice 3
Credit: 3
Prerequisites: None

Synopsis

This course will involve the student in an investigation of the range of materials commonly used in civil engineering. The characterization of materials and the need for material parameters for design will be considered. The student will test a range of materials in the laboratory to establish material properties. Presentation and interpretation of test results will also form an important part of the course.

Course Outcome

CO 1 Demonstrate characteristics of materials commonly used in engineering are important in civil engineering design and construction

CO2 Describe how key characteristics of civil engineering materials are quantified

CO3 Plan the test regime used to ascertain design parameters for civil engineering materials

CO4 Organize a testing procedure and sequence to obtain parameters for civil engineering design purpose

CO5 Analyse test data and present the data and its analysis for use by other engineering personnel

BET3513
Conflict and Risk Management
Credit: 3
Prerequisites: None

Synopsis

This course is designated to expose to students various managerial skills and good practices in managing conflict infrastructure projects. Students are also introduced to the risk management aspect in a project.

Course Outcome

CO 1 Identify good practices in managing conflicts among team members

CO2 Describe steps in effective risk management in infrastructure projects

CO3 Understand risks associated with infrastructure project lifecycle

CO4 Apply concepts of effective risk management through case studies

BET3522
Procurement for Infrastructural Project
Credit: 2
Prerequisites: None

Synopsis

Front end engineering design, detailed engineering, asset improvement, procurement and construction management, EPCM and PMC services for customer sector based on HVE (High Value Engineering) and low-cost but high quality professional services that meet international standards.

Course Outcome

CO 1 Differentiate between procurement and value added

CO2 Propose procedure on how to conduct design review

CO3 Organise value management value

CO4 Conclude procuurement as a binding report

BET4783
Final Year Project 2
Credit: 3
Prerequisites: None

Synopsis

This subject is the continuation of the subject Engineering Technology Senior Design Project I. In this course, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of the semester, the students are required to produce a design project report and present it to faculty's evaluation panel.

Course Outcome

CO 1 Analyze data, discuss and conclude the findings

CO2 Manage the research work

CO3 Practice positive attitude and ethics in research activities

CO4 Present the research report and cited latest publications on the subject

BET4774
Technology Design Project
Credit: 4
Prerequisites: None

Synopsis

In this course, the widest implications of a service, product or process are considered at the project design stage, including not only the technical interactions of the various sub-systems, but also the financial ethical, sociological, and socio-economic implications. This course leads the students the understanding of the philosophy and methodology of the design process in the context of the system which embraced sociological, economic, technical and ergonomic aspects. The technology design project is the capstone project course in the four year bachelor of engineering technology (infrastructure management).

Course Outcome

CO 1 Conceptualize problems and develop strategic solutions from open-ended scenarios

CO2 Identify, review, and evaluate multi-disciplinary design projects that require the system design approach

CO3 Rationalize, plan, develop, optimize, and communicate a system design in the wider engineering environment of statutes, ecology, common law,

ergonomics, social acceptability, marketing, and economics, etc

CO4 Transfer and apply appropriate use of computer technology to the design project

CO5 Cooperate as effective members of teams working and communicate the multi-displinary project results in a professional manner with formal report structure, an executive summary and a formal conveyance letter.

BET 1113
Green Technology for Infrastructure Facilities
Credit: 3
Prerequisites: None

Synopsis

This course will expose to the students the concept and application of green technology for construction especially in the area of infrastructural facilities. The subject topics encompasses introduction to the green technology, elements of green construction, economic analysis on green construction, green project requirement and application of green technology in infrastructure facilities
such as public building, road and highway, drainage, sewerage and water supply system. In addition, this course also introduces the use of Green Building Index in the assessment of green building. Students will have to discuss the assessment criteria in the Green Building Index as part of the assessment.

Course Outcome

CO1 Apply the principle and element of green technology in construction of infrastructure facilities

CO2 Design green technology for sustainable infrastructure facilities.

CO3 Demonstrate the awareness of the need for sustainable development.

BET3573
Engineering Management
Credit: 3
Prerequisites: None
Synopsis

This course provides the basic requirement and best practices of management in engineering organizations, namely at Government AgenciesConsultancy Firms and Construction Companies.It covers technical knowledge with basic business and management techiques.The modules produces engineers that meet management responsibilities, formulate practical meaningful business ideas and take into account on the requirement in leadership role as to face challenges in a competitive environment.

Course Outcome

CO 1 Identify formal structure requirement for engineering operation activities

CO2 Discuss various management methods available of engineering related agencies and companies

CO3 Practice the functions of a management team

CO4 Analyse the way an engineering organizationfunction

BET 3582
Digital Construction Technology
Credit: 2

Synopsis

This course discusses selected technology related to software and hardware application in construction industry. The students will be introduced the latest

technology used in construction field related to in design engineering, construction and operational management. At the end of study, student is expected able to produce and analyses the small scale engineering model adopting the latest technology.

Course Outcome

CO1 Able to demonstrate the latest hardware and software technology in infrastructure Management

CO2 Conduct the standardized engineering analysis adopting latest technology

BET3583
Urban Infrastructure
Credit: 3

Synopsis

This course is designed for persons who work in the built environment. This course will expose students to the understanding of how infrastructure systems are planned, designed and operated. Students will be introduced to emergent behavior and transitional strategies including the competing technical, economic, social, environmental and community dimensions in the urban strategy development. In addition, students will be exposed to the concept of sustainability and universal design as adding skills in developing and analyzing urban transitional strategies for a particular infrastructure component.

Course Outcome

CO1 Recognize the principles of implementing infrastructure in urban areas.

CO2 Determine solutions in tackling issues regarding infrastructure in urban areas

COURSE SYNOPSIS FOR DEGREE PROGRAMME 2020/2021
BACHELOR OF ENGINEERING TECHNOLOGY
(ENERGY AND ENVIRONMENTAL) WITH HONOURS

BTU1113
Physics
Credit Hours: 3
Pre-requisite: None

Synopsis
This course introduces a fundamental of physics. It covers unit and measurements, kinematics, forces and Newton's law of motion, statics equilibrium, work, energy and power, fluid mechanics, electric and magnetism.

Course Outcomes
By the end of semester, students should be able to:

CO1: Illustrate basic concepts, theories and principles of physics in engineering application.
CO2: Solve physics problem in statics, dynamics, electric and magnetism.
CO3: Demonstrate physics concepts in a team.

BTU1112
Physics Laboratory
Credit Hours: 2
Pre-requisite: None

Synopsis
This laboratory introduces the students with the application of physics concept in engineering devices such as free fall, Bernoulli's law, hydrostatic pressure and electric field. the concepts of physics introduced related in mechanics or dynamics motion and basic concepts of electrical area. The students will learn how to run the experiment with referring to the basic concepts of physics during the lab hours.

Course Outcomes
By the end of semester, students should be able to:

CO1: Understanding the basic concepts, theories and principles of physics in engineering application.
CO2: Demonstrating skills in logical thinking in handling equipment.
CO3: Applying basic physics concepts to problem solving.
CO4: Applying physics knowledge to personal decisions involving physical problems.

BTE1213
Electrical Fundamentals
Credit Hours: 3
Pre-requisite: None

Synopsis
This module will introduce students to basic science of electricity, introduction to instrumentation and measurement, work and energy theorem, basic electrical circuits and introduction to magnetism.

Course Outcomes
By the end of semester, students should be able to:

CO1: Describe the basic concept of electricity, conductors, insulators, circuit, magnetism and other devices.
CO2: Apply basic electrical laws such as Ohm and Kirchhoff Law to solve circuit or electrical problems.
CO3: Shows the ability to communicate effectively.

BTE1212
Electrical Fundamentals Laboratory
Credit Hours: 2
Pre-requisite: None

Synopsis

This course introduces students to the fundamentals laboratory of DC and AC circuits and basic network laws and theorems. The students will be handling the basic measurement equipment to measure and analyse the parameter of the electrical circuits.

Course Outcomes
By the end of semester, students should be able to:

CO1: Construct simple electrical and electronics and simulate the operation of the circuits using circuit simulation software (OrCAD).
CO2: Measure parameter of electrical circuits (resistance, voltage, current, etc).
CO3: Work ethically and effectively as an individual and in a group.

BTE2313
Computer Programming
Credit Hours: 3
Pre-requisite: None

Synopsis
Fundamental principles and concepts of C++ programming, with definitions of data, expressions, control-flow constructions, functions, input and output and preprocessing. Basic problem solving and programming techniques, structured programming ideas, fundamental algorithms and data structures (array).

Course Outcomes
By the end of semester, students should be able to:

CO1: Construct computer programs using C++ language.
CO2: Develop appropriate programming techniques and program control structures.
CO3: Display the ability to use IDE (Integrated Design Environment) for C++.
CO4: Propose an algorithm for a specific problem by implementing appropriate programming techniques.

BTM3314
Computer Aided Drafting
Credit Hours: 4
Pre-requisite: None

Synopsis
This course is a basic and advanced computer aided drafting in 2D. CAD tools required to document engineering designs. This subject is designed to introduce to the student the principle of computer-aided design including drafting, drawing, dimensioning, tolerances and commands.

Course Outcomes
By the end of semester, students should be able to:

CO1: Analyse technical drawing.
CO2: Apply basic geometric construction technique in creating 2D object and projecting 3D object in 2D space.
CO3: Perform working drawing with its components and follow the standards that apply.
CO4: Display geometric dimensioning and tolerancing in working drawing.

BTV1113
Environmental Technology
Credit Hours: 3
Pre-requisite: None

Synopsis
The study of environmental technology and environmental preventive and mitigation measures in the industries. Case studies and local environmental issues will be analysed to evaluate potentially adverse outcomes of environmental technology in relation to existing legislation (EPA, EQA 1974 &

OSHA 1994, FMA 1967) and other existing public policies. The course will also address the human health and economic impact in the private sector.

Course Outcomes
By the end of semester, students should be able to:

CO1: Outline the concept of environmental technology as well as environmental preventive and mitigation measures.
CO2: Integrate concept of environmental technology and environmental preventive and mitigation measures in few case studies and local environmental issues in Malaysia.
CO3: Recognize the needs for professional development in environmental and sustainability in the broad scope of industrial sector.

BTV1112
Environmental Technology Lab
Credit Hours: 2
Pre-requisite: None

Synopsis
This course will focus on environmental testing techniques, common environmental laboratory protocols, data analysis and reporting. Topics will cover the quality of water, wastewater, air, and noise through the use of modern tool equipment. Skills gained will be directly applicable to careers in environmental technology both in data collection and managing field assessments especially for industry. The course will provide an appreciation for the effort involved in environmental samples testing, and an ability to critically evaluate data from a sampling program.

Course Outcomes
By the end of semester, students should be able to:

CO1: Apply environmental related knowledge by performing field and lab scale experiments.
CO2: Demonstrate the ability to use a variety of modern tools necessary for carrying out environmental monitoring and assessment.
CO3: Perform environmental monitoring and assessment in a team.

BTM1113
Basic Manufacturing Processes
Credit Hours: 3
Pre-requisite: None

Synopsis
Introduction to the materials, techniques, and equipment of industrial manufacturing. Emphasis on laboratory demonstration and simulation activities such as machining, welding, casting, and forming operations.

Course Outcomes
By the end of semester, students should be able to:

CO1: Identify various states of matter, structure and properties of basic engineering materials and their relationship.
CO2: Describe the fundamental differences between ferrous and nonferrous alloys and their configuration and applications.
CO3: Identify different manufacturing processes and their applications.
CO4: Analyse process parameters in operation and their effect on the quality.

BTV2123
Environmental Law, Policy and Economics
Credit Hours: 3
Pre-requisite: BTV1112 and BTV1113

Synopsis

This module will introduce students on the history of environment law and legislation system that applied in our country. The students will exposure the applied the of EQA 1974 Act to the industries, construction, agriculture and other activities that required under the act. Students will learn the environmental policies that applied in other country, the turns of economics on environmental analysis and the mitigation measures action. The module goal is to enable the student to practise the environmental law and policies in the industries sectors and identify mitigation measures that suitable to overcome the environmental problem.

Course Outcomes
By the end of semester, students should be able to:

CO1: Describe environmental legislation, regulation, policies and environmental economic.
CO2: Discriminate an environmental problem with related law and regulation, and mitigation measure approaches to improve environmental quality management.
CO3: Practise to the Environmental law and regulation to the environmental issues and cases.

BTV2213
Thermodynamics
Credit Hours: 3
Pre-requisite: BTU1113

Synopsis
This course deals with properties of a simple pure compressible substance, equations of state, the first law of thermodynamics, internal energy, specific heats, enthalpy and the application of the first law to a system or a control volume. The study of the second law of thermodynamics is also discussed leading to the discovery of entropy as a property and its ramifications.

Course Outcomes
By the end of semester, students should be able to:
CO1: Apply knowledge on energy transfer and transformation in systems using fundamental concepts of properties of materials, work, heat, internal energy, entropy, equilibrium, and relations derived from the First and Second Laws of Thermodynamics.
CO2: Analyse the concept of heat and work to the engineering problems.
CO3: Solve broadly define thermodynamic problems involving first and second law of thermodynamics.

BTV3333
Biobased Fuels and Alternative Energy Applications
Credit Hours: 3
Pre-requisite: None

Synopsis
Overview of bio-fuel sources, production, and applications. Review of conventional energy supplies and uses. The study of liquid and gaseous fuels derived from plant and animal matter, utilizing of biofuels for combustion, stationary power, and transportation. Study of biofuels used in conventional and alternative manners, Energy from Biomass; Bioreactor design, sustainability, environmental impacts, economic and social issues, and global governmental policies. Biohydrogen production, pretreatment of biomass and nanotechnology for biofuel production topics from an applied perspective of technology practices, with implementing large-scale consumption of biofuels.

Course Outcomes

By the end of semester, students should be able to:

CO1: Describe the fundamentals and main characteristics of biobased energy sources and analyse their environmental impact/problems compared to fossil fuels.
CO2: Development of integrative energy efficiency systems.
CO3: Design biofuel energy systems that meet specific energy demands, are economically feasible and have a minimal impact on the environment.

BTM1124
Machine Production Process
Credit Hours: 4
Pre-requisite: None

Synopsis
This course intends to provide detailed study of conventional methods of metal machining. Laboratory experience includes the fundamentals of machine tool setup and operation, precision measurement techniques, and machine tool safety, care and maintenance.

Course Outcomes
By the end of semester, students should be able to:

CO1: Discover basic machine tool processing knowledge, abilities and skills.
CO2: Expand machine tool processing knowledge, abilities and skills through experience with conventional process.
CO3: Practise the ethics of workplace safety during completion of assigned projects.
CO4: Recognize the function, application as well as limitations of machine tool processes through examination, discussion and operation.

BTM2234
Fluid Power Technology
Credit Hours: 4
Pre-requisite: BTU1113

Synopsis
This course consists fundamental of fluid mechanics and fluid power system. Fundamental of fluid mechanics including properties of fluid, fluid in static and fluid in motion. Fluid power system including fluid power principles, devices, materials, hydraulic and pneumatic systems with emphasis on pumps, compressors, motors, and actuators.

Course Outcomes
By the end of semester, students should be able to:

CO1: Use the fundamental of fluid mechanics and fluid power including properties of fluid, fluid flow, hydraulics system and pneumatics system to solve problems in both of these fields.
CO2: Analyze and solve problems in fluid mechanics by applying the Bernoulli's equation and energy equation.
CO3: Sketch and construct basic circuits to solve the problems regarding pneumatic and hydraulic system that are applied in the daily lives.
CO4: Demonstrate theoretical and experimental data in spoken presentation and written lab report in order to understand the fundamental concept of fluid mechanics.

BTV2223
Environmental Management System
Credit Hours: 3

Pre-requisite: None

Synopsis
The demand for trained practitioners in environmental management system at the project level and related environmental management fields continues to grow. To meet this demand, this module provides an opportunity for specialist study in the principles of sustainability, international and national policy, approaches to valuing the environment, attitudes to conservation and the role of the public in environmental decision-making. The module emphasizes fieldwork or case studies.

Course Outcomes
By the end of semester, students should be able to:

CO1: Relate the systems and approaches of environmental management system which are being increasingly used in industry.
CO2: Monitor and improve environmental performance.
CO3: Adapt and meet the challenge of sustainable development.

BTV2314
Green Technology
Credit Hours: 4
Pre-requisite: None

Synopsis
Introduction to environmentally friendly engineering and technological advances and new technologies that utilize green principles and green transportation. Course includes topics in new areas of green manufacturing and materials used today and planned for the future, including the operation and manufacture of solar cells and the production of wind, thermal, and hydroelectric power. Topics will vary depending upon new trends in industry. Several experiments related to green technology were exposed in this subject.

Course Outcomes
By the end of semester, students should be able to:

CO1: Propose alternative renewable technologies considering availability of the different energy resources and environmental needs.
CO2: Operate various types of renewable energy equipment and perform measurement and data collection.
CO3: Demonstrate ethical responsibility towards environment and sustainability by applying green technology principles.

BTV3413
Industrial Quality Control
Credit Hours: 3
Pre-requisite: None

Synopsis
This course will present the fundamental concepts and methods of quality monitoring including Problem solving tools (cause and effect diagrams, scatter diagrams, run charts etc.), normal curves, control charts, process capability and acceptance sampling. The use of control charts and statistical tools determine the stability and capability of processes to produce quality product. The implementation and applications of quality management systems such as TQM, ISO9000 and Six sigma will be briefly studied.

Course Outcomes
By the end of semester, students should be able to:

CO1: Understand the philosophy and basic concepts of quality improvement, problem solving

techniques, and describe the PDCA process (plan, do, check and act).

CO2: Perform analysis of statistical process control tools (variable control chart, attribute control charts), process capability of industrial operations.

CO3: Engage in independent and lifelong learning about industrial quality control in industrial cases of TQM, Six sigma and continuous improvement.

BTV3113
Wastewater Treatment Technology
Credit Hours: 3
Pre-requisite: BTV2123

Synopsis
Water and wastewater technology focus on design and operation of water and wastewater treatment systems. This course prepare students for certification examinations administered by Malaysia Government as well as those administered by professional associations within the water and wastewater industry.

Course Outcomes
By the end of semester, students should be able to:

CO1: Develop understanding on regulatory framework on industrial pollution control as regulated by Industrial Effluent Regulation (IER) and develop ability to perform engineering process design of industrial effluents treatment system (IETS).

CO2: Measure, determine, perform and interpret the water and wastewater treatment system experiment as a group.

CO3: Demonstrate technical skills in using computer statistical software for analyzing and interpreting IETS performance monitoring data.

BTV3233
Solid and Scheduled Waste Management
Credit Hours: 3
Pre-requisite: BTV2123

Synopsis
This course introduces the student to the physical, chemical and toxic properties of solid and Scheduled waste which are the basis for their hazard classification, movement and distribution as well as their impacts on human health and the environment. The industries which generate solid and Scheduled waste will be identified. The management of these wastes which include handling, storage and transportation based on the regulations stipulated in the Environmental Quality Act, 1974 and Solid Waste and Public Cleansing Management 2007, (Act 672). The treatment and disposal processes will be emphasized including pollution prevention and waste minimization strategies.

Course Outcomes
By the end of semester, students should be able to:

CO1: Apply the theories and principle of solid and scheduled waste management, the impact and the risks towards human health and environment.

CO2: Conduct case studies for best practices solid and scheduled waste management.

CO3: Apply various solid and scheduled waste treatment technologies in the industries as Competent Person.

BTV3224

Heating, Ventilating and Air Conditioning Technology
Credit Hours: 4
Pre-requisite: BTV2213 and BTM2234

Synopsis
Heat gains and losses, heat producing equipment, cooling, and refrigeration equipment are studied. Human comfort and air quality requirement and efficient design of HVAC system for commercial, industrial, and residential systems.

Course Outcomes
By the end of semester, students should be able to:

CO1: Examine the operation of common HVAC equipment such as chillers, cooling towers, heat exchangers and recognise the energy cost associated with them.
CO2: Design air heating and cooling processes and perform basic heating and cooling load calculations.
CO3: Demonstrate technical communication skills (written, sketches, charts and graphs).
CO4: Engage in independent and lifelong learning with the broad scope of human comfort requirement in residential, commercial and industrial settings.

BTV3324
Design for Energy Efficiency and Green Materials
Credit Hours: 4
Pre-requisite: BTV2213

Synopsis
Overview of energy forms, sources, generation, devices, systems, and materials. Review of the physics of energy transformation and conservation. Energy efficiencies of components and systems from stationary and transportation sectors. Energy-efficient design in residential, commercial, industrial, and manufacturing systems. Sustainability, environmental impacts, economic and social issues, and global governmental policies. Potential of alternative energy sources. Use of eco-friendly materials to improve efficiency. Topics from an applied perspective of technology practices, management, responsibilities, and policies involved with implementing energy conservation designs.

Course Outcomes
By the end of semester, students should be able to:

CO1: Explain the concepts of conversion of mass, conservation of energy and the second law of thermodynamics.
CO2: Measure and evaluate energy exchange.
CO3: Design a comprehensive understanding of a system that applies the principles of conversion of mass and energy.

BTV3424
Facilities Management Technology
Credit Hours: 4
Pre-requisite: None

Synopsis
An overview of the technology facility management responsibilities, policies, and practices involved in implementing and/or managing technology properties that have sustainable goals connected to them.Identification of competencies needed by the technology facility management function to properly design, operate, and maintain facilities within the scope of responsibilities of technology facilities managers.

By the end of semester, students should be able to:

CO1: Demonstrate understanding of Facilities Management technology

components, scopes and applications.

CO2: Analyze and estimate requirements (maintenance, budgetary, working condition) and resources needed for the efficient management of facilities.

CO3: Ability to manage or lead projects efficiently, how to meet the challenge, and add project management skills to their repertoire.

BTV3143
Air Pollution Control Technology
Credit Hours: 3
Pre-requisite: BTV2123

Synopsis
The topics in this course discuss several important aspects of air pollution that include classification and sources of air pollutants, their impact to environment, sampling methods, preventing and controlling air pollution, Pollution control technology and air quality management system will be discussed.

Course Outcomes
By the end of semester, students should be able to:

CO1: Define the terminologies, theories and principle of air pollution technology.

CO2: Demonstrate the specific air pollutants and its control technology.

CO3: Predict the air pollution problem and preventing action.

BTV3433
Engineering Economy
Credit Hours: 3
Pre-requisite: None

Synopsis
This course introduces concept of life cycle cost, interest and equivalent. Formula and factors for single and multiple cash flow. Method for investment assessment and alternative comparison and project evaluation using cost worth ratio, inflation and cash flow method.

Course Outcomes
By the end of semester, students should be able to:

CO1: Understand basic principles of engineering economy, cost estimation, money-time relationships.

CO2: Apply analytical and numerical methods for evaluation of engineering projects to come up with best alternatives.

CO3: Use computer to solve problems using Microsoft programs such as Excel etc.

BTV3453
Energy Auditing
Credit Hours: 3
Pre-requisite: BTV2213

Synopsis
Basics of energy auditing, energy accounting and analysis and understanding the utility bill for buildings and industrial plants including the use and application of survey/measurement instruments will be discussed. The auditing of building envelops, electrical systems, HVAC systems and energy efficiency improvement and operation of industrial boiler systems will be highlighted in this course.

Course Outcomes
By the end of semester, students should be able to:

CO1: Illustrate energy audit basic concepts, theories, principles, documentation and develop method of auditing current energy for best utilization practice of buildings and industrial plants.

CO2: Demonstrate the ability to use a variety of modern tools necessary for carrying out energy auditing of buildings and industrial plants.

CO3: Engage in independent and lifelong learning with the broad scope of energy auditing and energy conservation opportunities.

BTV3463
Energy Management
Credit Hours: 3
Pre-requisite: BTV2213

Synopsis
This course is designed to emphasize the importance of energy in human's life by reviewing the national and global energy scenario. The students will be exposed to the principle of Sustainable Energy Management System (SEMS) and make them capable to setup the system at real application. The content of this course consists of fundamental of energy and energy management, energy policies and legislations, energy efficiency and conservation programs and methodology of SEMS implementation based on Asean Energy Management Scheme (AEMAS). Green building components also considered as part of this course.

Course Outcomes
By the end of semester, students should be able to:

CO1: Relate global and local energy scenario, fundamental of energy and energy management system, energy policies and legislations, economics and energy efficiency & conservation programs.

CO2: Acquaint with the principle and methodology of Sustainable Energy Management System (SEMS) and able to setup the system at real application.

CO3: Engage in independent and lifelong learning with the broad scope of energy management opportunities.

BTV3473
Safety & Risk Management
Credit Hours: 3
Pre-requisite: None
Synopsis
This course introduces the principles and basic concepts of safety and risk management practice in the industries. Students will be exposed to the fundamental scopes of Occupational Safety Health and Environment (OSHE) in organization, comprehend the reasons why OSHE has to be managed, the acts and legislations in relation to OSHE, analyzed the sources of OSHE harm and their effects and choose the appropriate risk management way in managing the OSHE hazards and understand their responsibilities in practicing all of the safety elements in the workplace.

Course Outcomes
By the end of semester, students should be able to:

CO1: Evaluate the occupational safety health and environment (OSHE) fundamentals theory to identify hazards, risk and exposure at the workplace.

CO2: Integrate concept of occupational safety health and environment (OSHE) in few case studies and local industrial issues in Malaysia.

CO3: Recognize the needs for professional development in risk management in the broad scope of industrial sector.

BTV3813
Engineering Technology Senior Design Project I

Credit Hours: 3
Pre-requisite: None

Synopsis
Overview of energy forms, sources, generation, devices, systems, and materials. Review of the physics of energy transformation and conservation. Energy efficiencies of components and systems from stationary and transportation sectors. Energy-efficient design in residential, commercial, industrial, and manufacturing systems. Sustainability, environmental impacts, economic and social issues, and global governmental policies. Potential of alternative energy sources. Use of eco-friendly materials to improve efficiency. Topics from an applied perspective of technology practices, management, responsibilities, and policies involved with implementing energy conservation designs.

Course Outcomes
By the end of semester, students should be able to:

CO1: Ability to identity problem and determine path for solution.
CO2: Ability to interact with supervisors to discuss project details.
CO3: Ability to function on design team.
CO4: Ability to apply ethics and quality concepts to design task.
CO5: Ability to apply engineering economy concepts and societal issues to design task.
CO6: Understanding of research in project development and component determination.

BTV4703
Solar Energy System
Credit Hours: 3
Pre-requisite: BTE1213 and BTV2213

Synopsis
The course is intended for students who have interest in alternate energy sources as a contributor to sustainability. It provides a comprehensive treatise on the science and technology of solar energy, its collection and the design principles that need to be understood for its effective use in a variety of installations and uses. At the end of the course the students should be able to understand the factors that influence the use of solar radiation as an energy source, know the various active and passive technologies that are available for collecting solar energy and have the ability to apply design principles to selection of an appropriate solar energy installation to meet requirements.

Course Outcomes
By the end of semester, students should be able to:

CO1: Distinguish the terminologies, principle of solar energy and the mechanism of heat transfer including techno economics analysis.
CO2: Demonstrate the application of principle of solar energy in solar technology system.
CO3: Engage in independent and lifelong learning of solar energy technologies.

BTV4753
Environmental Impact Assessment
Credit Hours: 3
Pre-requisite: None

Synopsis
This course addresses the constraints and opportunities that natural environment brings to the success of development. The emphasis is on the development and correct application of the fundamental concepts of environmental impact assessment (EIA). Topics covered are an introductory guide to EIA, Scoping methods and baseline studies in EIA,

Developments in EIA methods, Environmental Management Planning (EMP), Environmental Management System (EMS) and application of EIA. In addition students will also be exposed to environmental regulations and strategies in environmental protection via EIA and EMS. The emphasis is on theoretical background, site visit and application through EIA report.

Course Outcomes
By the end of semester, students should be able to:

CO1: Explain the impacts of the environmental of a proposed project based on EIA requirement.
CO2: Illustrate the appropriate pollution control technique and mitigation measure prior to project approval.
CO3: Evaluate the concept of Environmental Management Plan and Environmental Management System.

BTV4763
Geographic Information System
Credit Hours: 3
Pre-requisite: None

Synopsis
This course offers an introduction to the concepts, principles, and theories behind Geographic Information Systems and Science (GIS), with emphasis on the nature of geographic information, data models and structures for storing geographic information, geographic data input, data manipulation, and simple spatial analysis and modeling techniques. The course is composed of two components: lectures and labs. The lectures will discuss the concepts, principles, and theories behind GIS and the labs will reinforce the concepts and principles through hands-on exercises and projects. Students must be clear that this is not a class on any specific GIS software. It is a course on the underpinning theory and concepts in GIS. However, students will be exposed to the major commercial GIS software packages of ArcGIS in their labs.

Course Outcomes
By the end of semester, students should be able to:

CO1: Practice the concepts, principles, techniques and applications that are fundamental to GIS and that differentiate GIS and geographic science from other information systems, technologies and sciences.
CO2: Interpret the nature and characteristics of geospatial data, data representations, methods of data input and editing, and data organization/management in GIS.
CO3: Apply GIS concepts, principles and techniques to real-world spatial problem solving and mapping applications.
CO4: Combine different types of spatial analysis to meet specified need of GIS project.

BTV4826
Engineering Technology Senior Design Project II
Credit Hours: 6
Pre-requisite: None

Synopsis
This course is designed to expose the students to a senior design project. They have to apply all the knowledge that they have learned in the program to complete the senior design project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the senior design project I, the students will be able to do a literature

survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, and expected result, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

Course Outcomes
By the end of semester, students should be able to:

CO1: Ability to identify problem and determine path for solution.
CO2: Ability to interact with supervisors to discuss project details.
CO3: Ability to function on design team.
CO4: Ability to apply ethics and quality concepts to design task.
CO5: Ability to apply engineering economy concepts and societal issues to design task.
CO6: Understanding of research in project development and component determination.

BTV4812
Industrial Training
Credit Hours: 12
Pre-requisite: None

Synopsis
In Industrial Training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

Course Outcomes
By the end of semester, students should be able to:

CO1: Initiate effort to apply acquired technical skill for problem solving in the industry.
CO2: Function as a professional and ethical trainee in an organization during the industrial training.
CO3: Demonstrate a professional commitment and responsibilities at workplace.
CO4: Present the outcomes of industrial training in a formal oral presentation.
CO5: Conduct an analysis on one main issue discovered during industrial training.

CURRICULUM STRUCTURE FOR DIPLOMA IN CIVIL ENGINEERING (DAA)

DAA 1032
Engineering Drawing
Credit Hour: 2

Synopsis

This subject aims to expose civil engineering students to engineering drawing and to prepare this knowledge in their future profession. This includes the structural, section and structural detailing drawings. Hands-on sessions using drawing software packages will equip the students with first hand practice on producing the drawings for some idealized and actual projects. Mini project covers several disciplines of civil engineering profession integrated through a series of these hands-on sessions.

Course Outcome

At the end of semester, student should be able to:

CO1: Describe the basic characteristics and features of civil engineering drawing.
CO2: Identifying drafting tools.
CO3: Execute computer-aided software to produce engineering drawing
CO4: Interpret the civil engineering drawings to the actual construction.

DAA 1312
Civil Engineering Materials
Credit Hour: 2

Synopsis

This course will enable students to demonstrate understanding in the fundamental properties of construction material. Students will learn the basic properties of cement, aggregate, water, admixtures, manufacturing of concrete, masonry, timbers, metals, and other construction materials. At the end of the course students should be able to identify the suitability of each material in a construction, analyse and provide basic solution to the problematic material, and recognize the importance of sustainability practice in construction material.

Course Outcome

At the end of semester, student should be able to:

CO1: Demonstrate understanding in the fundamental properties of construction materials.
CO2: Identify suitability of one material in civil construction.
CO3: Analyze and provide solutions to the problematic material in civil construction.
CO4: Understand how the concept of sustainability applies to construction materials.

DAA 1113
Engineering Mechanics
Credit Hour: 3

Synopsis

The emphasis on the development and correct application of the fundamental concepts of rigid body mechanics. Topics covered for both statics & dynamics are force system resultants, condition of equilibrium, centroid & moment of inertia; force & acceleration and work & energy.

Course Outcome
At the end of semester, student should be able to:

CO1: Analyze the concept of static mechanics system in two and three dimensions problems and solve it by applying the equilibrium condition.
CO2: Determine the location of centroid and moment of inertia for a body of arbitrary shape.
CO3: Analyze the kinematics of motion that involves force & acceleration and work & energy principle.

DAA 2931
Engineering Laboratory II
Credit Hour: 1

Synopsis

This ENGINEERING LAB II covers material and structural testing. The experiments are complimentary to the theory that students have learned in the classroom and also to expose them to the practice work at the construction

industry.

Course Outcome

At the end of semester, student should be able to:

CO1: Observe and detect the failure from destructive and non-destructive testing
CO2: Conduct concrete mix design and produce the output from the design.
CO3: Conduct tensile strength test and discuss the properties of steel from the test.

DAA 1212
Computer Programming
Credit Hour: 2

Synopsis

The subject focusess on development of programming skills using computer programming language that is suitable for the current computer operating system.

Course Outcome

At the end of semester, student should be able to:

CO1: Describe basic computer programming and its functionalities
CO2: Construct and adopt a pseudo code and flow chart for solving a computing problem
CO3: Analyze a simple computing-based project
CO4: Design and develop computer program using basic language programming

DAA 1123
Mechanics of Materials
Credit Hour: 3

Synopsis

The course covers the introduction and concepts of material stress and strain in a variety of different loading situation within a given material's elastic limit. This course also concerned with the calculation of forces acting on static objects and structures. Major concepts include: material properties; loads, reactions, axial load: stress and deformation, including statically indeterminate systems, axial force, shear force, bending moments, flexural and shear stresses in beams, beam deflections and torsion: stress and deformation.

Course Outcome

At the end of semester, student should be able to:

CO1: Solve the state of stresses, strains and deformation response of elastic solids in the external loading and axially load assemblies.
CO2: Solve the mechanical behavior of materials under load and provide insight for modeling the behavior to theory.
CO3: Analyze the shear-moment diagrams accordingly calculate the bending and shear stress in determinate beams.
CO4: Analyze the principal stresses and angles in plane cases using analytical method and Mohr's circle.
CO5: Analyze the stresses, deformation and twist of angle of a torsional bar.

DAA 1723
Fluid Mechanics
Credit Hour: 3

Synopsis

To introduce the fundamental principles of fluids mechanics, the basic equations governing fluid statics and fluid flow and the methods of solving engineering problems related to Fluid Mechanics

Course Outcome

At the end of semester, student should be able to:

CO1: Define the fluid properties and the fundamentals of Fluid Mechanics concept.
CO2: Explain Fluid Mechanics system and devices such as Manometer and Peizometer.
CO3: Apply Fluid Mechanics theories such as Bernuolli's Theorem and Continuity Equation.
CO4: Demonstrate the pipeline system as related to Civil Engineering

DAA 1951
Engineering Laboratory I
Credit Hour: 1

Synopsis

Engineering Lab I for diploma covers laboratory experiments in the field of Water and Environment. The laboratory experiments are complementary to the theory that students have learnt in their classrooms and will expose them to the practical work in the working industry.

Course Outcome

At the end of semester, student should be able to:

CO1: Collect, analyze, interpret and apply experiment data using significant and limitations of properties based on related standard requirement as well as use communication skills to transfer their findings in a formal report format.
CO2: Interact professionally among themselves and able to conduct laboratory tests.

DAA 2313
Engineering Surveying
Credit Hour: 3

Synopsis

This subject will expose to the civil engineering students the role of survey engineering in their field. The subject topics encompasses introduction to the engineering surveying, surveying equipment, measurement unit, bearing/angle and distance measurement for horizontal control, coordinate system, area & volume calculation, mass transfer diagram & mass transfer measure and the final setting out for construction work.

Course Outcome

At the end of semester, student should be able to:

CO1: Identify and describe the definition and the principle of engineering survey including the engineering surveying roles in civil engineering works [i.e: determination point location technique, coordinate system, read and understand the information shown in site plan.
CO2: Describe the procedure to perform horizontal and vertical control based on related provision i.e theodolite and traversing and levelling [angle, horizontal distance and vertical distance measurement and cogo computation.
CO3: Understand the range of calculations that can be made with surveying data i.e An ability to make a necessary calculation to fix position of forming a horizontal and vertical curve, area and volume of construction work project.

DAA 2322
Engineering Surveying Fieldwork
Credit Hour: 2

Synopsis

This fieldwork emphasizes on handling of survey equipments, carry out linear survey, traverse survey, leveling, establishing temporary bench mark, detail survey, techniques of gathering the locating man-made and natural features, preparation of site plan, related computation, and setting-out simple construction work.

Course Outcome

At the end of semester, student should be able to:

CO1: Organize a small survey work for project.
CO2: Practice the significant of survey work using engineering survey techniques based on related provision
CO3: Use various survey instruments at site.
CO4: Write report effectively

DAA 2123
Theory of Structures
Credit Hour: 3

Synopsis

To introduce the concept of project management which will provide the students with the knowledge of managing of construction project. As an introduction, students will be given general information on basic elements involved in management and phases in construction project. Then they will be given exposure to the methods to properly plan and schedule the project plus knowledge to do cost estimation of the construction project.

Course Outcome

At the end of semester, student should be able to:

CO1: Determine the deflection and slope for statically determinate beams
CO2: Analyze the an indeterminate beams and frames to obtain the end moments
CO3: Analyze the internal forces and compute the deflection of determinate plane trusses
CO4: Construct the influence lines and determine the reaction, shear and moment due to moving loads
CO5: Analyze the three-hinges arch to obtain the internal forces

DAA 2513
Soil Mechanics and Geology
Credit Hour: 3

Synopsis

This course provides an elementary introduction and the basic mechanics necessary for Geotechnical Engineering. This course aims to provide the basic understanding of the engineering geology, the soil origin and formation, basic soil engineering properties, the soil classification, the compaction of the soil, the effect of water in soil in term of permeability and seepage and also the stresses in the soil mass.

Course Outcome

At the end of semester, student should be able to:

CO1: Acknowledge and explain the geological background and rock cycle.
CO2: Understand the fundamental of weight-volume relationship in soil and able to produce the compaction curve from soil compaction.
CO3: Identify the soil classification, its consistency properties and able to produce particle distribution curve.
CO4: Identify the soil's permeability, calculate the amount of water flowing by producing the flow net diagram.
CO5: Acknowledge the principle of effective stress and able to analyze the soil stresses in various cases.

DAA 2612
Environmental Engineering
Credit Hour: 2

Synopsis

Introduction to environmental engineering; physical, chemical and biological processes; water and wastewater treatment; air pollution; solid and hazardous waste; sewage treatment and disposal and treatment plant design

Course Outcome

At the end of semester, student should be able to:

CO1: Identify and calculate the physical, chemical and biological water quality parameters
CO2: Illustrate water treatment processes
CO3: Demonstrate wastewater treatment processes
CO4: Analyze the environmental pollution such as solid waste, water and air pollution

DAA 2723
Hydraulics & Hydrology
Credit Hour: 3

Synopsis

Hydraulics introduces the basic concepts of fluid flow in open channel including uniform flow, non-uniform flow and hydraulic jump. Water distribution through pipeline and hydraulic machinery, especially pumps are covered in this course. Whilst hydrology includes, the hydrological cycle, precipitation, measurement and analysis of rainfall, hydrological losses, runoff and hydrograph.

Course Outcome

At the end of semester, student should be able to:

CO1: Define the type of channel flow and analyze the uniform flow, non-uniform flow in open channel.
CO2: Apply Loop method for pipe network and Nodes method for branching pipes in pipelines water distribution also identify the types of pumps, their selection criteria and performance evaluation.

CO3: Define and solve the basic concept of hydrology processes and precipitation.
CO4: Apply and solve hydrological losses, runoff and hydrograph problems using various methods.

DAA 2951
Engineering Laboratory III
Credit Hour: 1

Synopsis

This ENGINEERING LAB III covers Highway and Geotechnical laboratory testing. The experiments are complimentary to the theory that students have learned in the classroom and also to expose them to the practical work at the construction industry.

Course Outcome

At the end of semester, student should be able to:

CO1: Conduct pavement material and soil testing and analyze the data.
CO2: Demonstrate flexible pavement design based on JKR Standard.
CO3: Produce soil related graphs/curves/diagrams.

DAA 2023
Project Management
Credit Hour: 3

Synopsis

To introduce the concept of project management which will provide the students with the knowledge of managing of construction project. As an introduction, students will be given general information on basic elements involved in management and phases in construction project. Then they will be given exposure to the methods to properly plan and schedule the project plus knowledge to do cost estimation of the construction project.

Course Outcome

At the end of semester, student should be able to:

CO1: Understand the overall construction project management process and the function of each party involved in construction.
CO2: Identify and explain types of project organization practiced in construction industry.
CO3: Discover and uses the appropriate techniques of project planning, scheduling, monitoring and controlling.
CO4: Apply the method of estimation to estimate the cost of construction projects.
CO5: Uses the appropriate software in performing the project planning and scheduling tasks.

DAA 2213
Structural Design I
Credit Hour: 3

Synopsis

This subject is intended to give students a good understanding of the design and behaviour of reinforced concrete structures at the design ultimate limit state. We will look at the design of building structures in some detail with particular emphasis on the design of beams, slabs, columns and pad footing. Emphasis is placed on understanding structural behaviour and the background to the design methods in EC2 and other codes where appropriate. By the end of this module student will have a good understanding of the design and behaviour of reinforced concrete beams, slabs, columns and pad footing.

Course Outcome

At the end of semester, student should be able to:

CO1: Explain the basic concepts of reinforced concrete design and load involved in structural design. Analysis first priciple for single and double reinforced concrete beam.Analyse and design reinforced concrete beam
CO2: Analyse and design reinforced concrete slab by using relevant codes of practice and carry out the concrete structures detail.
CO3: Analyse and design reinforced concrete column by using relevant codes of practice and carry out the concrete structures detail.

CO4: Analyse and design reinforced shallow foundation by using relevant codes of practice and carry out the concrete structures detail
CO5: Interpret the architect drawing to engineering drawing thus construct structural drawing in designing a one-storey building project via manual calculation, and then comparing with ESTEEM software tasks.

DAA 2222
Structural Design II
Credit Hour: 2

Synopsis

To introduce the concept of project management whereby this will provide the students with the knowledge of managing of construction project. As an introduction, students will be given general information on basic elements involved in management and phases in construction project. Then they will be given exposure to the methods to properly plan and schedule the project plus knowledge to do cost estimation of the construction project.

Course Outcome

At the end of semester, student should be able to:

CO1: Analyse & design beam according to the relevant codes of practice in building design.
CO2: Analyse & design column according to the relevant codes of practice in building design.
CO3: Analyse & design steel trusses in according to the relevant codes of practice in building design.
CO4: Analyse & design steel connection in according to the relevant codes of practice in building design.
CO5: Analyse and design a typical timber structure
CO6: Communicate effectively within a team designing a project using modern tools to produces a report according to a given time.

DAA 2523
Geotechnical Engineering
Credit Hour: 3

Synopsis

This subject provides further discussion and explanation related to soil engineering. The topics cover in the subjects includes the shear strength of soil, lateral earh pressure, slope stability, site investigation, shallow foundation, compressibility of soil and environmental geotechnics. at the end of this course, student should be able to have ample knowledge regarding the soil engineering and behaviour and also able to practice the knowledge outside.

Course Outcome

At the end of semester, student should be able to:

CO1: Define the Mohr Coulomb criterion and describe the laboratory tests to obtain the shear strength parameters and also explain the soil behaviour that relate to soil shear strength.
CO2: Solve the lateral earth pressure based on various cases and method of analysis and Compute the stability of the slope in term of factor of safety using various approach of analysis.
CO3: Describe the important things in site investigation process that need to be consider before a construction can take place.
CO4: Illustrate the types of shallow foundation and its function, able to describe bearing capacity and also apply the soil bearing capacity under various conditions.
CO5: Define the concept of soil compressibility, describe the laboratory test to obtain various consolidation parameters and able to predict future settlement and Use the modern technology to manage the landfill by using the geosynthetics materials.

DAA 2413
Traffic & Highway Engineering
Credit Hour: 3

Synopsis

To introduce the concept of project management which will provide the students with the knowledge of managing of construction project. As an introduction, students will be given general

information on basic elements involved in management and phases in construction project. Then they will be given exposure to the methods to properly plan and schedule the project plus knowledge to do cost estimation of the construction project.

Course Outcome

At the end of semester, student should be able to:

CO1: Categorized Malaysian road network system according to road design standard and explain the fundamentals of traffic engineering elements such as road, driver and vehicles characteristics
CO2: Analyze the fundamental traffic studies data of speed, volume and capacity and outline the intersection design principal based on local standard
CO3: Carry out specific highway geometric design attributes based on JKR standards
CO4: Identify mix design properties and conduct flexible pavement designs based on JKR Standard

DAA 3912
Industrial Training
Credit Hour: 12

Synopsis

Students are exposed to the industrial practice as associate to engineers through attachment at public and private sectors. They need to be attached at the workplace for six months or at least through the final semester as set by the faculty. Achievement of every student will be assessed by visiting supervisor (tutors and lecturers) and host supervisor (the representative of the industry where the student is attached). At the end of the industrial training period, students are required to write a report of all recorded activities in the log book in a standard format, present it and submit a copy to the industrial training coordinator for evaluation.

Course Outcome

At the end of semester, student should be able to:

CO1: Experience actual working environment at the workplace and use information and data collected in the logbook as prime source for writing a technical report
CO2: Practice relevant theory in carrying duties at the workplace as well as making arrangement, assessing and discuss the results of the data while making reference to prevailing standards and specifications
CO3: Argue or support about the fulfillment of the project objectives and recommend for further works. and use logbook as diary for technical personal
CO4: Learn new skills at workplace and later demonstrate, describe, discuss, illustrate , argue and predict about the finding of the project in an oral presentation.
CO5: Communicate and work as team member with all level of work force.

FACULTY OF COMPUTING

FACULTY OF COMPUTING

INTRODUCTION

The Faculty of Computing was rebranded in August 2019 and is currently under the College of Computing and Applied Science. The College of Computing and Applied Sciences (KKGS) provides avenues for students to study under excellent undergraduate accredited programs such as Software Engineering, Computer Systems & Networking, Graphic & Multimedia, Occupational, Safety & Health (OSH), Data Analytics, Industrial Chemistry, Industrial Biotechnology, and Material Technology. CCAS, consists of Faculty of Computing, Faculty of Industrial Sciences & Technology, and Centre for Mathematical Sciences, has embodied the excellence of teaching and learning experience, enculcate the culture of knowledge sharing through research, innovation, publications, and industrial collaboration which aimed to benefits its students, community, and industries.

The Faculty of Computing was formerly known as Faculty of Computer Systems & Software Engineering which was established on 16 February 2002 to produce knowledgeable, high skilled and competitive graduates within the sphere of software engineering, system and computer network. At the beginning, the faculty had two fields which are Software Engineering and Networking. However, as of today, the faculty has expanded to four programmes which are Software Engineering, Computer Science, Computer Systems & Networking, and Graphic & Multimedia.

The faculty has also embarked on research and development activities in the area such as information systems, software engineering, computer systems, communication systems, and also graphic and multimedia technology to produce technologies that are relevant to the needs of industries. Currently, the faculty has five research groups which are Information Systems (InSys), Software Engineering (SErg), Soft Computing & Intelligent Systems (SPInT), Multimedia Computing & Computer Vision (MCVis), and System Network & Security (SysNetS) to support university's focus groups (Manufacturing & Automotive and Chemical & Biotechnology).

The faculty emphasizes on the development and growth of its students' enrolment and graduates. Through high quality teaching (by completing specific quality outcome and generic skills), great laboratories facilities, proper and careful advising and numerous professional activities, our students have opportunity to excel in the classroom and laboratory session. In a personable atmosphere, the students become well prepared in the terms of software engineering knowledge and technical skills. Thus, they are ready and confident to begin their professional career or further their studies.

The faculty's current planning is to be an ICT reference centre in Pahang to support the development of East Coast Economic Region (ECER), Malaysia.

To realize this, many activities which involve industries and government sectors have been carried out.

PROGRAMMES OFFERED

Bachelor of Computer Science (Software Engineering)
Bachelor of Computer Science (Computer Systems & Networking)
Bachelor of Computer Science (Graphics & Multimedia Technology)
Diploma in Computer Science

CAREER OPPORTUNITIES

Diploma in Computer Science

- Assistant Software Engineer
- Computer Programmer
- Web Application Developer
- Assistant Information Developer
- Computer System Analyst
- Assistant IT Manager
- Technical Consultant
- Computer Application Developer
- Sales & Marketing
- Technoprenuer

Bachelor of Computer Science (Software Engineering)

- Software Quality Engineer
- System Analyst
- System Administrator
- Information System Officer
- Solutions Architect
- System Specialist
- Database Administrator
- Research Engineer
- Consultant
- Marketing Executive
- Technoprenuer

Bachelor of Computer Science (Computer Systems & Networking)

- Computer Systems & Network Engineer
- System Analyst
- Network Administrator
- Information System Officer
- Server Administrator

- Information System Officer
- System & Network Analyst
- Research Engineer
- Consultant
- Marketing Executive
- Technoprenuer

Bachelor of Computer Science (Graphics & Multimedia Technology)

- Computer Graphic & Multimedia Programmer
- System Analyst
- Web Designer
- Information System Officer
- 3D Programmer
- Game Developer
- Multimedia Developer
- Research Engineer
- Consultant
- Marketing Executive
- Technoprenuer

FACULTY OF COMPUTING
CURRICULUM STRUCTURE
BACHELOR OF COMPUTER SCIENCE (COMPUTER SYSTEMS & NETWORKING) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEM	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	**BCN1043** COMPUTER ARHITECTURE AND ORGANIZATION	**BCI1023** PROGRAMMING TECHNIQUES	**BCI2023** DATABASE SYSTEMS	**BCI2313** ALGORITHM & COMPLEXITY	**BUM2413** APPLIED STATISTICS	**BCS2313** ARTIFICIAL INTELLIGENCE TECHNIQUES	**BCN3063** DISTRIBUTED & PARALLEL COMPUTING	**BCC4012** INDUSTRIAL TRAINING
	BCI1143 PROBLEM SOLVING	**BCN2053** OPERATING SYSTEMS	**BUM1433** DISCRETE STRUCTURE & APPLICATION	**BCS1133** SYSTEMS ANALYSIS AND DESIGN	**BCS2143** OBJECT ORIENTED PROGRAMMING	**BCN2023** DATA & NETWORK SECURITY	**BCC3024** UNDERGRADUAT E PROJECT II	
	BUM1233 DISCRETE MATHEMATICS & APPLICATION	**BCN1053** DATA COMMUNICATION AND NETWORKING	**BCI1093** DATA STRUCTURE & ALGORITHMS	**BCN3033** NETWORK PROGRAMMING	**BCN3043** NETWORK SERVICE ADMINISTRATION	**BCS2243** WEB ENGINEERING	**BCN1*23** ELECTIVE BCN II	
	BCN1063 STRUCTURED NETWORK CABLING	**BCS1033** SOFTWARE ENGINEERING	**BCN2193** NETWORK TECHNOLOGIES	**BCN2083** COMPUTER NETWORKS	**BCN2093** NETWORK ANALYSIS AND DESIGN	**BCC3012** UNDERGRADUATE PROJECT I	**BCN1*33** ELECTIVE BCN III	
	UQB11** CO-CURRICULUM 1	**UHC2022** PENGHAYATAN ETIKA DAN PERADABAN	**UHF1**1** FOREIGN LANGUAGE LEVEL I	**UHE3**2** ELECTIVE COURSE	**BCN3203** WAN TECHNOLOGY	**BCN3023** NETWORK MANAGEMENT	**UHF2**1** FOREIGN LANGUAGE LEVEL II	
	UHC1012 FALSAFAH DAN ISU SEMASA	**UHL2412** ENGLISH FOR ACADEMIC COMMUNICATION	**UHL2422** ENGLISH FOR TECHNICAL COMMUNICATIO N	**UGE2002** TECHNOPRENEU RSHIP	**UHL2432** ENGLISH FOR PROFESIONAL COMMUNICATION	**BCN1*13** ELECTIVE BCN I	**UHE***2** ELECTIVE COURSES	
	UHS1021 SOFT SKILLS 1	**UHL2400** FUNDAMENTALS OF ENGLISH LANGUAGE				**UHS2021** SOFT SKILLS 2		
	UCS1110 FIRST YEAR SEMINAR	**UQ*2**1** CO-CURRICULUM II						
TOTAL CREDIT	16	17	15	16	17	18	16	12
TOTAL CREDIT FOR GRADUAT ION	127							

FACULTY OF COMPUTING
CURRICULUM STRUCTURE
BACHELOR OF COMPUTER SCIENCE (SOFTWARE ENGINEERING) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEM	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	**BCI1143** PROBLEM SOLVING	**BCI2023** DATABASE SYSTEMS	**BCI1093** DATA STRUCTURE & ALGORITHMS	**BCN2053** OPERATING SYSTEMS	**BCI2313** ALGORITHM & COMPLEXITY	**BCS1*23** ELECTIVE BCS II	**BCS1*23** ELECTIVE BCS III	**BCC4012** INDUSTRIAL TRAINING
	BCS1033 SOFTWARE ENGINEERING	**BCN1053** DATA COMMUNICATION AND NETWORKING	**BCS2143** OBJECT ORIENTED PROGRAMMING	**BCS2313** ARTIFICIAL INTELLIGENCE TECHNIQUES	**BCS2213** FORMAL METHOD	**BCC3012** UNDERGRADUATE PROJECT I	**BCC3024** UNDERGRADUATE PROJECT II	
	BCN1043 COMPUTER ARHITECTURE AND ORGANIZATION	**BCI1023** PROGRAMMING TECHNIQUES	**BCS2173** HUMAN COMPUTER INTERACTION	**BCS2243** WEB ENGINEERING	**BCS3233** SOFTWARE TESTING	**BCS3133** SOFTWARE ENGINEERING PRACTICES	**BCS3263** SOFTWARE QUALITY ASSURANCE	
	BUM1233 DISCRETE MATHEMATICS & APPLICATION	**BCS1133** SYSTEMS ANALYSIS AND DESIGN	**BCS2233** SOFTWATE REQUIREMENT WORKSHOP	**BCS2343** SOFTWARE DESIGN WORKSHOP	**BCN2023** DATA & NETWORK SECURITY	**BCS3153** SOFTWARE EVOLUTION & MAINTENANCE	**UHF2**1** FOREIGN LANGUAGE LEVEL II	
	UQB11** CO-CURRICULUM 1	**BUM1433** DISCRETE STRUCTURE & APPLICATION	**UQ*2**1** CO-CURRICULUM II	**BUM2413** APPLIED STATISTICS	**UHL2432** ENGLISH FOR PROFESSIONAL COMMUNICATION	**BCS3143** SOFTWARE PROJECT MANAGEMENT	**UHE***2** ELECTIVE COURSE	
	UHS1021 SOFT SKILLS 1	**UHL2412** ENGLISH FOR ACADEMIC COMMUNICATION	**UHL2422** ENGLISH FOR TECHNICAL COMMUNICATION	**UGE2002** TECHNOPRENEUR SHIP	**BCS1*13** ELECTIVE BCS I	**UHE3**2** ELECTIVE UNIVERSITY I		
	UHC1012 FALSAFAH DAN ISU SEMASA	**UHL2400** FUNDAMENTAL OF ENGLISH LANGUAGE	**UHC2022** PENGHAYATAN ETIKA DAN PERADABAV			**UHS2021** SOFT SKILLS 2		
	UCS1110 FIRST YEAR SEMINAR					**UHF1**1** FOREIGN LANGUAGE LEVEL I		
TOTAL CREDIT	**16**	**17**	**17**	**17**	**17**	**18**	**13**	**12**
TOTAL CREDIT FOR GRADUATION	**127**							

FACULTY OF COMPUTING
CURRICULUM STRUCTURE
BACHELOR OF COMPUTER SCIENCE (GRAPHICS & MULTIMEDIA TECHNOLOGY) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	**BCI1143** PROBLEM SOLVING	**BCN1053** DATA COMMUNICATION & NETWORKING	**BCI1093** DATA STRUCTURE & ALGORITHMS	**BCG1*13** ELECTIVE BCG I	**BCS2243** WEB ENGINEERING	**BCI2313** ALGORITHM & COMPLEXITY	**BCG1*33** ELECTIVE BCG III	**BCC4012** INDUSTRIAL TRAINING
	BCS1033 SOFTWARE ENGINEERING	**BUM1133** MATHEMATICS FOR COMPUTER GRAPHICS	**BCS1133** SYSTEM ANALYSIS & DESIGN	**BCN2053** OPERATING SYSTEMS	**BCS2313** ARTIFICIAL INTELLIGENCE TECHNIQUES	**BCN2023** DATA & NETWORK SECURITY	**BCG1*23** ELECTIVE BCG II	
	BCN1043 COMPUTER ARHITECTURE AND ORGANIZATION	**BCI2023** DATABASE SYSTEMS	**BUM1433** DISCRETE STRUCTURE & APPLICATION	**BCS2143** OBJECT ORIENTED PROGRAMMING	**BCM3163** COMPUTER GAME PROGRAMMING 1	**BCM3203** COMPUTER GAME PROGRAMMING II	**BCC3024** UNDERGRADUATE PROJECT II	
	BUM1233 DISCRETE MATHEMATICS & APPLICATION	**BCI1023** PROGRAMMING TECHNIQUES	**BCM2053** COMPUTER GRAPHIC	**BCS2173** HUMAN COMPUTER INTERACTION	**BCI3283** MOBILE APPLICATION DEVELOPMENT	**BCC3012** UNDERGRADUATE PROJECT I	**UHE***2** ELECTIVE COURSE	
	BCM2023 FUNDAMENTAL OF DIGITAL MEDIA DESIGN	**UQ*2**1** CO-CURRICULUM II	**UHF1**1** FOREIGN LANGUAGE LEVEL I	**BCM3233** 3D MODELING & ANIMATION	**BCM3103** VIRTUAL REALITY	**BCM3243** MULTIMEDIA DEVELOPMENT WORKSHOP	**UGE2002** TECHNOPRENEURSHIP	
	UQB11** CO-CURRICULUM 1	**UHC1012** FALSAFAH DAN ISU SEMASA	**UHC2022** PENGHAYATAN ETIKA DAN PERADABAN	**UH3***2** ELECTIVE COURSE	**UHS2021** SOFT SKILLS 2	**UHL2432** ENGLISH FOR PROFESSIONAL COMMUNICATION		
	UHS1021 SOFT SKILLS 1	**UHL2400** FUNDAMENTAL OF ENGLISH LANGUAGE	**UHL2422** ENGLISH FOR TECHNICAL COMMUNICATION	**UHF2**1** FOREIGN LANGUAGE LEVEL II				
		UHL2412 ENGLISH FOR ACADEMIC COMMUNICATION						
TOTAL CREDIT	17	17	17	18	16	16	14	12
TOTAL CREDIT FOR GRADUATION	127							

COURSE SYNOPSIS - DEGREE

BCN1043
COMPUTER ARCHITECTURE & ORGANIZATION

Credit Hour: 3
Prerequisite: None
Synopsis:

This course discusses the component, structure and function of a computer. It expose student with the architecture and organization of a computer. This subject covers on the numbering system and the representation of data, the internal and external computer communication through system buses and Input and Output, computer storage, internal architecture of Central Processing Unit, Logic Gates and Boolean Algebra. Assembly languages are expose to student for better understanding of the computer structure and component as a whole.

Course Outcome:

By the end of semester, students should be able to:

CO1: Classify and illustrate the internal and external components of a computer structure and its functionality which include CPU, buses, memory and I/O. Explain how the components of a computer architecture and organization contribute to the computer performance.

CO2: Display and calculate the different machine data level representation, arithmetic and write a assembly language code to show computer inner working behavior.

CO3: Demonstrate team working element by solving problems of computer architecture and organization in a groups.

BCI1143
PROBLEM SOLVING

Credit Hour: 3
Prerequisite: None
Synopsis:

This course expose to the students with the appropriate computing methods in solving problem through programming approach, which consists of programming design, algorithm, pseudo code, flow chart and logic structure.

Course Outcome:

By the end of semester, students should be able to:

CO1: Produce the solutions for a given problems using appropriate problem solving approach.

CO2: Demonstrate logical thinking skills in problem solving.

CO3: Demonstrate team working skills through group assignment

BCN1063
STRUCTURE NETWORK CABLING

Credit Hour: 3
Prerequisite: None
Synopsis:

This course introduces structured cabling for Local Area Network (LAN). Students are exposed to the fundamental of computer network,

network topology, network devices and cabling tools, Copper cabling, Fiber Optic cabling, Simple LAN Device Installation, Wide Area Network Connection and network troubleshooting and documentation.

Course Outcome:

By the end of semester, students should be able to:

CO1: Investigate the Local Area Network elements such as basic of networking, safety environment, network hardware and related LAN.

CO2: Design, install, implement, configure, test and troubleshoot structured cabling and LAN device based on LAN rules and standard.

CO3: Identify problem, discuss and make suggestion on the structured cabling network.

BCI1023
PROGRAMMING TECHNIQUES

Credit Hour: 3
Prerequisite: BCI1143 PROBLEM SOLVING
Synopsis:

This course discusses on understanding problems and translating them into computer solution techniques using programming language. This course enables students to select appropriate programming techniques, write programming codes from given problems and execute programming codes successfully.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate various techniques in solving a problem.

CO2: Construct and run programs.

CO3: Differentiate various techniques in solving a problem.

BCN2053
OPERATING SYSTEMS

Credit Hour: 3
Prerequisite: None
Synopsis:

This subject introduces the various data and control structures necessary for the design and implementation of modern computer operating systems. Memory, Processor, Concurrent, File, Device and Network Management are explored as the basic of all Operating Systems.

Course Outcome:

By the end of semester, students should be able to:

CO1: Distinguish the relationship between OS and hardware (User command interface, Memory Management, Processor Management, Concurrent Manager, File Management, Device Management & Network Management).

CO2: Construct & manipulate OS instructions via Command line and Shell Scripting.

CO3: Search and manage relevant information from different sources related to the operating systems.

BCN1053
DATA COMMUNICATION & NETWORKING

Credit Hour: 3
Prerequisite: None
Synopsis:

This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate knowledge and understanding of basics computer networking.

CO2: Construct a simple LAN topologies by applying basic principles of cabling using network simulation.

CO3: Follow basic configuration of network design using real network devices such as switches and routers.

CO4: Relate their surrounding environment (i.e. economy, environmental, cultural) with the professional practice in the context of data communication and networking.

BCS1033
SOFTWARE ENGINEERING

Credit Hour: 3
Prerequisite: None
Synopsis:

This course presents an introduction to software engineering concepts including: software engineering paradigms, requirements specification, design, software verification and validation; software evolution and reliability.

Course Outcome:

By the end of semester, students should be able to:

CO1: Distinguish the important terminology and activities involves (theoretically and practically) related to foundation concepts of software engineering and software development process.

CO2: Show technical solutions to a range of audience.

CO3: Work effectively in group and promote leadership's skills through effective communication ether in written, oral form, presentation and group discussion.

BCI2023
DATABASE SYSTEMS

Credit Hour: 3
Prerequisite: None
Synopsis:

The course emphasizes on the importance of data to an organization and how the data should be managed. Database management system (DBMS) will be viewed as a solution to the problems of file processing system. Aspects of relational database design will be covered in details. This includes database development life cycle, database architecture, data models, and normalization process. Several query languages such as relational algebra, Structured Query Language (SQL) and Query by Example (QBE) will be discussed but the emphasis is on SQL. Students will be given a real life problem to design and develop a database application system. In the later part of the course students will be exposed to the latest developments in database architecture.

Course Outcome:

By the end of semester, students should be able to:

CO1: Distinguish appropriate concepts, principles and applications of database systems.

CO2: Manipulate queries using the syntax of Structure Query Language (SQL), Relational Algebra and Query By Example.

CO3: Construct innovative solution through the representation of data model using ER and EER Diagrams and normalize database to be implemented in database application system using appropriate DBMS.

CO4: Work in group in order to complete the given assessments in specific time frame.

BCI1093
DATA STRUCTURE &ALGORITHMS

Credit Hour: 3
Prerequisite: BCI1023
PROGRAMMING TECHNIQUES
Synopsis:

This course is designed to expose the students to the data structures and algorithm. It provide theoretical basis in data structures and the application of data structures is based on standard algorithms. Students must also be able to transform the data structure and algorithms problems into the computer programs.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analise various types of data structures and algorithms techniques in solving a related problem.

CO2: Construct a programme by applying the data structure and algorithms techniques for a related problem.

CO3: Use online application to find solution for a related problem.

BCN2193
NETWORK TECHNOLOGIES

Credit Hour: 3
Prerequisite: BCN1053 DATA COMMUNICATION & NETWORKING
Synopsis:

This course describes the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with RIPv1, RIPv2, single-area and multi-area OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks.

Course Outcome:

By the end of semester, students should be able to:

CO1: Discover the critical role routers play in enabling communications across multiple networks.

CO2: Construct and organize basic operations for a newly-installed router with primary routing protocols.

CO3: Organize new idea and able for autonomous learning in the context of dynamic routing protocols and modern network design.

CO4: Relate their surrounding environment (i.e. economy, environmental, cultural) with the professional practice by identifying router, show and debug commands to troubleshoot common errors that occur in small routed networks.

BCI2313
ALGORITHMS AND COMPLEXITY

Credit Hour: 3
Prerequisite: BCI1093 DATA STRUCTURE & ALGORITHMS
Synopsis:

Algorithm design and analysis is a fundamental and important part of computer science. This course introduces students to advanced techniques for the design and analysis of algorithms and explorers a variety of applications.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze various advanced types of algorithms techniques in solving a related problem.

CO2: Construct a programme by applying the most optimize algorithms techniques for a related problem.

CO3: Use online application to find solution for a related problem.

BCS1133
SYSTEM ANALYSIS & DESIGN

Credit Hour: 3
Prerequisite: None
Synopsis:

This course describes the concepts and methods of information system analysis and design, with an emphasis on system analysis methods and

tools. The course focuses on the issues and management technique involved in analysis, design and implementation of information system.

Course Outcome:

By the end of semester, students should be able to:

CO1: Classify and choose the knowledge of systems analysis and design by selecting appropriate software development process and tools to be used.

CO2: Reproduce a system design from a case study that comply with the stages of systems development life cycle.

CO3: Work effectively in group and promote leadership's skills through effective communication ether in written, oral form, presentation and group discussion.

BCN3033
NETWORK PROGRAMMING

Credit Hour: 3
Prerequisite: BCI1023 PROGRAMMING TECHNIQUES
Synopsis:

This course will introduce the basic principles of network programming, such as socket programming (client and server side), developing client-server application, secure socket, and so on. It will provide students with an understanding of TCP/IP network programming. In particular, this course focuses on the understanding of network concepts, principles, and techniques in details and how to program them using a programming language.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate the programming language and technique in relation to the networking concept.

CO2: Write, construct and runs the network programming.

CO3: Organize new idea and able to autonomous learning.

BCN2083
COMPUTER NETWORKS

Credit Hour: 3
Prerequisite: BCN2193 NETWORK TECHNOLOGIES
Synopsis:

The primary focus of this course is on LAN redundancy, wireless LANs and dynamic routing. This course focuses on switching and routing protocols and concepts used to improve redundancy, propagate information, and secure the portion of the network where most users access network services. Switching technologies are relatively straightforward to implement; however, as with routing, the underlying protocols and algorithms are often quite complicated. This course will go to great lengths to explain the underlying processes of the common Layer 2 and layer 3 technologies.

Each concept will be introduced within the context of a single topology for each chapter.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze of how a switch communicates with other switches and routers in a small or medium-sized business network to implement wireless LANs and routing protocol.

CO2: Organize the configuration, verification, and troubleshooting Wireless LANs, Single-area and Multi-area OSPF, and EIGRP.

CO3: Organize new idea and able for autonomous learning in the context of network problems at layers 1, 2, 3 and 7 using a layered model approach

BCS2143 OBJECT ORIENTED PROGRAMMING

Credit Hour: 3

Prerequisite: BCI1023 Programming Techniques

Synopsis:

This course provides an introduction to the concepts of object orientation and object-oriented programming (OOP) techniques using any object-oriented programming language such as JAVA. It will emphasize on the use of OOP characteristic that expose students to Unified Modelling Language (UML) design, class and object, inheritance, polymorphism, exception handling and Graphical User Interface (GUI) and event driven programming.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate the ability of proposing solution based on object-oriented approach to the given problem.

CO2: Able to translate or implement from OOAD to working application/system.

CO3: Explain, explore and manipulate the proposes solution to build the application.

BCN3043 NETWORK SERVICE ADMINISTRATION

Credit Hour: 3
Prerequisite: None
Synopsis:

This course is designated to expose the student about Active Directory Technology Specialists including how to implement and configure secure network access and implement fault tolerant storage technologies, understand the network technologies, most commonly used and IP-enabled network, and how to secure servers and maintain update compliance.

Course Outcome:

By the end of semester, students should be able to:

CO1: Classify the services supported by the Server Technology.

CO2: Fix the problems to install and configure servers and clients applications individually.

CO3: Relate their surrounding environment (i.e. economy, environmental, cultural) with the professional practice in the Server Technology.

BCN2093
NETWORK ANALYSIS & DESIGN

Credit Hour: 3
Prerequisite: BCN1053 DATA COMMUNICATION & NETWORKING
Synopsis:

This course focuses on analysis and design of enterprise networks that are reliable, secure and manageable. It includes top-down network design methodology to design networks that meet customer's business and technical goals, analyzation of business and technical requirements, examine traffic flow and Quality of Service (QoS) requirements, and production of RFP documentation with relevant procedure steps for case study/project to fulfil this subject requirement.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze various computer networks, formulate problems and provide technical solutions to improve quality of service (QoS).

CO2: Build a logical and/or physical network following all the steps and documentation phases for a specific requirement.

CO3: Demonstrate ability to lead a project in order to produce RFP.

BCN3203
WAN TECHNOLOGY

Credit Hour: 3
Prerequisite: BCN2083 COMPUTER NETWORKS
Synopsis:

This course discusses the WAN technologies and network services required by converged applications in a complex network. The course enables students to understand the selection criteria of network devices and WAN technologies to meet network requirements. Students learn how to configure and troubleshoot network devices and resolve common issues with data link protocols. Students also develop the knowledge and skills needed to implement IPSec and virtual private network (VPN) operations in a complex network.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze and classify the components required for switched network, switching concept involving configuration, VLAN, LAN redundancy, link aggregation, and inter VLAN routing. DHCP concept and configuration for IPv4 & IPv6, wireless LAN concept, configuration and security.

CO2: Assemble, build, construct and organize switched network involving basic switch configuration and security management, VLAN implementation, LAN redundancy via PSVT and link aggregation, inter - VLAN routing and troubleshooting, DHCP and wireless LAN setup.

CO3: Organize new idea and able for autonomous learning.

BCS2313
ARTIFICIAL INTELLIGENCE TECHNIQUES

Credit Hour: 3
Prerequisite: BCI1093 DATA STRUCTURE & ALGORITHMS
Synopsis:

This course introduces student to the theory and practice of the Artificial Intelligence (AI). Student are expose to the main artificial intelligence topics including the fundamental issues, search strategies, knowledge representation and reasoning, advanced search, agents, machine learning and robotics. Practical examples of how artificial intelligence is applied to commercial, scientific and consumer applications will be covered.

Course Outcome:

By the end of semester, students should be able to:

CO1: Distinguish the artificial intelligence concepts and methodologies in computer science.

CO2: Construct an intelligence system prototype/module.

CO3: Demonstrate critical thinking ideas in artificial intelligence knowledge and problem-solving.

CO4: Initiate AI knowledge to the final year/capstone projects and future problems.

BCN2023
DATA & NETWORK SECURITY

Credit Hour: 3
Prerequisite: BCN1053 DATA COMMUNICATION & NETWORKING
Synopsis:

The course introduces fundamental of data and network security. Course's chapters explain information security concepts, fundamentals, purposes, implementation and discussion in their respective areas related to data and network security. Topics include: foundational concepts in security, principles of secure design, threats and attacks, malware, cryptographic tools, network securing, and intrusion detection and prevention systems.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze theory and principles of information security, types of security threats, potential attacks, data cryptography, firewalls, and intrusion detection systems.

CO2: Construct attack and defense methods into

computer and network environments.

CO3: Relate their surrounding environment (i.e. economy, environmental, cultural) with the professional practice in the context of data network and security.

BCS2243
WEB ENGINEERING

Credit Hour: 3
Prerequisite: BCI1023 PROGRAMMING TECHNIQUES
Synopsis:

This course introduces the essential topics of managing the diversity and complexity of web applications development. Students are required to develop a web/Internet application based on web engineering concepts.

Course Outcome:

By the end of semester, students should be able to:

CO1: Design appropriate solution using fundamental web engineering concepts.

CO2: Construct a web-based application using web-engineering technologies.

CO3: Demonstrate communication effectively in written and oral form through group discussion, meeting and presentation session.

BCN3023
NETWORK MANAGEMENT

Credit Hour: 3
Prerequisite: None
Synopsis:

This course introduces the overview of network management to familiarize student with network management systems and the five areas of network management. Student will learn a practical means of designing or evaluating a network management system for particular networking environment. Student also equipped with the example of simple, complex and advanced tools for each category of network management so that they could determine that a particular functionality would be useful and might want to pursue its development.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze all of the possible pieces of information available on a network device including Management Information Bases (MIBs) and also about Remote Network Monitoring Devices (RMON) MIB.

CO2: Organize Network Management Protocols such as Simple Network Management Protocol (SNMP) that is the most widely deployed network management protocols on networking devices.

CO3: Relate their surrounding environment (i.e. economy, environmental, cultural) with the professional practice by

Identifying and explain the five areas of network management.

BCN3063

DISTRIBUTED & PARALLEL COMPUTING

Credit Hour: 3
Prerequisite: BCN1053 DATA COMMUNICATION & NETWORKING
Synopsis:

The course aims to provide an understanding of the principles on which the Internet and other distributed systems are based; their architecture, algorithms and how they meet the demands of contemporary distributed applications. The course covers the building blocks for a study of distributed systems, and addressing the characteristics and the challenges that must be addressed in their design: scalability, heterogeneity, security and failure handling being the most significant.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate the principles and fundamentals of distributed and parallel computing the technical challenges and current issues the systems design.

CO2: Practice in analyzing, design and implementation of distributed and parallel programs to solve specified problems..

CO3 : Organize new idea and able for autonomous learning.

BCS2173
HUMAN COMPUTER INTERACTION

Credit Hour: 3
Prerequisite: BCS1033 SOFTWARE ENGINEERING
Synopsis:

This course provides an introduction to Human-Computer Interaction (HCI). HCI is concerned with understanding, designing, implementing and evaluating user-interfaces so that the students have better support users in carrying out their tasks. On completing this course, the students will have knowledge of the theoretical foundations of designing for interaction between humans and computers. They will also have practical experience in implementing and evaluating graphical user interfaces.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze Human Computer Interface (HCI) principles and related approaches.

CO2: Construct an application based on HCI principles and approaches.

CO3: Work effectively in a team for a project on developing and evaluating the prototype based on HCI rules.

BCS2233
SOFTWARE REQUIREMENT WORKSHOP

Credit Hour: 3
Prerequisite: BCS1133 SYSTEMS ANALYSIS AND DESIGN

Synopsis:

This course exposes the student to software requirement stages. It will concentrate on discovering and eliciting requirements techniques, languages and models for representing requirements, requirement documentation standard, handling requirement changes and writing Software Requirement Specifications (SRS) customize from DOD and IEEE standard.

Course Outcome:

By the end of semester, students should be able to:

CO1: Classify and capturing requirement by using appropriate software development process and tools to be used.

CO2: Construct a comprehensive Software Requirement Specification (SRS) document by using UML tools.

CO3: Fix problems and construct innovative solutions that comply with principles of software engineering (problem solving skills).

CO4: Work effectively in group and promote leadership's skills through effective communication ether in written, oral form, presentation and group discussion.

BCS2343
SOFTWARE DESIGN WORKSHOP

Credit Hour: 3
Prerequisite: BCS2233 SOFTWARE REQUIREMENT WORKSHOP
Synopsis:

This course introduces the students how to develop software development documents –Software Design Description (SDD) and their system development process. Continue from previous project/problems, students must produce Software Design Description document follow certain standards.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze the software design and architecture then develop the software design documentation.

CO2: Construct a system prototype that comply with the pre-developed software design documentation.

CO3: Work effectively in group and promote leadership's skills through effective communication either in written, oral form, presentation and group discussion.

BCS2213
FORMAL METHODS

Credit Hour: 3
Prerequisite: BUM1233 DISCRETE MATHEMATICS & APPLICATION
Synopsis:

This course is introducing Formal Methods, which can be used in developing software specification. Formal Methods is the software

specification technique that is used to ensure the software or system to be developed is being validated before it is actually developed. Therefore, any bugs can be detected at early stage in order to reduce the cost of the development. Formal Methods to be introduced in formal notations using appropriate techniques, skills and tools.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate the understanding of theory and principles of Formal Methods in software development.

CO2: Construct the software specification in formal notation using appropriate techniques, skills and tools.

CO3: Work and communicate effectively in group to develop software specification in formal notation.

BCS3233
SOFTWARE TESTING

Credit Hour: 3
Prerequisite: BCS1133 SYSTEMS ANALYSIS AND DESIGN
Synopsis:

This course is designed to provide students with in-depth knowledge on software testing and its test process. The course covers the basic principles of software testing and test activities that include the test plan, test design, monitoring, implementation and test closure. The student will also learn various categories of test design techniques and methods used in both black-box and white-box testing. At the end of this course, students should be able to recognize various types and levels of testing as well as categorizing and applying software testing process & techniques.

Course Outcome:

By the end of semester, students should be able to:

CO1: Compare and classify between various levels of testing, test types and test approaches.

CO2: Organize and display the test activities throughout the software testing life cycle.

CO3: Work on the test design techniques, risk analysis and reporting within test process.

BCS3133
SOFTWARE ENGINEERING PRACTICES

Credit Hour: 3
Prerequisite: BCS2343 SOFTWARE DESIGN WORKSHOP
Synopsis:

The course aims to prepare software engineering students to work in a small team on a small

project, and to gain hands on knowledge on software engineering practices through a capstone project.

Course Outcome:

By the end of semester, students should be able to:

CO1: Internalize the best practices for software engineering (from inception, design, implementation, testing, maintenance).

CO2: Formulate and justify software engineering solution for a particular problem.

CO3: Demonstrate critical thinking ideas to software design.

BCS3153
SOFTWARE EVOLUTION & MAINTENANCE

Credit Hour: 3
Prerequisite: BCS3233 SOFTWARE TESTING
Synopsis:

This course will introduce types of maintenance as well as other issues such as economic implications, maintenance organizational structure, quality measurement, processes related to change requests and configuration management. Student will also expose on different maintenance process models such as Boehm, Osborne, Iterative enhancement and reuse-oriented models. Upon completing this class student are expected to be able to understanding the fundamental aspects of software maintenance and evolution, including concepts, techniques and process models for system evolution.

Course Outcome:

By the end of semester, students should be able to:

CO1: Differentiate and classify the software evolution and m maintenance techniques and issues.

CO2: Examine technical and managerial problem in software maintenance.

CO3: Explain and organize the related information to justify the given idea.

BCS3143
SOFTWARE PROJECT MANAGEMENT

Credit Hour: 3
Prerequisite: BCS2343 SOFTWARE DESIGN WORKSHOP
Synopsis:

This course exposes the student with step by step project management process inclusive of project planning, evaluation, estimation, resource allocation, monitoring and control and managing people and teams to bring about the successful completion of specific project goals and objectives.

Course Outcome:

By the end of semester, students should be able to:

CO1: Distinguish appropriately the concepts and principles of Software Project Management.

CO2: Construct and produce a practical software project management plan based on PMBOK.

CO3: Utilise teamwork skill in executing the project plan.

BCS3263
SOFTWARE QUALITY ASSURANCE

Credit Hour: 3
Prerequisite: BCS3233 SOFTWARE TESTING
Synopsis:

This course introduces students to the concept of Software Quality Assurance (SQA) including principles, component, process, models, standards and certification of SQA. Students are required to understand the relationship between software quality assurance and software engineering.

Course Outcome:

By the end of semester, students should be able to:

CO1: Inquire a knowledge of main software quality assurance activities, their tasks, work products and their models.

CO2: Organize software product quality related activities by applying ISO and IEEE standards.

CO3: Work in a team and present the team decision/solution for a given tasks.

BCM2023
FUNDAMENTAL OF DIGITAL MEDIA DESIGN

Credit Hour: 3
Prerequisite: None
Synopsis:

This course will provide students the foundations of media design using media software. Students will capture digital media and learn to manipulate them to create dynamic designs. Project-based curriculum will apply design elements and principles. This course will also expose students to the theoretical and fundamental concepts of multimedia, its applications and the techniques involved. Topics to be covered include five elements of multimedia such as text and audio, animation, image and video and the art of multimedia.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate an understanding of terminology, software, principles and equipment necessary in digital media design.

CO2: Manipulate digital media design concepts in multimedia elements (text, graphic, audio, video & animation) using software tools and recognize the issues in context of digital media design in multimedia technology and able to adapt to other related fields

CO3: Work together effectively to achieve the same goal by building a good relationship and interaction among team members.

BCM2053
COMPUTER GRAPHICS

Credit Hour: 3
Prerequisite: BCI1023 PROGRAMMING TECHNIQUES
Synopsis:

This course is designed to expose the student to the concept of computer graphics. This includes understanding and designing aspects by using a computer graphics concepts and technology. Through this course, students will be exposed to the skill of interactive computer graphics and some drawing algorithms using a computer graphics.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate the concept of computer graphics and ability to use the computer graphics technology.

CO2: Construct 2D graphics by implementing concepts of computer graphics and computer graphics programming.

CO3: Work together effectively to achieve the same goal by building a good relationship and interaction among team members.

BCM3233
3D MODELLING & ANIMATION

Credit Hour: 3
Prerequisite: None
Synopsis:

The focus of the course is on 3D modelling and animation. Students are introduced to 3D modelling and animation methods such as modelling with NURBS, polygons, and subdivision surfaces. Texture mapping, lighting, key framing, rigging and rendering are also discussed. Production pipeline issues such as geometry deformation and level of detail are emphasized.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate understanding of 3D modelling basic concepts and its methods.

CO2: Construct 3D models by implementing concepts of 3D modelling.

CO3: Demonstrate roles as a leader that been able to plan, coordinate and managing task and resources.

BCM3163
COMPUTER GAMES PROGRAMMING

Credit Hour: 3
Prerequisite: BCI1023 PROGRAMMING TECHNIQUES
Synopsis:

This course will expose students to the theoretical and fundamental concepts of games design, development and documentation. Topics to be covered are game design and documentation, game space, 3D in game, platforms, and user interaction/input.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze various components in game application and development across

diverse game genre and platform.

CO2: Construct a basic game design based on fundamental concepts of game development.

CO3: Demonstrate critical thinking during interactive game development.

BCI3283
MOBILE APPLICATION DEVELOPMENT

Credit Hour: 3
Prerequisite: BCS2143 OBJECT ORIENTED PROGRAMMING
Synopsis:

This course is concerned with the development of applications on mobile and wireless computing platforms. It explores mobile application development aspects with emphasis on the relationship between theoretical and its practical application using cases and real examples of mobile applications. Emphasis is placed on the process, tools and frameworks required to develop applications for current and emerging mobile computing devices.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze the limitations and challenges in mobile applications.

CO2: Construct a mobile application using selected software development environment.

CO3: Demonstrate ability to recognize and respect group member's attitude, act and belief.

BCM3103
VIRTUAL REALITY

Credit Hour: 3
Prerequisite: None
Synopsis:

This module introduces the concepts of virtual reality and enables the students to gain hands-on experience by developing their own virtual reality applications. The student will learn about the virtual reality architecture, hardware and software, modelling, augmented reality and applications of virtual reality in various fields.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate conceptual understanding of virtual reality, regardless of the programming language used.

CO2: Construct virtual reality application by implementing concepts of virtual reality.

CO3: Work in team and undertake the role of a leader and a group member interchangeably.

BCN3213
EMBEDDED SYSTEM

Credit Hour: 3
Prerequisite: None

Synopsis:

In this course, student will learn the fundamental of cyber-physical systems in embedded systems. In the Internet of Things (IoT) world, the interfaces between these worlds are inspired by and derived from information technology.The mechanisms by which software interacts with the physical world are changing rapidly. Today, the trend is towards "smart" sensors and actuators, which carry microprocessors,network interfaces, and software that enables remote access to the sensor data and remote activation of the actuator. This course emphasized both theory and technique in utilizing microprocessors, sensors and actuators in creating a cyber-physical system through programming techniques and networks in IoT world. Through this course, students should be able to design, construct and analyze their own cyber-physical system as a part of IoT technology.

Course Outcome:

By the end of semester, students should be able to:

CO1: Describe the fundamental of cyber-physical system of embedded System, that involve integration of computation with physical process.

CO2: Design, construct and analyse a cyber-physical system of embedded system.

CO3: Apply and demonstrate solutions in problems occurred when utilizing a cyber-physical system of embedded system.

BCN3233
FORENSIC COMPUTING

Credit Hour: 3
Prerequisite: None
Synopsis:

The primary focus of this course is to teach the students the principle knowledge about the current techniques of forensic and cybercrime investigation (FCInv). These techniques will assist students to successfully identify, secure, analyze and present digital evidence. This course will enable students to practice the acquired knowledge in the field of FCInv, which simultaneously fulfils the requirements of IR4.0.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze and conduct a FCInv examination and report the findings that are suitable for use by counsel bot in civil and criminla matters.

CO2: Illustrate FCInv techniques to identify, acquire, secure, and analyze possible digital evidence at a suspected cybercrime scene.

CO3: Practice life long learning initiatives in completing the given tasks.

BCN3113
ETHICAL HACKING

Credit Hour: 3
Prerequisite: None
Synopsis:

In this course, students begin with understanding how perimeter defenses work and they are led into scanning and attacking their own networks, no real network is harmed. Students then learn how hackers escalate privileges and what steps can be taken to secure a system. The interactive lab-environment provides each student in-depth knowledge and practical experience with the current security systems. This course will enable students to practice the acquired knowledge in the field of EH, which simultaneously fulfils the requirements of IR4.0.

Course Outcome:

By the end of semester, students should be able to:

CO1: Inquire and analyze theory and principles of information security, element of security, hacking cycle, hacktivsm and ethical hacking.

CO2: Construct attack and defense methods into computer and network environments.

SO3: Relate their surrounding environment (i.e. economy, environmental, cultural) with the professional practice by demonstrating usage of data and ethical hacking methods and tools.

BCN3223
CRYPTOGRAPHY

Credit Hour: 3
Prerequisite: None
Synopsis:

In this course, classical and modern cryptography are taught in detail, from basic block and stream cyphers through to systems based on elliptic and hyperelliptic curves, accompanied by concise summaries of the necessary mathematical background. This course will enable students to practice the acquired knowledge of various cryptographic methods associated with authentication and protocol-sharing which simultaneously fulfils the requirements of IR4.0.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze cryptography fundamentals and its applications.

CO2: Construct secure communication using various cryptographic methodology.

CO3: Practice life-long learning initiatives in practice the acquired knowledge of various cryptographic methods associated with authentication and protocol-sharing.

BCS3433
SOFTWARE ARCHITECTURE FOR AUTONOMUS SYSTEMS

Credit Hour: 3
Prerequisite: None
Synopsis:

This course introduces fundamental concepts of Autonomous Systems (AUS), the principles of their design and evolution. It describes algorithms of AUS, which allow to make a choice based on the assess of current

situation and environment. Architectural design patterns for AUS are introduced. As a result of the course, students will be able to design a system that is capable for auto-configuration and self-organization.

Course Outcome:

By the end of semester, students should be able to:

CO1: Criticize software architecture for AUS based on the client's needs to achieve a needed level of autonomy.

CO2: Design an autonomous system to meet the users requirements.

CO3: Work effectively as part of a team to design an autonomous system static and run-time structure.

BCS3423
INTEGRATED BUSINESS PROCESSING USING SAP

Credit Hour: 3
Prerequisite: None
Synopsis:

This course exposes students to the integrated business processes by using SAP ERP Systems. In the first part, student are exposes to the basic knowledge of the ERP including Procurement, Fulfilment, Inventory and Material Planning process. Furthermore, in the second part, as a support for the ERP, SAP system is introduced and student are exposes to the process of managing SAP applications as an administrator.

Course Outcome:

By the end of semester, students should be able to:

CO1: Classify and distinguish between each business processes in their fields and how they compliments each other in the term of information sharing and exchange.

C02: Navigate and organize all given business processes information and manage the SAP Application.

CO3: Propose and present advice and implementation for an enterprise by using Enterprise Resource Planning concepts.

BCS3443
CYBER-PHYSICAL SYSTEMS MODELLING AND DESIGN

Credit Hour: 3
Prerequisite: None
Synopsis:

This course introduces Smart Cyber-Physical Systems, where physical and software components are deeply intertwined. In this course, a student will be introduced the way of CPS modelling, design and validation with different techniques and tools. At the end of the course, a student will be able to model, to design and to validate a sample of a CPS.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate the understanding of theory

and principles of a CPS design and development.

CO2: Model and design a system with sensing, actuating and embedded processing components corresponding to requirements.

CO3: Work effectively as part of a team to model and design a cyber-physical system.

BCM3253
DATA ANALYTICS AND VISUALIZATION

Credit Hour: 3
Prerequisite: None
Synopsis:

This course exposes student with various data processing stages including data acquisition, data cleansing, data modelling and data mapping and rendering. The data analytics topics cover basic descriptive and predictive analytics. While data visualization techniques cover the types of visualization, context of decision making and stakeholder identification.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze the concept of data analytics and visualization in various applications.

CO2: Construct a visualization application by implementing data analytics and visualization techniques.

CO3: Shows the ability for independence learning and propose the suitable solutions to facilitate stakeholder decision making.

BCM3263
AUGMENTED REALITY

Credit Hour: 3
Prerequisite: None
Synopsis:

This course is designed to expose to the student with the theoretical and fundamentals concept of augmented reality. The course will cover the history of the area, hardware technologies involved, interaction techniques, design guidelines, evaluation methods, and specific application areas.

Course Outcome:

By the end of semester, students should be able to:

CO1: Understand the concept of augmented reality and analyze related information into its components.

CO2: Construct an augmented reality application based on fundamental concepts of augmented reality development.

CO3: Demonstrate the ability to plan, give clear instruction and coordinate tasks & resources based on task objectives during AR project development.

BCI3293
EMERGING TECHNOLOGY

Credit Hour: 3
Prerequisite: None
Synopsis:

This course addresses several emerging trends in ICT locally and globally. The issues are raised from several areas in ICT with the Industrial Revolution 4.0 (IR4.0): autonomous robots, simulation, system integration, internet of things, cybersecurity, cloud computing, additive manufacturing, augmented reality and big data.

Course Outcome:

By the end of semester, students should be able to:

CO1: To demonstrate understanding in the emerging trends in ICT.

CO2: To organize effective approaches in gathering up-to-date information and trends in ICT.

CO3: To demonstrate effective skill in presenting emerging trends in ICT (oral)

CO4: To demonstrate effective skill in presenting emerging trends in ICT (written)

BCC3012
UNDERGRADUATE PROJECT I

Credit Hour: 3
Prerequisite: None
Synopsis:

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce report proposal and solve the problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project progress and to ensure that they can achieve the course objective.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze a specific problem and design the proposed solutions that comply with principles of computer science.

CO2: Organize the solution based on specific problem and usage of appropriate tools to be used in the development of the solution.

CO3: Explore and find solution through independent work.

CO4: Present the solution through oral and written form in order to defend their proposal.

CO5: Demonstrate professional values and attitude through meeting and punctuality in any form of deliverables.

BCC3024
UNDERGRADUATE PROJECT II

Credit Hour: 3
Prerequisite: BCC3012
UNDERGRADUATE PROJECT I
Synopsis:

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce report proposal and solve the problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project progress and to ensure that they can achieve the course objective.

Course Outcome:

By the end of semester, students should be able to:

CO1: Develop the solution based on the approved proposal (PSM1) which comply with the principles of computer science.

CO2: Organize an appropriate validation and verification tasks for the propose solution.

CO3: Identify and critically discuss the solution for future values.

CO4: Organize and justify the solution through oral and written form.

CO5: Demonstrate professional values and attitude through meeting and punctuality in any form of deliverables.

BCC4012
INDUSTRIAL TRAINING

Credit Hour: 3
Prerequisite: None
Synopsis:

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Student also supervised by industrial and university supervisor to guide and ensure that they can do their work as good as possible and achieved the objective for this course.

Course Outcome:

By the end of semester, students should be able to:

CO1: Organize the industrial training knowledge, experience and skills in appropriate written report.

CO2: Construct solution by applying the theory learned to solve real problem in organization.

CO3: Build communication skills on oral presentation.

CO4: Work effectively with good critical thinking and problem solving in organization to perform task given.

CO5: Practice interpersonal skills and professional ethics in organization.

COURSE SYNOPSIS - DIPLOMA

DCS1013
SYSTEMS ANALYSIS AND DESIGN

Credit Hour: 3
Prerequisite: None
Synopsis:

This course describes the concepts and methods of information system analysis and design, with an emphasis on system analysis methods and tools. The course focuses on the issues and management technique involved in analysis, design and implementation of information system.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate the understanding of the stages in System Development Life Cycle.

CO2: Reproduce the design of a given case study that comply with the stages of systems development lifecycle.

CO3: Discuss effectively in a team by proposing solution for a given case study and capable to demonstrate leadership's skills through group assignment.

DCI1053
COMPUTER SYSTEMS & APPLICATION

Credit Hour: 3
Prerequisite: None
Synopsis:

This course enables students to learn how to develop an executable application starting with the design of interface, writing of the codes using programming tool and lastly integrating the application with database. Students is also exposed to troubleshooting and managing all computer hardware and software.

Course Outcome:

By the end of semester, students should be able to:

CO1: Discover the activities for simple application development, computer installation, maintenance and troubleshooting.

CO2: Follow the standard operating procedures for application development and computer systems.

CO3: Work effectively in team in order to complete the given assessment in specific time.

DCI1013
PROBLEM SOLVING

Credit Hour: 3
Prerequisite: None
Synopsis:

This course expose to the students with the appropriate computing methods in solving problem through programming approach, which consists of programming design, algorithm, pseudo code, flow chart and logic structure.

Course Outcome:

By the end of semester, students should be able to:

CO1: Produce the solutions for a given problems using appropriate problem solving approach.

CO2: Demonstrate logical thinking skills in problem solving.

CO3: Demonstrate team working skills through group assignment.

DCN1013
COMPUTER ARCHITECTURE & ORGANIZATION

Credit Hour: 3
Prerequisite: None
Synopsis:

This course discusses the structure and function of a computer. It expose student with the architecture and organization of a computer. This subject covers on the numbering system and the representation of data, the internal and external computer communication through system buses and Input and Output, computer storage, internal architecture of Central Processing Unit and Boolean Algebra.

Course Outcome:

By the end of semester, students should be able to:

CO1: Identify and classify computer structure and its functions.

CO2: Explain the internal components and their functionality of a computer (control unit, ALU, register, memory and CPU addressing modes); and their design to produce high performance.

CO3: Demonstrate team working by solving problems in groups.

DCM1013
GRAPHICAL USER INTERFACE

Credit Hour: 3
Prerequisite: None
Synopsis:

This course introduces the standard Graphical User Interface (GUI) using usability-engineering life cycle for any software system and application. Student will expose to the concept of graphical user interface for computer application and how to design good user interface based on the usability heuristic concept.

Course Outcome:

By the end of semester, students should be able to:

CO1: Classify the Graphical User Interface (GUI) in various types of software.

CO2: Construct a GUI prototype according to the user interface guidelines.

CO3: Work and communicate effectively in group to complete the given assessment in specific time given.

DCI1043
DATABASE SYSTEMS

Credit Hour: 3
Prerequisite: None
Synopsis:

The course emphasizes on the importance of data to an organization

and how the data should be managed. Database management system (DBMS) will be viewed as a solution to the problems of file processing system. Aspects of relational database design will be covered in details. This includes database development life cycle, database architecture, data models, and normalization process. Several query languages such as Structured Query Language (SQL) and Query by Example (QBE) will be discussed but the emphasis is on SQL. Students will be given a real life problem to design and develop a database application system. In the later part of the course students will be exposed to the latest developments in database architecture.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate the concepts and principles of database systems.

CO2: Manipulate queries using the syntax of Structure Query Language (SQL) and Query By Example.

CO3: Construct innovative solution through the representation of data model, relationship ER and EER Diagrams and database normalization in database application system using appropriate DBMS.

CO4: Organize the group work to complete the given assessments in specified time frame.

DCI1023
PROGRAMMING TECHNIQUES

Credit Hour: 3
Prerequisite: None
Synopsis:

This course discusses on understanding problems and translating them into computer solution techniques using programming language. This course enables students to apply programming techniques, write programming codes from given problems and execute programming codes successfully.

Course Outcome:

By the end of semester, students should be able to:

CO1: Select appropriate techniques in solving a problem.

CO2: Construct and run programs.

CO3: Differentiate various techniques in solving a problem.

DCN1023
Data Communication & Networking

Credit Hour: 3
Prerequisite: None
Synopsis:

This course introduces the communication of voice and video, networks and its functions, data conversions, controlling of errors, switching information and its devices, internetworking device and different layers of TCP/IP.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate knowledge and understanding of basics computer networking.

CO2: Construct the physical arrangement of networks, types and modes of networks, data conversions and transmission medium.

CO3: Build the detection and correction of errors, link control and link protocols of data link layer.

CO4: Perform logic of link mechanisms used in networks and different layers of TCP/IP.

DCI2063
OBJECT ORIENTED PROGRAMMING

Credit Hour: 3
Prerequisite: DCI1023 Programming Techniques
Synopsis:

This course provides an introduction to the concepts of object orientation and object-oriented programming (OOP) techniques using Java programming language. It will provide students with a through look at the basic constructs of the Java programming language such as its basic data types and operations. It will also emphasize on the use of OOP characteristic that expose students to Unified Modelling Language (UML) design, class and object, inheritance, polymorphism, exception handling and Graphical User Interface (GUI) and event driven programming.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate the concept of object-oriented in programming.

CO2: Manipulate object-oriented programming in given problems.

CO3: Formulate the solution of given problems using object-oriented programming technique.

DCI2073
WEB PROGRAMMING

Credit Hour: 3
Prerequisite: DCI1023 Programming Techniques
Synopsis:

This course introduces the essential topics of Internet programming & development of web-based applications. Students are required to develop a web/Internet application which connected to the database.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate understanding in fundamental of dynamic web-based applications.

CO2: Design and construct a web-based application prototype using HTML, web server, database and scripting language.

CO3: Demonstrate communication effectively in written and oral form

through group discussion, meeting and presentation session.

DCN1033
OPERATING SYSTEMS

Credit Hour: 3
Prerequisite: None
Synopsis:

This subject introduces the various data and control structures necessary for the design and implementation of modern computer operating systems. Process creation and control, communication synchronization and concurrency, memory management and file systems concept are explored in the context of the WINDOWS/LINUX operating system.

Course Outcome:

By the end of semester, students should be able to:

CO1: Describe the theory of operating systems, distinguish the relationship between OS and hardware (system calls, I/O, files and symbolic links, directories and file systems, process management, forks, threads, inter-process communication, shells, signal handling, pipes, sockets, CPU scheduling and memory management).

CO2: Follow instructions on Operating Systems installation.

CO3: Identify the current issues in operating system from the viewpoint of a system designer.

DCI1033
DATA STRUCTURE & ALGORITHMS

Credit Hour: 3
Prerequisite: DCI1023 Programming Techniques
Synopsis:

This course is designed to expose the students to the data structures and algorithm. It provide theoretical basis in data structures and the application of data structures is based on standard algorithms. Students must also be able to transform the data structure and algorithms problems into the computer programs.

Course Outcome:

By the end of semester, students should be able to:

CO1: Analyze various types of data structures and algorithms techniques in solving a related problem.

CO2: Construct a programme by applying the data structure and algorithms techniques for a related problem.

CO3: Use online application to find solution for a related problem.

DCI3293
EMERGING TECHNOLOGIES

Credit Hour: 3
Prerequisite: None
Synopsis:

This course addresses several emerging trends in ICT locally and globally. The issues are raised from several areas in ICT with the Industrial Revolution 4.0 (IR4.0): autonomous

robots, simulation, system integration, internet of things, cybersecurity, cloud computing, additive manufacturing, augmented reality and big data.

Course Outcome:

By the end of semester, students should be able to:

CO1: To demonstrate understanding in the emerging trends in ICT.

CO2: To organise effective approaches in gathering up-to-date information and trends in ICT

CO3: To demonstrate effective skill in presenting emerging trends in ICT (oral)

CO4: To demonstrate effective skill in presenting emerging trends in ICT (written)

DCI2093
WEB APPLICATION DEVELOPMENT

Credit Hour: 3
Prerequisite: None
Synopsis:

This course provides students with the knowledge and skills that are needed to develop web application. Students learn data access from database to web application, create and utilize web services, create component and deploy application. The students will implement what they have learned in a mini project.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrate understanding in fundamental web-based applications within the context of framework technology.

CO2: Manipulate web service components, configuration, securing and deployment in web application.

CO3: Identify appropriate solution using web technology to the specified problem.

DCN2023
DATA & NETWORK SECURITY

Credit Hour: 3
Prerequisite: None
Synopsis:

The course introduces fundamental of security. Every chapter will explain security concepts, fundamentals, purpose, implementation and discussion in their respective areas related to data and network security. Topics include: Introduction to security, cryptographic tools, user authentication and access control, security in networks, intrusion detection systems, firewalls and intrusion prevention systems and wireless security.

Course Outcome:

By the end of semester, students should be able to:

CO1: Inquire and analyze theory and principles of security, cryptographic tools, user

authentication and access control, security in networks, intrusion detection systems, firewalls and intrusion prevention systems and wireless security.

CO2: Construct and organize attack and defense methods into computer and network environments.

CO3: Identify and investigate security issues and keep abreast with current trends.

CO4: Demonstrate and explain security issues and propose possible solutions.

DCM2063
FUNDAMENTAL OF MULTIMEDIA

Credit Hour: 3
Prerequisite: None
Synopsis:

This course will expose students to the theoretical and fundamental concepts of multimedia, its applications and the techniques involved. Topics to be covered include text and audio, image and video, the art of multimedia, and multimedia over the network.

Course Outcome:

By the end of semester, students should be able to:

CO1: Demonstrates conceptual understanding and knowledge in multimedia, functions of each multimedia element, its usage and processing technique.

CO2: Manipulate multimedia elements (text, graphic, audio, video & animation) using software tools.

CO3: Recognize the issues in context of multimedia technology and able to adapt to other related fields.

DCC3013
FINAL YEAR PROJECT I

Credit Hour: 3
Prerequisite: None
Synopsis:

This course aims to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce proposal report and solve the problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project progress and to ensure that they can achieve the course objective.

Course Outcome:

By the end of semester, students should be able to:

CO1: Design a solution based on specific problem by following the principle of

software development process.

CO2: Organise the solution and use appropriate tools in the development of the solution.

CO3: Demonstrate good communication and presentation skills.

CO4: Demonstrate student professional values and responsibility throughout the project completion.

DCC3026
FINAL YEAR PROJECT II

Credit Hour: 3
Prerequisite: DCC3013 Final Year Project I
Synopsis:

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce proposal report and solve the problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project progress and to ensure that they can achieve the course objective.

Course Outcome:

By the end of semester, students should be able to:

CO1: Develop the solution based on the approved proposal (PTA1) which comply with the principles of system development process.

CO2: Organize an appropriate unit testing and user acceptance test (UAT) for the proposed solution.

CO3: Demonstrate good communication and presentation skills.

CO4: Demonstrate student professional values and responsibility throughout the project completion.

FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY

FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY

INTRODUCTION

The Faculty of Electrical and Electronics Engineering Technology was first established on 16th February 2002 with the aim to produce high-skilled engineers and technical assistants in the field of electrical and electronic engineering. The faculty delivers high-quality teaching in diploma and degree, which combine technology and engineering aspects, targeting both theory and practical skills. The programs offered by the faculty focus on two areas that are electronics and power systems. Besides producing professional and semi-professional engineers in electrical and electronic engineering, the faculty aims at being a leading service provider in its field related to the electrical- and electronics-based industries. The faculty's research activities are organized broadly into groups of expertise, in the fields of computer vision, intelligent systems, signal processing, applied electronics, robotics, control & instrumentation, optimization, power system and renewable energy. Each group collaborates widely with partners in industry and research institutions, funded by a wide range of sources. The objective of the research activities is to become the center of reference for industries in electrical and electronic solutions especially in the east coast region of Peninsular Malaysia.

PROGRAMMES OFFERED

Bachelor of Engineering Technology (Electrical) with Honours - BTE
Bachelor of Electrical Engineering Technology (Power & Machine) with Honours - BTW
Bachelor of Electronics Engineering Technology (Computer System) with Honours - BTS
Bachelor of Technology in Electrical Systems Maintenance with Honours - BVE
Bachelor of Technology in Industrial Electronics Automation with Honours - BVI
Diploma in Electrical Engineering (Industrial Electronics) - DEE

CAREER OPPORTUNITIES

The demand for professionals in the fields of electrical and electronics is increasing year by year such as electrical control engineer, electrical design engineer, electrical project engineer, instrumentation and electrical reliability engineer and power system, engineer and electronic production engineer. Graduates will have the opportunity to work in the fields of industrial power systems, consumer and industrial electronics, manufacturing and education.

CURRICULUM STRUCTURE
BACHELOR OF ENGINEERING TECHNOLOGY (ELECTRICAL) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	BTU1113 Physics	UHC1012 Falsafah dan Isu Semasa	BTM1114 Basic Manufacturing Processes	BTM3234 Manufacturing Computer Applications	UHS2011 Soft-skills II	BTM3514 Computer Integrated Manufacturing	BTE4743 Power Electronics	BTE4912 Industrial Training
	BTU1112 Physics Laboratory	BTE1313 Instrumentation and Measurements	UHF1111 Foreign Language I	BTE2113 Analog Electronics	BTE2413 Electrical Power System	BTE3254 Microprocessors and Interfacing	BTE4**3 Elective 1	
	BTE1122 Electrical Installation Workshop	BUM1223 Calculus	BTM1614 Computer-Aided Drafting	BTE2112 Analog Electronics Laboratory	BTE3223 Digital Logic Design	BTE3252 Microprocessors and Interfacing Laboratory	BTE4**3 Elective 2	
	BTE2313 Computer Programming	BTE2223 Circuit Analysis I	BUM2113 Applied Mathematics	UQ*2**1 Co-curriculum 2	BTE3222 Digital Logic Design Laboratory	BTE3323 Control Systems	BTE4**3 Elective 3	
	BUM1113 Technical Mathematics	BTE2222 Circuit Analysis I Laboratory	UHL2422 English For Technical Communication	UHF2041 Foreign Language 2	BTE3262 Electrical Automation	BTE3322 Control Systems Laboratory	BTE4826 Engineering Technology Senior Design Project II	
	UHL2400 Fundamentals of English Language	UHL2412 English For Academic Communication	BTE2233 Circuit Analysis II	UHL2432 English For Professional Communication	BTE3912 Engineering Ethics	BTE3813 Engineering Technology Senior Design Project I		
	BTE1213 Electrical Fundamentals	UHC2022 Penghayatan Etika dan Peradaban	BTE2232 Circuit Analysis II Laboratory	BTE3143 Electric Machines and Transformers	BTE3233 Communication System Design			
	BTE1212 Electrical Fundamentals Laboratory	UGE2002 Technopreneurship	UHS1011 Soft-skills 1	BTE3142 Electric Machines and Transformers Laboratory	BTE3232 Communication System Design Laboratory			
	UQB1**1 Co-curriculum 1							
TOTAL CREDIT PER SEMESTER	19	19	20	18	18	18	18	12
OVERALL TOTAL CREDIT FOR GRADUATION	142							

FACULTY OF ELECTRICAL & ELECTRONICS ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
BACHELOR OF ELECTRONICS ENGINEERING TECHNOLOGY (COMPUTER SYSTEM) WITH HONOURS

SEMESTER	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	**FIRST**	**SECOND**	**FIRST**	**SECOND**	**FIRST**	**SECOND**	**FIRST**	**SECOND**
COURSES	UHL2400 FUNDAMENTALS OF ENGLISH LANGUAGE	UHC1012 FALSAFAH DAN ISU SEMASA	UQ*2**1 CO-CURRICULUM II	UHL2432 ENGLISH FOR PROFESSIONAL COMMUNICATION	BTE3233 COMMUNICATION SYSTEM DESIGN	BTS3133 SIGNALS & NETWORKS	BTS4164 ROBOTICS	BTS4919 INDUSTRIAL TRAINING
	UQB1**1 CO-CURRICULUM I	UHL2412 ENGLISH FOR ACADEMIC COMMUNICATION	UHL2422 ENGLISH FOR TECHNICAL COMMUNICATION	UGE2002 TECHNOPRENEURSHIP	BTE3232 COMMUNICATION SYSTEM DESIGN LABORATORY	BTS3132 SIGNALS & NETWORKS LABORATORY	BTS4**3 ELECTIVE I	BTS4913 INDUSTRIAL TRAINING REPORT
	BUM1113 TECHNICAL MATHEMATICS	UHS1011 SOFT-SKILLS I	UHF1111 FOREIGN LANGUAGE I	UHF2041 FOREIGN LANGUAGE II	BTE3253 MICROPROCESSOR AND INTERFACING	BTS3143 MICROCONTROLLER & EMBEDDED SYSTEMS	BTS4**3 ELECTIVE II	
	BTU1113 PHYSICS	BUM1223 CALCULUS	UHC2022 PENGHAYATAN ETIKA DAN PERADABAN	UHS2011 SOFT SKILLS II	BTE3252 MICROPROCESSOR AND INTERFACING LABORATORY	BTS3142 MICROCONTROLLER & EMBEDDED SYSTEMS LABORATORY	BTS4**3 ELECTIVE 3	
	BTU1112 PHYSICS LABORATORY	BTM1314 COMPUTER-AIDED DESIGN	BUM2113 APPLIED MATHEMATICS	BTE3223 DIGITAL LOGIC DESIGN	BTS3113 NUMERICAL & CONTROL SYSTEMS	BTS3153 PLC BASICS AND APPLICATIONS	BTS4826 ENGINEERING TECHNOLOGY SENIOR DESIGN PROJECT II	
	BTU1213 CHEMISTRY	BTE2133 ELECTRICAL FUNDAMENTALS & CIRCUIT ANALYSIS II	BTE2313 COMPUTER PROGRAMMING	BTE3222 DIGITAL LOGIC DESIGN LABORATORY	BTS3112 NUMERICAL & CONTROL SYSTEMS LABORATORY	BTS3152 PLC BASICS AND APPLICATIONS LABORATORY		
	BTU1212 CHEMISTRY LABORATORY	BTE2132 ELECTRICAL FUNDAMENTALS & CIRCUIT ANALYSIS II LABORATORY	BTE2213 ELECTRONIC I	BTE3243 ELECTRONIC II	BTS3123 COMPUTER ARCHITECTURE	BTS3813 ENGINEERING TECHNOLOGY SENIOR DESIGN PROJECT I		
	BTE2123 ELECTRICAL FUNDAMENTALS & CIRCUIT ANALYSIS I		BTE2212 ELECTRONIC I LABORATORY	BTE3242 ELECTRONIC II LABORATORY	BTS3122 COMPUTER ARCHITECTURE LABORATORY			
	BTE2122 ELECTRICAL FUNDAMENTALS & CIRCUIT ANALYSIS I LABORATORY			BTS4253 COMPUTER VISION SYSTEM				
TOTAL CREDIT	18	17	17	19	20	19	19	12
OVERALL TOTAL CREDIT FOR GRADUATION	**141**							

The information provided by Faculty of Electrical & Electronics Engineering Technology are based on University's Regulation and endorsement until 12 March 2020

FACULTY OF ELECTRICAL & ELECTRONICS ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY (POWER & MACHINE) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	BTU1113 Physics	UHR1012 Islamic and Asian Civilizations	BTM2014 Manufacturing Computer Applications	BTM1314 Computer-Aided Design	UHF2041 Foreign Language II	BTW3113 Power System Analysis	BTE4713 Programmable Logic Control	BTW4919 Industrial Training
	BTU1112 Physics Laboratory	BTE2313 Computer Programming	UGE2002 Technoprenerurshi pl	UHF2011 Soft Skills 2	BUM2423 Applied Statistics	BTW3223 Electrical Installation Design	BTW4723 Power Quality	BTW4913 Industrial Training Report
	BTU1213 Chemistry	BUM1223 Calculus	BTE2413 Electrical Power System	UQ*2**1 Co-curriculum 2	BTW3632 Maintainance Technology	BTW3222 Electrical Installation Design Lab	BTW4733 Alternative Energy	
	BTU1212 Chemistry Lab	BTE2123 Electrical Fundamentals and Circuit Analysis II	BUM2113 Applied Mathematics	UHF1111 Foreign Language I	BTM3343 Computer Integrated Manufacturing	BTE3313 Power Sytem Protection & High Voltage	BTW4713 Power System & Operation COntrol	
	BUM1113 Technical Mathematics	BTE2122 Electrical Fundamentals and Circuit Analysis II Laboratory	UHL2422 English For Technical Communication	UHL2432 English For Professional Communication	BTE3243 Control System	BTE3253 Microprocessor and Interfacing	BTW4826 Engineering Technology Senior Design Project II	
	UHL2400 Fundamentals of English Language	UHL2412 English For Academic Communication	BTE3143 Electrical Machine and Transformer	BTE3223 Digital Logic Design	BTE3242 Control System Lab	BTE3052 Microprocessor and Interfacing Lab		
	BTE2123 Electrical Fundamentals and Circuit Analysis I	UHM2012 Ethnics Relation	BTE3142 Electrical Machine and Transformer Laboratory	BTW2243 Advanced Electric Machines	BTW3213 Power Electronic Drive Machine	BTW3813 Engineering Technology Senior Design Project I		
	BTE2122 Electrical Fundamentals and Circuit Analysis I Laboratory	UGE2002 Technopreneurship	UHL2422 English For Technical Communication	BTW2242 Advanced Electric Machines Laboratory	BTW3212 Power Electronic Drive Machine Laboratory			
	UQB1**1 Co-curriculum I			BTE3232 Digital Logic Design Lab				
TOTAL CREDIT PER SEMESTER	19	18	19	19	19	19	18	12
OVERALL TOTAL CREDIT FOR GRADUATION	143							

The information provided by Faculty of Electrical & Electronics Engineering Technology are based on University's Regulation and endorsement until 12 March 2020

FACULTY OF ELECTRICAL & ELECTRONICS ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
DIPLOMA IN ELECTRICAL ENGINEERING (INDUSTRIAL ELECTRONICS)

YEAR	FIRST			SECOND		THIRD
SEMESTER	ZERO	FIRST	SECOND	FIRST	SECOND	FIRST
COURSES	**UHL1412** FOUNDATION ENGLISH	**DEE1124** CIRCUIT ANALYSIS I	**DEE2124** CIRCUIT ANALYSIS II	**DEE1233** ANALOG ELECTRONICS I	**DEE3233** ANALOG ELECTRONICS II	**DEE3812** INDUSTRIAL TRAINING
	UQB1011 BRIGED SISWA	**DEE2314** INSTRUMENTATION & MEASUREMENTS	**DEE1224** DIGITAL ELECTRONICS	**DEE3224** MICROPROCESSOR & MICROCONTROLLER FUNDAMENTALS	**DEE3313** PRINCIPLES OF CONTROL SYSTEMS	
	DUM1113 BASIC MATHEMATICS	**DEE1941** TECHNICAL DRAWING	**DEE1213** COMPUTER PROGRAMMING	**DEE3143** BASIC ELECTRICAL MACHINES & POWER SYSTEMS	**DEE3413** PRINCIPLES OF COMMUNICATION SYSTEMS	
		DEE1971 ELECTRICAL INSTALLATION	**DEE2931** BASIC PROGRAMMABLE LOGIC CONTROLLER	**DEE3323** INDUSTRIAL AUTOMATION	**DEE2612** BASIC MAINTENANCE TECHNOLOGY	
		UHL1422 ENGLISH FOR ACADEMIC SKILLS	**DEE3941** MICROCONTROLLER APPLICATION	**DEE3931** ELECTRO PNEUMATIC	**UHS2021** SOFT SKILLS II	
		UHS1021 SOFT SKILLS I	**UHL1432** ENGLISH FOR OCCUPATIONAL COMMUNICATION	**UHM2022** ETHNIC RELATIONS	**UGE1002** ASAS PEMBUDAYAAN KEUSAHAWANAN	
		UHR1012 ISLAMIC AND ASIAN CIVILISATIONS I	**DUM1123** CALCULUS	**DUM2113** TECHNICAL MATHEMATICS	**DEE3713** MINI PROJECT	
		DUF1113 PHYSICS				
TOTAL CREDIT	6	18	18	19	17	12
TOTAL CREDIT FOR GRADUATION	90					

COURSE SYNOPSIS

BACHELOR OF ENGINEERING TECHNOLOGY (ELECTRICAL) WITH HONOURS

CORE FACULTY

BTU1112
Physics Laboratory
Credit: 2
Prerequisites: None

Synopsis

This laboratory introduces the students with the application of physics concept in engineering devices such as Free Fall, Bernoulli's Law, Hydrostatic Pressure And Electric Field. The concepts of physics introduced related in mechanics or dynamics motion and basic concepts of electrical area. The students will learn how to run the experiment with referring the basic concepts of physics during the lab hours.

Course Outcome

CO 1	Understanding the basic concepts, theories and principles of physics in engineering application
CO 2	Demonstrating skills in logical thinking in handling equipment.
CO 3	Applying basic physics concepts to problem solving
CO 4	Applying physics knowledge to personal decisions involving physical problems

BTU1113
Physics
Credit: 3
Prerequisites: None

Synopsis

This course introduces a fundamental of physics. It covers unit and measurements, kinematics, forces and Newton's law of motion, statics equilibrium, work, energy and power, fluid mechanics, electric and magnetism

Course Outcome

CO 1	Understand the basic concepts, theories and principles of physics in engineering application
CO 2	Solve physics problems such as in kinematics, forces and static equilibrium
CO 3	Discuss physics quantity such as work, energy and power in a team
CO 4	Applying basic laws to solve fluid, electrical and magnetism problems

BUM1113
Technical Mathematics
Credit:3
Prerequisites: None

Synopsis

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Student are exposed to complex number, functions and graphs, trigonometric functions, analytic geometry, polar coordinates, 3 dimensional spaces and vector. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

CO 1	Apply appropriate mathematics concepts to solve various technological problems.
CO 2	Use appropriate software and tool to solve the graphical and computational problems in mathematics
CO 3	Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.
CO 4	Relate and applied the concepts and methods studied into other courses.

BUM1223
Calculus
Credit:3
Prerequisites: None

Synopsis

This course discusses Differentiation and applications, techniques of integration and applications, numerical integration and Taylor polynomial, Taylor Series & Maclaurin Series.

Course Outcome

CO 1 Understand the fundamental concepts of the calculus and connect them with the real world problem.

CO 2 Solve any related problem involving differentiation and integration.
CO 3 Apply the concepts and methods studied into other related courses.
CO 4 Communicate effectively in written and oral form through group discussion.
CO 5 Attain computational facility in differential and integral calculus.

BUM2113
Applied Mathematics
Credit:3
Prerequisites: None

Synopsis

This course introduces and discusses Partial Derivatives, Double Integrals, First Order Differential equations and Second Order differential equations.

Course Outcome

CO 1 Analyze and apply the knowledge of Multiple Integrations to solve various science and engineering problems.
CO 2 Analyze and solve various differential equation problems by using the basic principles and methodologies of First Order differential equations and Second Order differential.
CO 3 Apply the concepts and methods studied into other related courses.
CO 4 Communicate effectively in written and oral form through group discussion.

BTE2313
Computer Programming
Credit: 3
Prerequisites: None

Synopsis

Fundamental principles and concepts of C++ programming, with definitions of data, expressions, control-flow constructions, functions, input and output and preprocessing. Basic problem solving and programming techniques, structured programming ideas, fundamental algorithms and data structures (array).

Course Outcome

CO 1 Construct computer programs using C++ language
CO 2 Develop appropriate programming techniques and program control structures
CO 3 Display the ability to use IDE (Integrated Design Environment) for C++
CO4 Propose an algorithm for a specific problem by implementing appropriate programming techniques.

CORE PROGRAM

BTE1122
Electrical Installation Workshop
Credit: 2
Prerequisites: None

Synopsis

This course introduces students to the single phase domestic wiring and installation. The students will learn about supply system, rules and regulation, wiring system and electrical protection system.

They are also will practice in applying trunking and conduits for electrical wiring as well as doing fitting and installation of electrical system devices. Students need to construct the single phase domestic wiring and installation for lighting, socket outlet, fan and air conditioner. They are also will conduct inspection and testing on their wiring and installation as safety confirmation and fulfil the regulations.

Course Outcome

CO 1 Interpret rules and regulation for electrical wiring comprising of cable selection and load calculation
CO 2 Construct single phase electrical installation for domestic wiring using suitable wiring tools and accessories
CO 3 Perform inspection and testing in electrical wiring and installation.
CO4 Apply ethical principles and safety in electrical wiring installation

BTE1112
Electrical Fundamentals Laboratory
Credit: 2
Prerequisites: None

Synopsis

This course introduces students to the fundamentals laboratory of DC and AC circuits and basic network laws and theorems. The students will be handling the basic measurement equipment to measure and analyse the parameter of the electrical circuits.

Course Outcome

CO 1 Construct simple electrical and electronics and simulate the operation of the circuits using circuit simulation software (OrCAD).
CO 2 Measure parameter of electrical circuits (resistance, voltage, current, etc)
CO 3 Work ethically and effectively as an individual and in a group

BTE1113
Electrical Fundamentals
Credit:3
Prerequisites: None

Synopsis

This module will introduce students to basic science of electricity, introduction to instrumentation and measurement, work and energy theorem, basic electrical circuits and introduction to magnetism.

Course Outcome

CO 1 Describe the basic concept of electricity, conductors, insulators, circuit, magnetism and other devices.
CO 2 Apply basic electrical laws such as Ohm and Kirchhoff Law to solve circuit or electrical problems.
CO 3 Shows the ability to communicate effectively.

BTE1313
Instrumentation & Measurements
Credit:3
Prerequisites: None

Synopsis

This course introduces students to the principles of instrumentation and measurements, determination of error that caused by the meters. The students will be exposed to the architecture and the operation of DC and AC meters, oscilloscope, signal generator, storage instrument and display devices, analysis of DC and AC meters and introduction to signal conditioning.

Course Outcome

CO 1 Explain the basic concept of Instrumentation & measurement system including the operation, calibration and calculation

CO 2	Solve problems regarding AC & DC meters, oscilloscope and signal generator
CO 3	Construct the operation of meters, measuring devices or signal conditioning circuits into trainer board and interpret the experimental results into report.
CO4	Understand the functional role of individual towards task accomplishment

BTE2222
Circuit Analysis I Laboratory
Credit:2
Prerequisites: BTE1212

Synopsis

This course introduces the basic concepts and engineering methods of DC circuit analysis. It is also introduce the concept of AC circuits. The contents include Ohm's Law, Kirchhoff's Law, series and parallel circuits, Mesh and Nodal analysis, superposition theorem, Thevenin and Norton equivalent of a complex circuit, Measure capacitance, measure capacitor charge and discharge times, RL, RC circuits, phase difference, measure power in a single phase circuit and responses of basic First Order circuits.

Course Outcome

CO 1	Build various electrical circuits and properly use lab equipment to measure, analyse and troubleshoot the circuits. [PO1]
CO 2	Solve the DC circuit problems using nodal analysis and mesh analysis, Thevenin and Norton equivalent and evaluate the most efficient methods among them. Also introduce the concept of AC [PO2, PO5]
CO 3	Write lab reports in proper format to report work clearly and concisely.
CO 4	Demonstrate the role of individual in team to achieve task completion.

BTE2223
Circuit Analysis I
Credit:3
Prerequisites: BTE1213

Synopsis

This course introduces the engineering methods of DC circuit analysis. The contents include Mesh and Nodal analysis, Source Transformation, and 4 main network Theorems: Superposition, Thevenin, Norton and Maximum Power Transfer theorems. It also includes the basic of DC transients in capacitors and inductors. Introduction to AC fundamentals and impedance concept of RLC circuits are also covered.

Course Outcome

CO 1	Analyse DC circuit problems using various methods of DC Analysis and Network Theorems
CO 2	Describe the effects of DC transients on capacitors and inductors, and to relate them with electromagnetism concept
CO 3	Examine the AC (current and voltage) characteristics, and the concept of impedance in R,L,C circuits
CO 4	Describe the real industrial practice.

BTM1114
Basic Manufacturing Process
Credit:4
Prerequisites: None

Synopsis

This course intended to introduce to materials, techniques, and equipment of industrial manufacturing. Emphasis on laboratory demonstration and simulation activities such as machining, welding, casting, and forming operations.

Course Outcome

CO 1 Explain the structure and properties of basic engineering materials and their relationship to manufacturing.
CO 2 Describe the fundamental equipment and processes employed in common manufacturing operations.
CO 3 Identify process parameters and how they affect the manufacturing processes.

BTE2232
Circuit Analysis II Laboratory
Credit:2
Prerequisites: BTE2222

Synopsis

This course provides the basic concepts and engineering methods of AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, Filters, Bridges and Balanced 3-phase circuits are also covered.

Course Outcome

CO 1 Apply and validate circuit analysis theorems in ac circuits. [PO1, P2]
CO 2 Identify simple first-order filters and determines the resonant frequency and bandwidth for series/ parallel resonant circuits. [PO4, P3]
CO 3 Identify the functions and applications of transformers and introduce the Non-sinusoidal Waveforms and the 3 phase concept. [PO2, P4]

BTE2233
Circuit Analysis II
Credit:3
Prerequisites: BTE2223

Synopsis

This course provides the basic concepts and engineering methods of AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, Filters, Bridges and Balanced 3-phase circuits are also covered.

Course Outcome

CO 1 Determine impedance, voltage, current and other basic values for ac circuits.
CO 2 Apply circuit analysis theorems in ac circuits.
CO 3 Identify simple first-order filters and determines the resonant frequency and bandwidth for series/ parallel resonant circuits.
CO4 Identify the functions and applications of transformers and introduce the Non-sinusoidal Waveforms and the 3 phase concept.

BTM1614
Computer-Aided Drafting
Credit:4
Prerequisites: None

Synopsis

This subject is designed to introduce to the students the principle of computer-aided design. Topics includes Drafting Overview, Drawing Set-up , Basic CAD ,Commands Geometric Construction , Orthographic Projection , Basic Drawing ,Tools, Pictorial Drawings, Sectional Views, Advance CAD Commands, Modifying CAD,Drawings, Dimensioning, Tolerances, Working Drawings, Threads and Fasteners

Course Outcome

CO 1 Analyze problem in technical drawing and understand drawing

CO 2 Use basic geometric construction techniques to create objects in CAD

CO 3 Project a 3 dimensional object in 2 dimensional space with the proper utilization of views in CAD

CO 4 Read & create dimensioned drawings using conventional techniques in CAD.

CO 5 Identify and understand the components of working drawings & the standards that apply.

BTM3234
Manufacturing Computer Application
Credit:4
Prerequisites: BUM1113

Synopsis

Overview of computer hardware, software, and processing concepts related to the control of manufacturing tasks. Emphasis on use of integrated software packages in the solution of a variety of manufacturing problems. Laboratory assignments in automation control, real time data sampling, and creation of user interfaces.

Course Outcome

CO 1 Apply software development for technology problem solving.

CO 2 Perform adaptive programming skills for more diverse application environment.

BTE2112
Analog Electronics Laboratory
Credit:2
Prerequisites: BTE2233

Synopsis

Diode characteristics, Half wave and full wave rectifiers, Zener characteristics, Zener Voltage regulators, BJT characteristics, CE amplifier, MOSFET characteristics, CS amplifier.

Course Outcome

CO 1 Measure electronics devices characteristics.

CO 2 Construct electric circuits. Use lab equipment and Measure Electronics parameters in this circuits.

CO3 Build and simulate the operation of electric circuit.

BTE2113
Analog Electronics
Credit:3
Prerequisites: BTE2233

Synopsis

The P-N Junction Diode, Diode Applications, Bipolar Junction Transistors (BJT), DC Biasing of the BJT Amplifier, Transistor Modelling, Cascade Amplifier, Small-Signal BJT Amplifier, Metal-Oxide-Semiconductor FET (MOSFET), MOSFET Amplifier, Frequency Response of BJT and FET Amplifiers.

Course Outcome

CO 1 Understanding the electronics devices (Transistors, Op-Amp) theories.

CO 2 Analysing the electronics circuits.

CO3 Designing the electronics circuits.

BTE3222
Digital Logic Design Laboratory
Credit:2
Prerequisites: None

Synopsis

Laboratory experiments on digital circuits design and verification, using various digital circuit components. Combinational design techniques as well as sequential design techniques are presented with the use of Karnaugh mapping, state transition diagrams and tables.

Course Outcome

CO 1	To demonstrate the applications of digital logic simplification techniques
CO 2	Apply basic gates, flip flops and digital circuit
CO 3	Construct and analyse logic system, counter, decoder, memory devices and multiplexer.
CO 4	Demonstrate the report writing skills in technical field
CO 5	Work in a team and communicate effectively

BTE3223
Digital Logic Design
Credit:3
Prerequisites: None

Synopsis

This course emphasizes on the fundamental of digital electronics. The student is first taught about the number system and logic gates before introducing them to digital IC technology. Then they are exposed to both combinational logic network and combinational logic. In concurrence with this, the fundamental of sequential logic, flip-flop, counter and shift register will be taught. Finally, the memory devices are introduced.

Course Outcome

CO 1	Apply various techniques for digital logic simplification
CO 2	Apply basic gates, flip flops and various basic digital circuit
CO 3	Analyse logic system, counter, decoder, memory devices and multiplexer

BTE3262
Electrical Automation
Credit:2
Prerequisites: None

Synopsis

This course introduces student to electrical switching circuit design and construction. Students will learn how to design hard wire controller using the combination of switches, transistor, relay, timer, sensors, motor, etc.

Course Outcome

CO 1	Identify suitable voltage supply for electrical circuit
CO 2	Design a switching circuit for electrical automation system
CO 3	Construct a control circuit which consists of electrical and electronic components
CO 4	Work in a team and communicate effectively.

BTE3142
Electrical Machines and Transformers Laboratory
Credit:2
Prerequisites: BTE2233

Synopsis

This course introduces the fundamental concepts and principles of transformer and various types of electrical machines. It is intended for students to understand fundamental aspects of rotating electrical machines. The first part of the course is a quick review of some electromagnetism fundamental while the following will deal with the transformers and different types of electrical machines.

Course Outcome

CO 1	Describes the basic principles of selected electrical machines.
CO 2	Displays the transformer and machines equivalent circuits and the operating conditions for electrical machines under steady state conditions
CO 3	Construct driver circuit for DC and AC motor

CO 4 Justify the importance of electrical machines and impacts to the Load.

CO 5 Measure, Determine and interpret the parameters of transformer and torque-speed characteristics of rotating machines.

BTE3143
Electrical Machines and Transformers
Credit:3
Prerequisites: BTE2233

Synopsis

This course introduces the fundamental concepts and principles of transformer and various types of electrical machines. It is intended for students to understand fundamental aspects of rotating electrical machines. The first part of the course is a quick review of some electromagnetism fundamental while the following will deal with the transformers and different types of electrical machines.

Course Outcome

CO 1 Analyze the transformer and machines equivalent circuits and the operating conditions for electrical machines under steady state conditions.

CO 2 Construct driver circuit for DC and AC motor

CO 3 Justify the importance of electrical machines and impacts to the environment.

CO 4 Measure, Determine and interpret the parameters of transformer and torque-speed characteristics of rotating machines.

BTM3912
Engineering Ethics
Credit:2
Prerequisites: None

Synopsis

This subject gives an overview of engineering, the profession and its requirement in Malaysia scenario. Topics that will be included ethics, management and contribution of engineering also generic skills and study skills. Moreover, this subject can enhance students knowledge about obligation of engineers/technologists to the clients, professionals and society, ethical codes, safety codes.

Course Outcome

CO 1 Explain Engineering ethics, management and contribution.

CO 2 Analyze and comprehend the indispensable ethics, professionalism, responsibility, skills of teamwork and leadership

CO 3 Justify systematic approach to the ethical issue in the industry and engineering field

BTE3232
Communication System Design Laboratory
Credit:2
Prerequisites: BTE2232

Synopsis

This course introduces theories in the area of communication systems. Topics covered include the basic elements of communications, signal analysis, amplitude modulation

Course Outcome

CO 1 Demonstration of various components of electronic communication system.

CO 2 Demonstrate the understanding of signal generation using available integrated circuits.

CO 3 Demonstrate the understanding of various type of modulation and demodulation process.

CO 4 Work in a team effectively as an individual and in a group

BTE3233
Communication System Design
Credit:3
Prerequisites: BTE2233

Synopsis

This course introduces theories in the area of communication systems. Topics covered include the basic elements of communications, signal analysis, type of oscillators, amplitude modulation and angle modulations, as well as single-sideband communication systems.

Course Outcome

CO 1 Interpret the basic concept and understanding in communication design system.
CO 2 Analyse and differentiate various type of modulation and demodulation techniques
CO 3 Measure the parameters for various types of modulation and demodulation
CO 4 Work in a team effectively as an individual and in a group

BTE3252
Microprocessor and Interfacing Laboratory
Credit:2
Prerequisites: None

Synopsis

This course in an introduction to microprocessors. Students are exposed to the internal architecture of the microprocessor, various instruction sets, and basic hardware design of microprocessor-based.

Course Outcome

CO 1 Explain the architecture of the microprocessor system and its interface [PO1 P2]
CO 2 Manipulates the M68000 instruction sets [PO3, P4, CTPS4]
CO 3 Develop a program in a microprocessor system by using an assembly language [PO3, P5, CTPS5]
CO 4 Design and build a simple hardware based on the M68000 processor [PO11, P7, CTPS 4]

BTE2413
Electrical Power System
Credit:3
Prerequisites: BTE3142 & BTE3143

Synopsis

This course introduces the fundamental of electrical power system which are the overview of power system, generation, transmission lines, distribution, representation of components, basic power system analysis.

Course Outcome

CO 1 Compute load factor and load demand [PO1, C4].
CO 2 Determine the cost of electricity using the basic concept of electricity tariff and energy efficiency [PO1, C4].
CO 3 Develop the component representation of any balanced three phase power system using per-unit system [PO2, C5].
CO 4 Measure and calculate the performances of power transmission lines [PO3, P4, CTPS3].
CO 5 Work in team effectively [PO8, A3, TS3, and LS2].

BTE3254
Microprocessor and Interfacing
Credit:4
Prerequisites: None

Synopsis

This course in an introduction to a microprocessor. Students are exposed to the internal architecture of the microprocessor, various instruction sets, and basic hardware design of microprocessor-based.

Course Outcome

CO 1	Illustrate the architecture of the microprocessor system and its interface [PO1 C3]
CO 2	Interpret the M68000 instruction sets [PO1 C8]
CO 3	Develop a program in a microprocessor system by using an assembly language [PO2 C5]
CO 4	Design and build a simple hardware based on the M68000 processor [PO11, P7, CTPS 4]

BTE3322
Control System Laboratory
Credit:2
Prerequisites: BTE2113 & BTE2233

Synopsis

This course introduces students to the control system technology, mathematical models of feedback systems. The students will be exposed to transient and steady-state analysis, root locus, frequency response and analysis design of compensator.

Course Outcome

CO 1	Explain fundamental concept of control systems. [PO3, P2]
CO 2	Display mathematical model and transfer function of physical systems. [PO2, P5]
CO 3	Measure control system performance in terms of transient and steady-state of a linear time invariant systems. [PO3, P5]
CO 4	Alter a compensator to meet specifications in frequency domain. [PO4, P6]
CO 5	Utilize Computer aided tools for control system analysis and design. [PO10, A4, LL3]

BTE3323
Control System
Credit:3
Prerequisites: BTE2113 & BTE2233

Synopsis

This course introduces students to the control system technology, mathematical models of feedback systems. The students will be exposed to transient and steady-state analysis, root locus, frequency response and analysis design of compensator.

Course Outcome

CO 1	Acquire fundamental concept of control systems.
CO 2	Derive and manipulate mathematical model and transfer function of physical systems.
CO 3	Analyze control system performance in terms of transient and steady-state of a linear time invariant systems.
CO 4	Design a compensator to meet specifications in frequency domain.
CO 5	Utilize Computer aided tools for control system analysis and design.

BTE3813
Engineering Technology Senior Design I
Credit:3
Prerequisites: None

Synopsis

This course is designed to expose the students to a senior design project. They have to apply all the knowledge that they have learned in the programme to complete the senior design project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the senior

design project I, the students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, expected result, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

Course Outcome

CO 1 Propose background study, problem statement, objective and scopes of the research
CO 2 Practice positive attitude in research activities
CO 3 Present the research proposal and cited latest publications on the subject

BTM3514
Computer Integrated Manufacturing
Credit:4
Prerequisites: None

Synopsis

Three basic themes will be stressed throughout the course. First, developing manufacturing strategy involves considering factors beyond the traditional boundaries of the manufacturing function. Such factors include the overall competitive position of the firm, the nature of market demand, competitor's actions, government regulations, and so on. Second, there is a strong linkage between a firm's competitive strategy and its manufacturing strategy. If this linkage is maintained, operations can become a formidable competitive weapon. If this linkage is neglected, even the best-designed strategies can fail. Finally, the course will consider manufacturing strategy issues in an integrative manner by developing the interrelationship between operations, finance, accounting, and marketing.

Course Outcome

CO 1 List components of a computerized integrated manufacturing environment.
CO 2 Explain various automation techniques currently used in industry.
CO 3 Develop a systematic plan for manufacturing strategy implementation
CO 4 Develop a systematic plan for manufacturing strategy implementation required for a selected product.
CO 5 Model enterprise manufacturing and automation strategies that respond to national and global manufacturing demands.

BTE4743
Power Electronics
Credit:3
Prerequisites: BTE2112 & BTE2413

Synopsis

The primary objective of the course is to give students a foundation of knowledge, understanding, analysis and design of power electronics circuits for conversion and control of electrical energy. The course presents concepts, fundamentals analysis tools, practical consideration for design, and a range of power electronics applications. Practical experiments in the laboratory will also be conducted. Students will be exposed to the power converters, PWM switching techniques, DC and induction motor drives.

Course Outcome

CO 1 Investigate switching characteristics of basic solid state power devices, operating principles, advantages and disadvantages of basic power electronic technologies
CO 2 Analyse characteristics parameters and evaluate the operation of power electronic converter topologies
CO 3 Construct power electronic converters to meet functional objectives
CO 4 Construct electrical drives using electronic converter

BTE4826
Engineering Technology Senior Design Project II
Credit:6
Prerequisites: BTE3813

Synopsis

This subject is the continuation of the subject Engineering Technology Senior Design Project I. In this course, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of the semester, the students are required to produce a design project report and present it to faculty's evaluation panel.

Course Outcome

CO 1 Analyze data, discuss and conclude the findings
CO 2 Manage the research work
CO 3 Practice positive attitude in research activities
CO 4 Present the research report and cited latest publications on the subject

BTE4912
Industrial Training
Credit:12
Prerequisites: All Subject

Synopsis

In Industrial Training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

Course Outcome

CO 1 Show and classify in-depth the industrial structure and organization and to understand roles of typical personnel in that particular industry.[PO2,C3]
CO 2 Manipulate the knowledge learned in the university and to practice them in problem solving direct or indirect application to any design, planning, production or management .[PO3,P5,CTPS3]
CO 3 Practice the professionalism and work etiquette that comply to good and responsible engineer.[PO6,A5,EM2]
CO 4 Demonstrate management/leadership skills to lead or manage effectively in a industry environment. [PO8,A3,TS3]
CO 5 Demonstrate the knowledge and ability to search and retrieve information and materials related to the industrial needs. [PO10,A3,LL2]
CO 6 Arrange and display data and relevant information with a systematic approach.[PO6,A4,EM3]
CO 7 Explain and organize the industrial training experience through written communication.[PO7,P5,CS4]

ELECTIVE COURSES

BTE4713
Programmable Logic Controller
Credit:3
Prerequisites: BTE3223 & BTE3222

Synopsis

Basic concepts and skills needed to install, program, and apply programmable electronic controllers in industry. Discrete and analog input/output (I/O) devices and ladder logic will be studied, including basic and intermediate PLC functions. Experiments in operation, programming, and industrial applications with emphasis on discrete I/Os

Course Outcome

CO 1	Analyze the functions of hardware component of programmable logic controllers and PLC programming
Co 2	Design proficiency in ladder logic by applying programming skills to implement industrial applications
CO 3	Varies a program to operate the manufacturing application
CO 4	Display problems in industrial applications requiring PLCs by troubleshooting hardware and software

BTE4723
Advanced Electronics Circuits
Credit:3
Prerequisites: BTE2112 & BTE2113

Synopsis

Digital to Analog and Analog to Digital Converter Circuits, Class C Amplifier circuit, MOSFET Amplifiers and Switching Circuits, MOSFET DIGITAL SWITCHING circuits, Thyristors circuits and APPLICATIONS, Special-Purpose Op-Amp Circuits, Oscillators circuits, IC Voltage Regulators circuits, and Electronics sensing circuits

Course Outcome

CO 1	Solve advanced electronics circuit problems
CO 2	Design the advanced electronics circuits
CO 3	Build practically advanced electronic circuits
CO 4	Examine the operation of advanced electronic circuit using software tools (EWB)

BTE4733
Sensor Technology
Credit:3
Prerequisites: BTU1113

Synopsis

This module will introduce students to the structural and functional principles of sensors used for various physical and derived quantities and how to use them to measure these quantities.

Course Outcome

CO 1	Analyze the principles and operation of how different sensors work
CO 2	Evaluate different type of sensors and modalities are appropriate for different applications
CO 3	Conduct various measurements using different types of sensors
CO 4	Choose potential sensor for environment detection and monitor

BACHELOR OF ELETRONICS ENGINEERING TECHNOLOGY (COMPUTER SYSTEM) WITH HONOURS

CORE FACULTY

BTU1112
Physics Laboratory
Credit: 2
Prerequisites: None

Synopsis

This laboratory introduces the students with the application of physics concept in engineering devices such as Free Fall, Bernoulli's Law, Hydrostatic Pressure And Electric Field. The concepts of physics introduced related in mechanics or dynamics motion and basic concepts of electrical area. The students will learn how to run the experiment with referring the basic concepts of physics during the lab hours.

Course Outcome

CO 1	Understanding the basic concepts, theories and principles of physics in engineering application
CO 2	Demonstrating skills in logical thinking in handling equipment.
CO 3	Applying basic physics concepts to problem solving
CO 4	Applying physics knowledge to personal decisions involving physical problems

BTU1113
Physics
Credit: 3
Prerequisites: None

Synopsis

This course introduces a fundamental of physics. It covers unit and measurements, kinematics, forces and Newton's law of motion, statics equilibrium, work, energy and power, fluid mechanics, electric and magnetism

Course Outcome

CO 1	Understand the basic concepts, theories and principles of physics in engineering application
CO 2	Solve physics problems such as in kinematics, forces and static equilibrium
CO 3	Discuss physics quantity such as work, energy and power in a team
CO 4	Applying basic laws to solve fluid, electrical and magnetism problems

BTU1212
Chemistry Laboratory
Credit: 2
Prerequisites: None

Synopsis

In chemistry laboratory the students are responsible to conduct the basic physical, organic chemistry and analytical instrument experiments such as solubility &miscibility (1), chemical equilibrium (2), buffer and pH changes (3), calorimetry (4), gravimetric (5), Limiting reactant (6), Reaction rate (7), Extraction with solvent (8),UV-VIS spectrometer (9), and Melting Point (10). At the end of experiments, the students should be able to inculcate the critical thinking and able to work in safe working condition.

Course Outcome

CO1	Apply physical, organic & analytical chemistry theory in laboratory
CO2	Apply the basic science and analytical chemistry knowledge in operation of analytical chemistry equipment.
CO3	Able to demonstrate and operate each analytical equipment base on the theories applied in analytical chemistry
CO4	Able to indicate any minor/major malfunction of equipment, incorrect step/ result & troubleshoot it

BTU1213
Chemistry
Credit: 2
Prerequisit: None

Synopsis

Development of the fundamental principles and concepts of chemistry by lecture-demonstration, as well as the development of an appreciation of the nature of chemistry as a science. An historical development of the most important concepts and ideas. Methods and limitations of chemistry, its evolution and discussions of the problems currently being solved and created.

Course Outcome

CO1 Apply the basic knowledge about physical, inorganic and analytical chemistry.
CO2 Relate chemical concept and principles while presenting a broad range of topic in a clear and concise manner.
CO3 Develop problem solving and critical thinking skills on general chemistry.

BUM1113
Technical Mathematics
Credit:3
Prerequisites: None

Synopsis

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Students are exposed to complex number, functions and graphs, trigonometric functions, analytic geometry, polar coordinates, 3 dimensional spaces and vector. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

CO 1 Apply appropriate mathematics concepts to solve various technological problems.
CO 2 Use appropriate software and tool to solve the graphical and computational problems in mathematics
CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.
CO 4 Relate and applied the concepts and methods studied into other courses.

BUM1223
Calculus
Credit:3
Prerequisites: None

Synopsis

This course discusses Differentiation and applications, techniques of integration and applications, numerical integration and Taylor polynomial, Taylor Series & Maclaurin Series.

Course Outcome

CO 1 Understand the fundamental concepts of the calculus and connect them with the real world problem.
CO 2 Solve any related problem involving differentiation and integration.
CO 3 Apply the concepts and methods studied into other related courses.
CO 4 Communicate effectively in written and oral form through group discussion.
CO 5 Attain computational facility in differential and integral calculus.

BUM2113
Applied Mathematics
Credit:3
Prerequisites: None

Synopsis

This course introduces and discusses Partial Derivatives, Double Integrals, First Order Differential equations and Second Order differential equations.

Course Outcome

CO 1	Analyze and apply the knowledge of Multiple Integrations to solve various science and engineering problems.
CO 2	Analyze and solve various differential equation problems by using the basic principles and methodologies of First Order differential equations and Second Order differential.
CO 3	Apply the concepts and methods studied into other related courses.
CO 4	Communicate effectively in written and oral form through group discussion.

CORE PROGRAM

BTE2122
Electrical Fundamentals and Circuit Analysis I Laboratory
Credit: 2
Prerequisites: None

Synopsis

This course introduces the basic concepts and engineering methods of DC circuit analysis. It is also introduce the concept of AC circuits. The contents include Ohm's Law, Kirchhoff's Law, series and parallel circuits, Mesh and Nodal analysis, superposition theorem, Thevenin and Norton equivalent of a complex circuit, Measure capacitance, measure capacitor charge and discharge times, RL, RC circuits, phase difference, measure power in a single phase circuit and responses of basic First Order circuits.

Course Outcome

CO 1	Build various electrical circuits and properly use lab equipment to measure, analyse and troubleshoot the circuits. [PO1]
CO 2	Solve the DC circuit problems using nodal analysis and mesh analysis, Thevenin and Norton equivalent and evaluate the most efficient methods among them. Also introduce the concept of AC [PO2, PO5]
CO 3	Write lab reports in proper format to report work clearly and concisely.
CO 4	Demonstrate the role of individual in team to achieve task completion.

BTE2123
Electrical Fundamentals and Circuit Analysis I
Credit: 3
Prerequisites: None

Synopsis

This course introduces the engineering methods of DC circuit analysis. The contents include Mesh and Nodal analysis, Source Transformation, and 4 main network Theorems: Superposition, Thevenin, Norton and Maximum Power Transfer theorems. It also includes the basic of DC transients in capacitors and inductors. Introduction to AC fundamentals and impedance concept of RLC circuits are also covered.

Course Outcome

CO 1	Analyse DC circuit problems using various methods of DC Analysis and Network Theorems
CO 2	Describe the effects of DC transients on capacitors and inductors, and to relate them with electromagnetism concept
CO 3	Examine the AC (current and voltage) characteristics, and the concept of impedance in R,L,C circuits
CO 4	Describe the real industrial practice.

BTE2132
Electrical Fundamentals & Circuit Analysis II Laboratory
Credit:2
Prerequisites: BTE2123

Synopsis

This course provides the basic concepts and engineering methods of AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, Filters, Bridges and Balanced 3-phase circuits are also covered.

Course Outcome

CO 1 Apply and validate circuit analysis theorems in ac circuits. [PO1, P2]
CO 2 Identify simple first-order filters and determines the resonant frequency and bandwidth for series/ parallel resonant circuits. [PO4, P3]
CO 3 Identify the functions and applications of transformers and introduce the Non-sinusoidal Waveforms and the 3 phase concept. [PO2, P4]

BTE2133
Electrical Fundamentals & Circuit Analysis II Credit:3
Prerequisites: BTE2123

Synopsis

This course provides the basic concepts and engineering methods of AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, Filters, Bridges and Balanced 3-phase circuits are also covered.

Course Outcome

CO 1 Determine impedance, voltage, current and other basic values for ac circuits.
CO 2 Apply circuit analysis theorems in ac circuits.
CO 3 Identify simple first-order filters and determines the resonant frequency and bandwidth for series/ parallel resonant circuits.
CO4 Identify the functions and applications of transformers and introduce the Non-sinusoidal Waveforms and the 3 phase concept.

BTE2313
Computer Programming
Credit: 3
Prerequisites: None

Synopsis

Fundamental principles and concepts of C++ programming, with definitions of data, expressions, control-flow constructions, functions, input and output and preprocessing. Basic problem solving and programming techniques, structured programming ideas, fundamental algorithms and data structures (array).

Course Outcome

CO 1 Construct computer programs using C++ language
CO 2 Develop appropriate programming techniques and program control structures
CO 3 Display the ability to use IDE (Integrated Design Environment) for C++
CO4 Propose an algorithm for a specific problem by implementing appropriate programming techniques.

BTM1314
Computer-Aided Design
Credit:4
Prerequisites: None

Synopsis

This subject is designed to introduce to the students the principle of computer-aided

design. Topics includes Drafting Overview, Drawing Set-up , Basic CAD ,Commands Geometric Construction , Orthographic Projection , Basic Drawing ,Tools, Pictorial Drawings, Sectional Views, Advance CAD Commands, Modifying CAD,Drawings, Dimensioning, Tolerances, Working Drawings, Threads and Fasteners

Course Outcome

CO 1 Analyze problem in technical drawing and understand drawing
CO 2 Use basic geometric construction techniques to create objects in CAD

CO 3 Project a 3 dimensional object in 2 dimensional space with the proper utilization of views in CAD
CO 4 Read & create dimensioned drawings using conventional techniques in CAD.
CO 5 Identify and understand the components of working drawings & the standards that apply.

BTE2212
Electronics I Laboratory
Credit:2
Prerequisites: BTE2133

Synopsis

Diode characteristics, Half wave and full wave rectifiers, Zener characteristics, Zener Voltage regulators, BJT characteristics, CE amplifier, MOSFET characteristics, CS amplifier.

Course Outcome

CO 1 Measure electronics devices characteristics.
CO 2 Construct electric circuits and measure electronics parameters.
CO 3 Build and simulate the operation of electric circuit.

BTE2213
Electronics I
Credit:3
Prerequisites: BTE2133

Synopsis

The P-N Junction Diode, Diode Applications, Bipolar Junction Transistors (BJT), DC Biasing of the BJT Amplifier, Transistor Modelling, Cascade Amplifier, Small-Signal BJT Amplifier, Metal-Oxide-Semiconductor FET (MOSFET), MOSFET Amplifier, Frequency Response of BJT and FET Amplifiers.

Course Outcome

CO 1 Explain the electronics devices (Transistors, Op-Amp) theories.
CO 2 Analyze the electronics circuits.
CO 3 Design the electronics circuits.

BTE3222
Digital Logic Design Laboratory
Credit:2
Prerequisites: None

Synopsis

Laboratory experiments on digital circuits design and verification, using various digital circuit components. Combinational design techniques as well as sequential design techniques are presented with the use of Karnaugh mapping, state transition diagrams and tables.

Course Outcome

CO 1 To demonstrate the applications of digital logic simplification techniques
CO 2 Apply basic gates, flip flops and digital circuit
CO 3 Construct and analyse logic system, counter, decoder, memory devices and multiplexer.
CO 4 Demonstrate the report writing skills in technical field
CO 5 Work in a team and communicate effectively

BTE3222
Digital Logic Design
Credit:3
Prerequisites: None

Synopsis

This course introduces students to the fundamentals of digital electronics. The student is first taught about the number system and logic gates before introducing them to digital IC technology. Then they are exposed to both combinational logic network and combinational logic. In concurrence with this, the fundamental of sequential logic, flip-flop, counter and shift register will be taught. Finally, the memory devices are introduced.

Course Outcome

CO 1	Apply various techniques for digital logic simplification and use various basic digital circuits like flip flops, counter and shift register
CO 2	Analyse logic system, counter, decoder, memory devices and multiplexer
CO 3	Build a digital logic circuit for small project and demonstrate the report writing skills in technical field
CO 4	Work in a team and communicate effectively

BTE3242
Electronics II Laboratory
Credit:2
Prerequisites:BTE2213

Synopsis

Frequency response, multi stage Amplifiers, Differential Amplifier characteristics with differential and common inputs, Current source design, Ideal and Non Ideal OPAMP characteristics, Inverting Amplifier and Non-inverting Amplifier, Operational Amplifier Circuits (Comparator, Summation, Subtractor, Integrator, Differentiator, Active Low-Pass Filter, Active High-Pass Filter, Active Band-pass Filter, Active Band-Stop Filter.

Course Outcome

CO 1	Measure electronics devices characteristics.
CO 2	Construct electric circuits and measure electronics parameters
CO 3	Build and simulate the operation of electric circuit.

BTE3243
Electronics II
Credit:3
Prerequisites:BTE2213

Synopsis

Class A Power Amplifiers, Class B and AB Power Amplifiers, Differential Amplifier characteristics with differential and common inputs, Current source design, Ideal and Non Ideal OPAMP characteristics, Inverting Amplifier and Non-inverting Amplifier, Feedback in the Non-inverting and Inverting Amplifiers, Input and output impedance in the Non-inverting and Inverting amplifier, The Gain-Bandwidth Product, Operational Amplifier Circuits Analysis (Comparator, Summation, Subtractor, Scaling, Integrator, Differentiator, Active Low-Pass Filter, Active High-Pass Filter, Active Band-pass Filter, Active Band-Stop Filter, Digital-to-Analog Converter (DAC) and Analog-to-Digital Converter (ADC).

Course Outcome

CO 1	Explain the electronics devices (Transistors, Op-Amp) theories.
CO 2	Analyze the electronics circuits.
CO 3	Design the electronics circuits.

BTS4253
Computer Vision System
Credit:3

Prerequisites: None

Synopsis

This course introduces students to the principles of Computer Vision which includes image formation and low level image processing, theory and techniques for extracting features from images, measuring shape and location, and recognizing and classifying objects. Students will be exposed to design project using image processing software.

Course Outcome

CO 1 Explain the concept of computer vision and their applications.
CO 2 Select and evaluate appropriate technique of image processing to solve engineering application.
CO 3 Design and develop a vision system application using image processing software.
CO 4 Manipulate ideas on how the computer vision system works through group presentation.
CO 5 Work effectively in a team to achieve common goal.

BTE3232
Communication System Design Laboratory
Credit:2
Prerequisites: BTE2213

Synopsis

This course introduces theories in the area of communication systems. Topics covered include the basic elements of communications, signal analysis, amplitude modulation

Course Outcome

CO 1 Demonstration of various components of electronic communication system.
CO 2 Demonstrate the understanding of signal generation using available integrated circuits.
CO 3 Demonstrate the understanding of various type of modulation and demodulation process.
CO 4 Work in a team effectively as an individual and in a group.

BTE3233
Communication System Design
Credit:3
Prerequisites: BTE2213

Synopsis

This course introduces theories in the area of communication systems. Topics covered include the basic elements of communications, signal analysis, type of oscillators, amplitude modulation and angle modulations, as well as single-sideband communication systems.

Course Outcome

CO 1 Interpret the basic concept and understanding in communication design system.
CO 2 Analyse and differentiate various type of modulation and demodulation techniques
CO 3 Measure the parameters for various types of modulation and demodulation
CO 4 Work in a team effectively as an individual and in a group

BTE3252
Microprocessor and Interfacing Laboratory
Credit:2
Prerequisites: BTE3223

Synopsis

This course in an introduction to microprocessors. Students are exposed to the internal architecture of the microprocessor, various instruction sets, and basic hardware design of microprocessor-based.

Course Outcome

CO 1	Explain the architecture of the microprocessor system and its interface [PO1 P2]
CO 2	Manipulates the M68000 instruction sets [PO3, P4, CTPS4]
CO 3	Develop a program in a microprocessor system by using an assembly language [PO3, P5, CTPS5]
CO 4	Design and build a simple hardware based on the M68000 processor [PO11, P7, CTPS 4]

BTE3253
Microprocessor and Interfacing
Credit:3
Prerequisites: BTE3223

Synopsis

This course in an introduction to a microprocessor/microcontroller. Students are exposed to the internal architecture of the microprocessor/microcontroller, various instruction sets, program developing for applications in embedded systems using C language and basic hardware design of embedded systems basic hardware design of microprocessor-based.

Course Outcome

CO 1	Illustrate the architecture of the microprocessor/microcontroller system and develop programs for applications in embedded system using assembly language.
CO 2	Develop programs for applications in embedded systems using “c” language.
CO 3	Build a project using microcontroller & demonstrate the report writing skills in technical field.
CO 4	Demonstrate the role of individual in team to achieve task completion.

BTS3112
Numerical & Control Systems Laboratory
Credit:2
Prerequisites: None

Synopsis

This course introduces numerical and control systems. Topics include Principle of CNC part programming, tooling and work-holding devices, machine tool position and motion control systems, automatic tool changers and machining centres, kinematics and mechanics of milling operations, part programming using CAD/CAM systems.

Course Outcome

CO 1	Write fundamental manual G-code programs, for various machining applications, including spindle speeds, and feed rates.
CO 2	Program absolute and incremental tool positions for machining canned cycle operations, linear and circular interpolation, looping and subroutine.
CO 3	Use a PC to prepare, edit and print a machine readable part program and use a CNC machine to verify and machine a basic part.
CO 4	Use 2D CAM software to create job operation files, 2D shape profiles, generate machine code, verify tool path using computer simulation, and machine basic parts on a CNC machine using computer generated code.
CO 5	Demonstrate the report writing skills in technical field and work in a team and communicate effectively.

BTE3113
Numerical & Control Systems
Credit:3
Prerequisites: None

Synopsis

This course introduces numerical control systems. Topics includes Principle of CNC part programming, tooling and work-holding devices, machine tool position and motion control systems, automatic tool changers and machining centres, kinematics and mechanics of milling operations, part programming using CAD/CAM systems.

Course Outcome

CO 1 Write fundamental manual G-code programs, for various machining applications, including spindle speeds, and feed rates.
CO 2 Program absolute and incremental tool positions for machining canned cycle operations, linear and circular interpolation, looping and subroutine.
CO 3 Use a PC to prepare, edit and print a machine readable part program and use a CNC machine to verify and machine a basic part.
CO 4 Use 2D CAM software to create job operation files, 2D shape profiles, generate machine code, verify tool path using computer simulation, and machine basic parts on a CNC machine using computer generated code.

BTS3122
Computer Architecture Laboratory
Credit:2
Prerequisites: None

Synopsis

This course introduces the concepts Computer arithmetic and ALU design, Data path and control, Using Hardware Description Language to design and simulate the CPU, Pipelining, Memory hierarchy, caches and virtual memory, Interfacing CPU and peripherals, buses, Multiprocessors, networks of multiprocessors, parallel programming and Performance issues.

Course Outcome

CO 1 Design and emulate a single cycle or pipelined CPU by given specifications using Hardware Description Language (HDL).

CO 2 Develop projects on computer architecture elements.
CO 3 Write reports and make presentations of computer architecture projects.

BTS3123
Computer Architecture
Credit:3
Prerequisites: None

Synopsis

This course introduces the architecture of the computer by studying its various levels: physical level, operating-system level, conventional machine level and higher level. Students are supposed to understand computer arithmetic and ALE design, data path and control, using Hardware Description Language to design and simulate the CPU, pipelining, memory hierarchy, caches and virtual memory, Interfacing CPU and peripherals, buses, multiprocessors, network of multiprocessors, parallel programming and computer networking is provided.

Course Outcome

CO 1 Understand the fundamentals of different instruction set architecture and their relationship to the CPU.

CO 2 Understand the principles and the implementation of computer arithmetic.

CO 3 Understand the operation of modem CPUs including pipelining, memory systems and buses.
CO 4 Understand the principles of operation of multiprocessor systems and parallel programming.

BTS3132
Signal & Networks Laboratory
Credit:2
Prerequisites: None

Synopsis

This course introduces the students to signals transformation machines and its application to electrical circuits. This includes applying Fourier Series, Fourier Transforms and Laplace Transform. The concept of frequency response is introduced in filter analysis and design with additional two port network techniques.

Course Outcome

CO 1 Distinguish the different type of signals and its operations.
CO 2 Apply Fourier and Laplace techniques in solving electronics problems.
CO 3 Analyze and differentiate several types of passive filters.
CO 4 Evaluate various signals and systems using engineering software.
CO 5 Conduct independent readings and research in designing Graphical User Interface (GUI) for any transformation technique.

BTS3133
Signals & Networks
Credit:3
Prerequisites: None

Synopsis

This course introduces the students to various signals transformation techniques and its application to electrical circuits. This includes Fourier Series, Fourier Transforms and Laplace Transform. The concept of frequency response is introduced in filter analysis and design with additional two port network techniques.

Course Outcome

CO 1 Distinguish the different type of signals and its operations.
CO 2 Apply Fourier and Laplace techniques in solving electronics problems.
CO 3 Analyze and differentiate several types of passive filters.

BTS3142
Microcontrollers & Embedded Systems Laboratory
Credit:2
Prerequisites: BTE3253

Synopsis

This course introduces the application of embedded systems. This includes exposure to the internal architecture of the Microcontrollers using Motorola M68HC11, various instruction sets and basic hardware design of Microcontrollers-based. They will learn how to program the Microcontroller using assembly and C language.

Course Outcome

CO 1 Illustrate the architecture of the microcontroller.
CO 2 Interpret the M68HC11 instruction sets.
CO 3 Develop a firmware using assembly language
CO 4 Design a basic hardware based on 68HC11 microcontroller.
CO 5 Work in a team and communicate effectively.

BTS3143
Microcontrollers & Embedded Systems
Credit:3
Prerequisites: BTE3253

Synopsis

This course is an introduction to Microcontrollers. Students are exposed to

the internal architecture of the Microcontrollers, various instruction sets and basic hardware design of Microcontrollers-based. They will learn how to program the Microcontroller using assembly and C language.

Course Outcome

CO 1 Explain the principles, operation and function of microcontroller system.
CO 2 Create applications program for specific task.
CO 3 Develop & test programming for high level language.
CO 4 Construct interface electronics circuit to control the external devices.

BTS3152
PLC Basics and Applications Laboratory
Credit:2
Prerequisites: BTE3223

Synopsis

This course introduces on how to design the PLC Programming to control simple manufacturing applications. Students are also exposed to the analog input and output of the PLC card.

Course Outcome

CO 1 Explain and construct the mathematical calculation which is involve addition, subtraction, multiplication and division by using Ladder Programming.
CO 2 Demonstrate and discuss the function of discrete and analog card.
CO 3 Illustrate input and output component and principles used of simple manufacturing applications.
CO 4 Develop a program to operate the manufacturing applications.
CO 5 Practices right attitude and safety procedures.

BTS3153
PLC Basics and Applications
Credit:3
Prerequisites: BTE3223

Synopsis

This course introduces the fundamental of Programmable Logic Controller (PLC) including input and output component, memory address, wiring diagram, troubleshooting and design of ladder diagram. The student will learn on how to design the PLC literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, expected result, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

Course Outcome

CO 1 Propose background study, problem statement, objective and scopes of the research
CO 2 Practice positive attitude in research activities
CO 3 Present the research proposal and cited latest publications on the subject

BTS4164
Robotics
Credit:4
Prerequisites: None

Synopsis

This course introduces an understanding of the principles of operation of automated equipment with particular reference to the industrial robot. This course covers classification and various types of robots and its application, robot kinematics, differential kinematics, robot dynamics, robot path planning and robot sensing.

Course Outcome

CO 1 Understand robotics and sensing system, its basic components and applications.

CO 2 Design workcell based on industrial problem.
CO 3 Analyze robot kinematics and dynamic.
CO 4 Function effectively as an individual and in a group to complete given task.
CO 5 Apply techniques and skills of robot manipulation through laboratory work.

BTS3813
Engineering Technology Senior Design Project I
Credit:3
Prerequisites: None

Synopsis

This subject is the continuation of the subject Engineering Technology Senior Design Project I. In this course, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of the semester, the students are required to produce a design project report and present it to faculty's evaluation panel.

Course Outcome

CO 1 Propose background study, problem statement, objective and scope of the research.
CO 2 Practice positive attitude in research activities.
CO3 Present the research proposal and cited latest publications on the subject.

BTS4826
Engineering Technology Senior Design Project II
Credit:6
Prerequisites: BTS3813

Synopsis

This subject is the continuation of the subject Engineering Technology Senior Design Project I. In this course, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of the semester, the students are required to produce a design project report and present it to faculty's evaluation panel.

Course Outcome

CO 1 Analyze data, discuss and conclude the findings
CO 2 Manage the research work
CO 3 Practice positive attitude in research activities
CO 4 Present the research report and cited latest publications on the subject

BTS4919
Industrial Training
Credit:9
Prerequisites: All Subject

Synopsis

In Industrial Training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

Course Outcome

CO 1 Show and classify in-depth the industrial structure and organization and to understand roles of typical personnel in that particular industry
CO 2 Manipulate the knowledge learned in the university and to practice them in problem solving direct or indirect application to any design, planning, production or management
CO 3 Practice the professionalism and work etiquette that comply to good and responsible engineer.
CO 4 Demonstrate management/leadership skills

to lead or manage effectively in a industry environment.

CO 5 Demonstrate the knowledge and ability to search and retrieve information and materials related to the industrial needs.

BTS4913
Industrial Training Report
Credit: 3
Prerequisites: None

Synopsis

In Industrial Training, the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

Course Outcome

CO 1 Arrange and display data and relevant information with a systematic approach

CO 2 Explain and organize the industrial training experience through written communication

ELECTIVE COURSES

BTS4713
Advanced Microprocessor
Credit:3
Prerequisites: BTE3253

Synopsis

This course introduces software details of the 68000, exception processing, hardware details of the 68000, memory system design, I/O system design, building a working 68000 system and introduction to the advanced 680X0 series microprocessors.

Course Outcome

CO 1 Analyze the principles of the 68000 including the details of software and hardware

CO 2 Analyze the principles of the advanced 680X0 series microprosessors

CO 3 Design working 68000 and 680X0 system that include memory and I/O systems design

BTS4723 Software Engineering
Credit:3
Prerequisites: None

Synopsis

This course introduces the essential knowledge of software engineering dealing with the theories, methods and tools for professional software development. This course covers the definition, implementation, assessment, measurement, management, change and improvement of the software engineering process.

Course Outcome

CO 1 Understanding the process of professional software development in software engineering

CO 2 Analyze the theories and different methods and tools for professional software development

CO 3 Develop the professional software development using different methods and tool.

BTS4733
Internet Programming
Credit:3
Prerequisites: None

Synopsis

This course introduces the fundamentals of internet and world wide web including the concept of HTML, XHTML and CSS. The course also covers the creation of Internet

based applications using the Java Scripts programming language and provides an in-depth knowledge for the creation of dynamic web application with enhanced features by introducing various programming techniques XML and RSS using Java Scripts.

Course Outcome

CO 1	Analyze the principles of internet and world wide web
CO 2	Construct internet based applications using Java Scripts programming language.
CO 3	Design web applications with enhanced features using various programming technique

COURSE SYNOPSIS

BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY (POWER & MACHINE) WITH HONOURS

CORE FACULTY

BTU1112
Physics Laboratory
Credit: 2
Prerequisites: None

Synopsis

This laboratory introduces the students with the application of physics concept in engineering devices such as Free Fall, Bernoulli's Law, Hydrostatic Pressure And Electric Field. The concepts of physics introduced related in mechanics or dynamics motion and basic concepts of electrical area. The students will learn how to run the experiment with referring the basic concepts of physics during the lab hours.

Course Outcome

CO 1	Understanding the basic concepts, theories and principles of physics in engineering application
CO 2	Demonstrating skills in logical thinking in handling equipment.
CO 3	Applying basic physics concepts to problem solving
CO 4	Applying physics knowledge to personal decisions involving physical problems

BTU1113
Physics
Credit: 3
Prerequisites: None

Synopsis

This course introduces a fundamental of physics. It covers unit and measurements, kinematics, forces and Newton's law of motion, statics equilibrium, work, energy and power, fluid mechanics, electric and magnetism

Course Outcome

CO 1	Understand the basic concepts, theories and principles of physics in engineering application
CO 2	Solve physics problems such as in kinematics, forces and static equilibrium
CO 3	Discuss physics quantity such as work, energy and power in a team
CO 4	Applying basic laws to solve fluid, electrical and magnetism problems

BTU1212
Chemistry Laboratory
Credit: 2
Prerequisites: None

Synopsis

In chemistry laboratory the students are responsible to conduct the basic physical, organic chemistry and analytical instrument experiments such as solubility &miscibility (1), chemical equilibrium (2), buffer and pH changes (3), calorimetry (4), gravimetric (5), Limiting reactant (6), Reaction rate (7), Extraction with solvent (8),UV-VIS spectrometer (9), and Melting Point (10). At the end of experiments, the students should be able to inculcate the critical thinking and able to work in safe working condition.

Course Outcome

CO1	Apply physical, organic & analytical chemistry theory in laboratory
CO2	Apply the basic science and analytical chemistry knowledge in operation of analytical chemistry equipment.
CO3	Able to demonstrate and operate each analytical equipment base on the theories applied in analytical chemistry
CO4	Able to indicate any minor/major malfunction of equipment, incorrect step/ result & troubleshoot it

BTU1213
Chemistry
Credit: 2
Prerequisit: None

Synopsis

Development of the fundamental principles and concepts of chemistry by lecture-demonstration, as well as the development of an appreciation of the nature of chemistry as a science. An historical development of the most important concepts and ideas. Methods and limitations of chemistry, its evolution and discussions of the problems currently being solved and created.

Course Outcome

CO1 Apply the basic knowledge about physical, inorganic and analytical chemistry.
CO2 Relate chemical concept and principles while presenting a broad range of topic in a clear and concise manner.
CO3 Develop problem solving and critical thinking skills on general chemistry.

BUM1113
Technical Mathematics
Credit:3
Prerequisites: None

Synopsis

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Student are exposed to complex number, functions and graphs, trigonometric functions, analytic geometry, polar coordinates, 3 dimensional spaces and vector. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

CO 1 Apply appropriate mathematics concepts to solve various technological problems.
CO 2 Use appropriate software and tool to solve the graphical and computational problems in mathematics
CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.
CO 4 Relate and applied the concepts and methods studied into other courses.

BUM1223
Calculus
Credit:3
Prerequisites: None

Synopsis

This course discusses Differentiation and applications, techniques of integration and applications, numerical integration and Taylor polynomial, Taylor Series & Maclaurin Series.

Course Outcome

CO 1 Understand the fundamental concepts of the calculus and connect them with the real world problem.
CO 2 Solve any related problem involving differentiation and integration.
CO 3 Apply the concepts and methods studied into other related courses.
CO 4 Communicate effectively in written and oral form through group discussion.
CO 5 Attain computational facility in differential and integral calculus.

BUM2113
Applied Mathematics
Credit:3
Prerequisites: None

Synopsis

This course introduces and discusses Partial Derivatives, Double Integrals, First

Order Differential equations and Second Order differential equations.

Course Outcome

CO 1 Analyze and apply the knowledge of Multiple Integrations to solve various science and engineering problems.
CO 2 Analyze and solve various differential equation problems by using the basic principles and methodologies of First Order differential equations and Second Order differential.
CO 3 Apply the concepts and methods studied into other related courses.
CO 4 Communicate effectively in written and oral form through group discussion.

BTU2413
Applied Statistics
Credit:3
Prerequisites:None

Synopsis

Students are exposed to statistics including statistical problem-solving methodology and descriptive statistic, probability distributions commonly used in practice, sampling distribution and confidence interval, hypothesis testing, analysis of variance (ANOVA), goodness of fit test and contingency tables and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome
CO 1 Analyze data using statistical theory and methodology, and recommend a conclusion or suggestion based on the analyzed data.
CO 2 Perform statistical data analysis by using appropriate software tools.
CO 3 Apply statistical concepts and methods learned to solve any related problems in various scientific diciplines.
CO 4 Relate and apply the techniques and methods studied into other courses

BTE2313
Computer Programming
Credit: 3
Prerequisites: None

Synopsis

Fundamental principles and concepts of C++ programming, with definitions of data, expressions, control-flow constructions, functions, input and output and preprocessing. Basic problem solving and programming techniques, structured programming ideas, fundamental algorithms and data structures (array).

Course Outcome

CO 1 Construct computer programs using C++ language
CO 2 Develop appropriate programming techniques and program control structures
CO 3 Display the ability to use IDE (Integrated Design Environment) for C++
CO4 Propose an algorithm for a specific problem by implementing appropriate programming techniques.

CORE PROGRAM

BTE2122
Electrical Fundamentals and Circuit Analysis I Laboratory
Credit:2
Prerequisites: None

Synopsis

parallel circuits, Mesh and Nodal analysis, superposition theorem, Thevenin and Norton equivalent of a complex circuit, Measure capacitance, measure capacitor charge and discharge times, RL, RC circuits, phase difference, measure power

in a single phase circuit and responses of basic First Order circuits.

Course Outcome

CO 1 Build various electrical circuits and properly use lab equipment to measure, analyse and troubleshoot the circuits. [PO1]
CO 2 Solve the DC circuit problems using nodal analysis and mesh analysis, Thevenin and Norton equivalent and evaluate the most efficient methods among them. Also introduce the concept of AC [PO2, PO5]
CO 3 Write lab reports in proper format to report work clearly and concisely.
CO 4 Demonstrate the role of individual in team to achieve task completion.

BTE2123
Electrical Fundamentals and Circuit Analysis I
Credit:3
Prerequisites: None

Synopsis

This course introduces the engineering methods of DC circuit analysis. The contents include Mesh and Nodal analysis, Source Transformation, and 4 main network Theorems: Superposition, Thevenin, Norton and Maximum Power Transfer theorems. It also includes the basic of DC transients in capacitors and inductors. Introduction to AC fundamentals and impedance concept of RLC circuits are also covered.

Course Outcome

CO 1 Analyse DC circuit problems using various methods of DC Analysis and Network Theorems
CO 2 Describe the effects of DC transients on capacitors and inductors, and to relate them with electromagnetism concept
CO 3 Examine the AC (current and voltage) characteristics, and the concept of impedance in R,L,C circuits
CO 4 Describe the real industrial practice.

BTE2222
Electrical Fundamentals and Circuit Analysis II Laboratory
Credit:2
Prerequisites: BTE2122

Synopsis

This course provides the basic concepts and engineering methods of AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, Filters, Bridges and Balanced 3-phase circuits are also covered.

Course Outcome

CO 1 Apply and validate circuit analysis theorems in ac circuits. [PO1, P2]
CO 2 Identify simple first-order filters and determines the resonant frequency and bandwidth for series/ parallel resonant circuits. [PO4, P3]
CO 3 Identify the functions and applications of transformers and introduce the Non-sinusoidal Waveforms and the 3 phase concept. [PO2, P4]

BTE2233
Electrical Fundamentals and Circuit Analysis II
Credit:3
Prerequisites: BTE2223

Synopsis

This course introduces the engineering methods of DC circuit analysis. The contents include Mesh and Nodal analysis, Source Transformation, and 4 main

network Theorems: Superposition, Thevenin, Norton and Maximum Power Transfer theorems. It also includes the basic of DC transients in capacitors and inductors. Introduction to AC fundamentals and impedance concept of RLC circuits are also covered.

Course Outcome

CO 1 Analyse DC circuit problems using various methods of DC Analysis and Network Theorems
CO 2 Describe the effects of DC transients on capacitors and inductors, and to relate them with electromagnetism concept
CO 3 Examine the AC (current and voltage) characteristics, and the concept of impedance in R,L,C circuits
CO 4 Describe the real industrial practice.

BTE2232
Circuit Analysis II Laboratory
Credit:2
Prerequisites: BTE2222

Synopsis

This course provides the basic concepts and engineering methods of AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, Filters, Bridges and Balanced 3-phase circuits are also covered.

Course Outcome

CO 1 Apply and validate circuit analysis theorems in ac circuits. [PO1, P2]
CO 2 Identify simple first-order filters and determines the resonant frequency and bandwidth for series/ parallel resonant circuits. [PO4, P3]
CO 3 Identify the functions and applications of transformers and introduce the Non-sinusoidal Waveforms and the 3 phase concept. [PO2, P4]

BTE2233
Electrical Fundamentals and Circuit Analysis II
Credit:3
Prerequisites: BTE2223

Synopsis

This course provides the basic concepts and engineering methods of AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, Filters, Bridges and Balanced 3-phase circuits are also covered.

Course Outcome

CO 1 Determine impedance, voltage, current and other basic values for ac circuits.
CO 2 Apply circuit analysis theorems in ac circuits.
CO 3 Identify simple first-order filters and determines the resonant frequency and bandwidth for series/ parallel resonant circuits.
CO4 Identify the functions and applications of transformers and introduce the Non-sinusoidal Waveforms and the 3 phase concept.

BTM1314
Computer-Aided Design
Credit:4
Prerequisites: None

Synopsis

This subject is designed to introduce to the students the principle of computer-aided design. Topics includes Drafting Overview, Drawing Set-up , Basic CAD ,Commands Geometric Construction , Orthographic Projection , Basic Drawing ,Tools, Pictorial Drawings, Sectional Views, Advance CAD

Commands, Modifying CAD,Drawings, Dimensioning, Tolerances, Working Drawings, Threads and Fasteners

Course Outcome

CO 1 Analyze problem in technical drawing and understand drawing

CO 2 Use basic geometric construction techniques to create objects in CAD

CO 3 Project a 3 dimensional object in 2 dimensional space with the proper utilization of views in CAD

CO 4 Read & create dimensioned drawings using conventional techniques in CAD.

CO 5 Identify and understand the components of working drawings & the standards that apply.

BTM2014
Manufacturing Computer Application
Credit:4
Prerequisites: BUM1113

Synopsis

Overview of computer hardware, software, and processing concepts related to the control of manufacturing tasks. Emphasis on use of integrated software packages in the solution of a variety of manufacturing problems. Laboratory assignments in automation control, real time data sampling, and creation of user interfaces.

Course Outcome

CO 1 Apply software development for technology problem solving.

CO 2 Perform adaptive programming skills for more diverse application environment.

BTE3142
Electrical Machines and Transformers Laboratory
Credit:2
Prerequisites: None

Synopsis

This course introduces the fundamental concepts and principles of transformer and various types of electrical machines. It is intended for students to understand fundamental aspects of rotating electrical machines. The first part of the course is a quick review of some electromagnetism fundamental while the following will deal with the transformers and different types of electrical machines.

Course Outcome

CO 1 Describes the basic principles of selected electrical machines.

CO 2 Displays the transformer and machines equivalent circuits and the operating conditions for electrical machines under steady state conditions

CO 3 Construct driver circuit for DC and AC motor

CO 4 Justify the importance of electrical machines and impacts to the Load.

CO 5 Measure, Determine and interpret the parameters of transformer and torque-speed characteristics of rotating machines.

BTE3143
Electrical Machines and Transformers
Credit:3
Prerequisites: None

Synopsis

This course introduces the fundamental concepts and principles of transformer and various types of electrical machines. It is intended for students to understand fundamental aspects of rotating electrical machines. The first part of the course is a quick review of some electromagnetism fundamental while the following will deal with the transformers and different types of electrical machines.

Course Outcome

CO 1 Analyze the transformer and machines equivalent circuits and the operating conditions for electrical machines under steady state conditions.

CO 2 Construct driver circuit for DC and AC motor

CO 3 Justify the importance of electrical machines and impacts to the environment.

CO 4 Measure, Determine and interpret the parameters of transformer and torque-speed characteristics of rotating machines.

BTW3222
Electrical Installation Design Laboratory
Credit:2
Prerequisites: None

Synopsis

This course provides knowledge in electrical installation design especially for commercial buildings. It explores the basic estimation and design procedure based on various codes of practice and standards. Student will be introduced to design a few basic systems in electrical installation such as lighting, protection system, grounding and lightning protection. Students also involve in problem solving and troubleshooting technique when they study on system inspection and testing.

Course Outcome

CO 1 Describes the different types of electrical installation application available.

CO 2 Estimate electrical load for an installation and design single-line diagram for the installation

CO 3 Explain the protection system used in electrical installation

BTW3223
Electrical Installation Design
Credit:3
Prerequisites: None

Synopsis

This course provides knowledge in electrical installation design especially for commercial buildings. It explores the basic estimation and design procedure based on various codes of practice and standards. Student will be introduced to design a few basic systems in electrical installation such as lighting, protection system, grounding and lightning protection. Students also involve in problem solving and troubleshooting technique when they study on system inspection and testing.

Course Outcome

CO 1 Attribute the lighting layout and power layout using CADD software..

CO 2 Simulate fault and safety investigation through the use of simulators conditions

CO 3 Design and assemble the different types of professional industrial wiring of electrical installation

CO 4 Justify the importance of grounding system and lightning protection system.

CO 5 Measure and determine basic inspection and testing for building electrical

BTE3052
Microprocessor and Interfacing Laboratory
Credit:2
Prerequisites: BTE2313 & BTE3223

Synopsis

This course in an introduction to microprocessors. Students are exposed to the internal architecture of the microprocessor, various instruction sets, and basic hardware design of microprocessor-based.

Course Outcome

CO 1	Explain the architecture of the microprocessor system and its interface [PO1 P2]
CO 2	Manipulates the M68000 instruction sets [PO3, P4, CTPS4]
CO 3	Develop a program in a microprocessor system by using an assembly language [PO3, P5, CTPS5]
CO 4	Design and build a simple hardware based on the M68000 processor [PO11, P7, CTPS 4]

BTE3053
Microprocessor and Interfacing
Credit:3
Prerequisites: BTE2313 & BTE3223

Synopsis

This course in an introduction to a microprocessor/microcontroller. Students are exposed to the internal architecture of the microprocessor/microcontroller, various instruction sets, program developing for applications in embedded systems using C language and basic hardware design of embedded systems.basic hardware design of microprocessor-based.

Course Outcome

CO 1	Illustrate the architecture of the microprocessor/microcontroller system and develop programs for applications in embedded system using assembly language.
CO 2	Develop programs for applications in embedded systems using “c” language.
CO 3	Build a project using microcontroller & demonstrate the report writing skills in technical field.
CO 4	Demonstrate the role of individual in team to achieve task completion.

BTE3222
Digital Logic Design Laboratory
Credit:2
Prerequisites: None

Synopsis

Laboratory experiments on digital circuits design and verification, using various digital circuit components. Combinational design techniques as well as sequential design techniques are presented with the use of Karnaugh mapping, state transition diagrams and tables.

Course Outcome

CO 1	To demonstrate the applications of digital logic simplification techniques
CO 2	Apply basic gates, flip flops and digital circuit
CO 3	Construct and analyse logic system, counter, decoder, memory devices and multiplexer.
CO 4	Demonstrate the report writing skills in technical field
CO 5	Work in a team and communicate effectively

BTE3223
Digital Logic Design
Credit:3
Prerequisites: None

Synopsis

This course emphasizes on the fundamental of digital electronics. The student is first taught about the number system and logic gates before introducing them to digital IC technology. Then they are exposed to both combinational logic network and combinational logic. In concurrence with this, the fundamental of sequential logic, flip-flop, counter and shift register will be taught. Finally, the memory devices are introduced.

Course Outcome

CO 1	Apply various techniques for digital logic simplification

CO 2 Apply basic gates, flip flops and various basic digital circuit

CO 3 Analyse logic system, counter, decoder, memory devices and multiplexer

BTE2413
Electrical Power System
Credit:3
Prerequisites: None

Synopsis

This course introduces the fundamental of electrical power system which are the overview of power system, generation, transmission lines, distribution, representation of components, basic power system analysis.

Course Outcome

CO 1 Compute load factor and load demand [PO1, C4].
CO 2 Determine the cost of electricity using the basic concept of electricity tariff and energy efficiency [PO1, C4].
CO 3 Develop the component representation of any balanced three phase power system using per-unit system [PO2, C5].
CO 4 Measure and calculate the performances of power transmission lines [PO3, P4, CTPS3].
CO 5 Work in team effectively [PO8, A3, TS3, and LS2].

BTE3242
Control System Laboratory
Credit:2
Prerequisites: None

Synopsis

This course introduces students to the control system technology, mathematical models of feedback systems. The students will be exposed to transient and steady-state analysis, root locus, frequency response and analysis design of compensator.

Course Outcome

CO 1 Explain fundamental concept of control systems. [PO3, P2]
CO 2 Display mathematical model and transfer function of physical systems. [PO2, P5]
CO 3 Measure control system performance in terms of transient and steady-state of a linear time invariant systems. [PO3, P5]
CO 4 Alter a compensator to meet specifications in frequency domain. [PO4, P6]
CO 5 Utilize Computer aided tools for control system analysis and design. [PO10, A4, LL3]

BTE3243
Control System
Credit:3
Prerequisites: None

Synopsis

This course introduces students to the control system technology, mathematical models of feedback systems. The students will be exposed to transient and steady-state analysis, root locus, frequency response and analysis design of compensator.

Course Outcome

CO 1 Acquire fundamental concept of control systems.
CO 2 Derive and manipulate mathematical model and transfer function of physical systems.
CO 3 Analyze control system performance in terms of transient and steady-state of a linear time invariant systems.
CO 4 Design a compensator to meet specifications in frequency domain.

CO 5 Utilize Computer aided tools for control system analysis and design.

BTW3632
Maintenance Technology
Credit:2
Prerequisites: None

Synopsis

This course introduces students to the vast maintenance strategies and technologies in maintenance practices adoption. The course will cover the skills for implementing an effective maintenance program through workplace environment simulation such as effective work culture, costs appreciation, workplace safety and workplace productivity.

Course Outcome

CO 1 Classify the types of maintenance strategies and tools utilized in industry.
CO 2 Solve LCC and inventory cost based on various problems.
CO 3 Explain the important role of safety practices for the environment.
CO 4 Display maintenance performance using CMMS (Computerized Maintenance Management System) software.
CO 5 Demonstrate appropriate and effective action during plant shutdown.

BTW2242
Advance Electric Machine Laboratory
Credit:2
Prerequisites: None

Synopsis

This course is a continuation of BTE 3143 where it will focus more on understanding the principles and analysis of electromechanical systems It is intended for students to understand fundamental aspects of A.C electrical machines..

Course Outcome

CO 1 Displays the simple models of synchronous machine, p.u. system, windings
CO 2 Construct induction machines,
CO 3 Measure, Determine and interpret the parameters of permanent magnet AC machines.

BTW3212
Advance Electric Machine
Credit:3
Prerequisites: None

Synopsis

This course is a continuation of BTE 3143 where it will focus more on various types of A.C electrical machines. It is intended for students to understand fundamental aspects of A.C electrical machines. The course is dealing with transformers and different types of A.C electrical machines.

Course Outcome

CO 1 Attribute the basic principles of selected A.C electrical machines,
CO 2 Analyze the transformer and machines equivalent circuits and the operating conditions for A.C electrical machines,
CO 3 Construct driver circuit for AC motor.
CO 4 Justify the importance of A.C electrical machines and impacts to the industry.
CO 5 Measure, Determine and interpret the parameters of transformer and torque-speed characteristics of A.C Electrical machines.

BTW3313
Power System Protection and High Voltage
Credit:3
Prerequisites: None

Synopsis

Safety is highly important when dealing with electrical power. Understanding power system protection will be able to ensure safety is covered.

Course Outcome

CO 1	Describe the components of power system protection.,
CO 2	Recognize the various type of circuit breaker.
CO 3	Design the relay setting of IDMT and distance protection.
CO 4	Explain the concepts of high voltage engineering
CO 5	Work effectively in team.

BTW3113
Power System Analysis
Credit:3
Prerequisites: None

Synopsis

This course introduces students to the fundamental concepts of power system analysis which covered the power flow problem analysis, balanced and unbalanced fault analysis and stability evaluation. Students will be exposed to the problems commonly encountered in power system engineering practice, analysis and techniques applied to solve some practical problems in power systems..

Course Outcome

CO 1	Analyze the power flow equations for an n- bus power system,
CO 2	Analyze balance and unbalance fault analysis.
CO 3	Evaluate the performance of power system stability.
CO 4	Analyze model of power system network under steady state and faults conditions using power system software.
CO 5	Work in team effectively.

BTW3212
Power Electronic Drive Machine Laboratory
Credit:2
Prerequisites: None

Synopsis

The primary objective of the course is to give students a foundation of knowledge, understanding, analysis and design of power electronics circuits for conversion and control of electrical energy. The course presents concepts, fundamentals analysis tools, practical consideration for design, and a range of power electronics applications. Practical experiments in the laboratory will also be conducted. Students will be exposed to the power converter, PWM switching techniques, DC and induction motor drives.

Course Outcome

CO 1	Work with different types of power electronic converters,
CO 2	Measure and interpret the parameters of inverter circuits,
CO 3	Design and implement complete electric vehicle using electric drivers.

BTW3213
Power Electronic Drive Machine
Credit:3
Prerequisites: None

Synopsis

The primary objective of the course is to give students a foundation of knowledge, understanding, analysis and design of power electronics circuits for conversion and control of electrical energy. The course presents concepts, fundamentals analysis tools, practical consideration for design, and a range of power electronics applications. Practical experiments in the laboratory will also be conducted. Students will be exposed to the power converter, PWM switching techniques, DC and induction motor drives..

Course Outcome

CO 1	Investigate switching characteristics of basic solid state power devices, operating principles, advantages and disadvantages of basic power electronic converter topologies.
CO 2	Design power electronic converters using commercially available simulation tools.
CO 3	Construct power electronic converters to meet functional objectives environment.
CO 4	Work effectively in team.
CO 5	Construct electrical drives using electronic converter

BTE3813
Engineering Technology Senior Design I
Credit:3
Prerequisites: None

Synopsis

This course is designed to expose the students to a senior design project. They have to apply all the knowledge that they have learned in the programme to complete the senior design project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the senior design project I, the students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, expected result, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

Course Outcome

CO 1	Propose background study, problem statement, objective and scopes of the research
CO 2	Practice positive attitude in research activities
CO 3	Present the research proposal and cited latest publications on the subject

BTM3514
Computer Integrated Manufacturing
Credit:4
Prerequisites: None

Synopsis

Three basic themes will be stressed throughout the course. First, developing manufacturing strategy involves considering factors beyond the traditional boundaries of the manufacturing function. Such factors include the overall competitive position of the firm, the nature of market demand, competitor's actions, government regulations, and so on. Second, there is a strong linkage between a firm's competitive strategy and its manufacturing strategy. If this linkage is maintained, operations can become a formidable competitive weapon. If this linkage is neglected, even the best-designed strategies can fail. Finally, the course will consider manufacturing strategy issues in an integrative manner by developing the interrelationship between operations, finance, accounting, and marketing.

Course Outcome

CO 1	List components of a computerized integrated manufacturing environment.
CO 2	Explain various automation techniques currently used in industry.
CO 3	Develop a systematic plan for manufacturing strategy implementation
CO 4	Develop a systematic plan for manufacturing strategy implementation required for a selected product.
CO 5	Model enterprise manufacturing and automation strategies that respond to national and global manufacturing demands.

BTE4826
Engineering Technology Senior Design Project II
Credit:6
Prerequisites: BTE3813

Synopsis

This subject is the continuation of the subject Engineering Technology Senior Design Project I. In this course, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of the semester, the students are required to produce a design project report and present it to faculty's evaluation panel.

Course Outcome

CO 1 Analyze data, discuss and conclude the findings
CO 2 Manage the research work
CO 3 Practice positive attitude in research activities
CO 4 Present the research report and cited latest publications on the subject

BTU4912
Industrial Training
Credit:12
Prerequisites: All Subject

Synopsis

In Industrial Training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

Course Outcome

CO 1 Show and classify in-depth the industrial structure and organization and to understand roles of typical personnel in that particular industry.[PO2,C3]
CO 2 Manipulate the knowledge learned in the university and to practice them in problem solving direct or indirect application to any design, planning, production or management .[PO3,P5,CTPS3]
CO 3 Practice the professionalism and work etiquette that comply to good and responsible engineer.[PO6,A5,EM2]
CO 4 Demonstrate management/leadership skills to lead or manage effectively in a industry environment. [PO8,A3,TS3]
CO 5 Demonstrate the knowledge and ability to search and retrieve information and materials related to the industrial needs. [PO10,A3,LL2]
CO 6 Arrange and display data and relevant information with a systematic approach.[PO6,A4,EM3]
CO 7 Explain and organize the industrial training experience through written communication.[PO7,P5,CS4]

BTE4713
Programmable Logic Controller
Credit:3
Prerequisites:

Synopsis

Basic concepts and skills needed to install, program, and apply programmable electronic controllers in industry. Discrete and analog input/output (I/O) devices and ladder logic will be studied, including basic and intermediate PLC functions. Experiments in operation, programming, and industrial applications with emphasis on discrete I/Os

Course Outcome

CO 1 Analyze the functions of hardware component of programmable logic controllers and PLC programming
Co 2 Design proficiency in ladder logic by applying programming skills to implement industrial applications
CO 3 Varies a program to operate the

manufacturing application

CO 4 Display problems in industrial applications requiring PLCs by troubleshooting hardware and software

ELECTIVE COURSES

BTW47*3
Power System Operation & Control
Credit:3
Prerequisites:

Synopsis

Digital to Analog and Analog to Digital Converter Circuits, Class C Amplifier circuit, MOSFET Amplifiers and Switching Circuits, MOSFET DIGITAL SWITCHING circuits, Thyristors circuits and APPLICATIONS, Special-Purpose Op-Amp Circuits, Oscillators circuits, IC Voltage Regulators circuits, and Electronics sensing circuits

Course Outcome

CO 1 Solve advanced electronics circuit problems

CO 2 Design the advanced electronics circuits

CO 3 Build practically advanced electronic circuits

CO 4 Examine the operation of advanced electronic circuit using software tools (EWB)

BTW4723
Power Quality
Credit:3
Prerequisites:

Synopsis

This module will introduce students to the structural and functional principles of sensors used for various physical and derived quantities and how to use them to measure these quantities.

Course Outcome

CO 1 Analyze the principles and operation of how different sensors work

CO 2 Evaluate different type of sensors and modalities are appropriate for different applications

CO 3 Conduct various measurements using different types of sensors

BTW4733
Alternative Energy
Credit:3
Prerequisites:

Synopsis

This course introduces students to theories of alternative energies and energy usage in electric power system industry. It goes over energy conversion, usage and storage of renewable energy technologies (wind, solar, wave, fuel cell and biomass). This course focuses on technological development of photovoltaic (PV) systems. It also covers the basic of environmental effect of applying alternative energy technology specifically to global climate change and pollution

Course Outcome

CO 1 Describe the properties (source, pros, cons) of available alternative energy today

CO 2 Measure and calculate the best design properties of PV systems

CO 3 Analyze solar and wind resources and components of PV and wind turbine system

CO 4 Interpret the various design of renewable systems and generate useful data

CO 5 Explain the effects of alternative energy to the environment

DIPLOMA COURSE SYNOPSIS

DEE1124 Circuit Analysis I
Credit : 4
Pre-Requisite : None

Synopsis
This course introduces the basic concepts and engineering methods of DC circuit analysis. The contents include Ohm's Law, Kirchhoff's Law, series and parallel circuits, Mesh and Nodal analysis, Superposition, Source Transformation, Thevenin's and Norton's theorem, and responses of First Order circuits.

Course Outcomes

CO1 Attribute the basic concepts of electrical quantities by using basic circuit laws (Ohm's law and Kirchhoff's law) and simplification of resistive circuits.

CO2 Analyse DC circuit problems using circuit theorem, nodal analysis and mesh analysis.

CO3 Attribute the basic concepts of capacitance and inductance and analyse the characteristic of natural and step response in first order circuits.

CO4 Construct DC electric circuits to apply the concept of electrical quantities and verify circuit theorems.

CO5 Able to express ideas precisely, effectively and confidently, in written communication.

DEE1213 Computer Programming
Credit : 3
Pre-Requisite : None

Synopsis
This course presents the C programming language for electrical and electronic engineer. The contents emphasis not only on the theoretical knowledge of programming but also the practical implementation in real-life situation. Students will learn structured program development, input and output, selection statement, repetitive statement, function, array, pointer and file input and output.

Course Outcomes

CO1 Identify the basic principles and concept of computer programming to solve the basic problem with utilization the knowledge of mathematics & sciences.

CO2 Use and apply structure programming technique using high level programming language.

CO3 Proposed a solution using computer programming techniques for solving engineering problems.

CO4 Demonstrate a solution using computer programming tools for solving engineering problems.

CO5 Pursue knowledge beyond expectation.

DEE1224 Digital Electronics
Credit : 4
Pre-Requisite : None

Synopsis
This course emphasizes on the fundamental of digital electronics. The student is first taught about the number system and logic gates before introducing them to digital IC technology. Then they are exposed to both combinational logic network and combinational MSI logic. In concurrence with this, the fundamental of sequential logic, flip-flop, counter and shift register are taught. Finally, the memory devices are introduced.

Course Outcomes

CO1 Apply various techniques for digital logic fundamental and simplification.

CO2 Analyze combinational logic system for MSI design and sequential logic system using flip-flops in counter and shift register design.

CO3 Explain the architecture and operations of memory devices.

CO4 Construct logic circuit and counter.

CO5 Work in a team and communicate effectively.

DEE1233 Analog Electronics I
Credit : 3
Pre-Requisite : DEE1124

Synopsis
Nowadays, industrial demands especially in semiconductor devices are increasing rapidly. This requires a strong basic knowledge in semiconductors. In this course, an introduction of basic knowledge in analog electronics, that includes knowledge of semiconductors and modern electronics components such as diodes, rectifiers, capacitor as filters and also BJT are covered. Their basic applications and circuit troubleshooting technique are also discussed in this course to meet the industrial demands.

Course Outcomes

CO1 Describe the characteristic and operation of semiconductor diodes and BJT transistor properties in AC and DC condition.

CO2 Analyse the operating condition of various application of semiconductor diodes.

CO3 Analyse the operating condition of various BJT configuration in DC and AC condition.

CO4 Construct the semiconductor diode and BJT transistor circuit.

CO5 Work effectively as an individual and in a group.

DEE1941 Technical Drawing
Credit : 1
Pre-Requisite : None

Synopsis
This course covers theoretical knowledge and practical-based on doing technical drawing by using mainly AutoCAD software. The course is focusing on the fundamental level of AutoCAD from scratch until the plotting technique. The students will be guided and exposed to technical drawing knowledge as well as electrical, electronic, geometrical and isometric drawing.

Course Outcomes
CO1 Apply the principles of technical drawing with utilization of knowledge of drawing and modifying techniques in AUTOCAD.

CO2 Construct electrical engineering schematic drawing using AUTOCAD.

CO3 Sketch electronic circuit using AutoCAD software.

CO4 Follow basic commands in AutoCAD to draw technical drawing.

CO5 Practice usage of AutoCAD software in other engineering discipline.

DEE1971 Electrical Installation
Credit : 1
Pre-Requisite : None

Synopsis
This course introduces students to the single phase and three phase wiring and installation. The students will learn about supply system, rules and regulation, wiring system and electrical protection system. They are also will practice in applying trunking and conduits for electrical wiring as well as doing fitting and installation of electrical system devices. Then, they will conduct inspection and testing on their wiring and installation as safety conformation and fulfill the regulations.

Course Outcomes
CO1 Interpret rules and regulation for electrical wiring comprising of cable selection and load calculation.

CO2 Perform inspection and testing in electrical installation.

CO3 Construct electrical wiring using suitable wiring tools and accessories.

CO4 Apply ethical principles and commit to professional ethics.

DEE2124 Circuit Analysis II
Credit : 4
Pre-Requisite : DEE1124

Synopsis
This course provides the basic concepts and engineering methods of AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, second order circuit and Balanced 3-phase circuits are also covered.

Course Outcomes
CO1 Analyze AC circuit problems using nodal, mesh, Superposition, Source Transformation, Thevenin and Norton.

CO2 Perform AC steady-state power calculations, power triangle and power factor correction.

CO3 Analyze variation of RLC circuits.

CO4 Apply the theorems and concepts in order to analyse any given linear electric circuit.

CO5 Able to deliver oral presentation clearly and confidently according to the level of audience.

DEE2314 Instrumentation & Measurements
Credit : 4
Pre-Requisite : None

Synopsis
This course introduces students to the principles of instrumentation and measurements, determination of error that caused by the meters. The students will be exposed to the architecture and the operation of DC and AC meters, oscilloscope, signal generator, sensors and transducers, analysis of DC and AC meters and introduction to signal conditioning.

Course Outcomes

CO1 Explain the elements of Instrumentation & Measurement System.

CO2 Solve numerical problems for AC and DC meters.

CO3 Describe the operation of oscilloscope, sensors and transducers and their applications.

CO4 Demonstrate basic calibration techniques and signal conditioning.

CO5 Differentiate the functional role of individual towards task accomplishment.

DEE2612 Basic Maintenance Technology

Credit : 2

Pre-Requisite : None

Synopsis

This course aims to develop maintenance skills and knowledge in two distinct areas:

1. Exposes students to the required technical / engineering discipline knowledge and skills to diagnosis and correct faults across a wide range of equipment.
2. Provides knowledge of different strategic approaches to maintenance and the manufacturing environment and context they are best suited to.

Course Outcomes

CO1 Identify the difference between the key maintenance strategies and their affects upon manufacturing performance.

CO2 Suggest an appropriate mitigation or maintenance plan on a given situation.

CO3 Demonstrate the use of maintenance management software i.e. CMMS and subsequently analyze the data forthcoming from this application.

CO4 Explain the impact of good maintenance job execution negligence to the society.

DEE2931 Basic Programmable Logic Controller

Credit : 1

Pre-Requisite : None

Synopsis

This course covered the fundamental of Programmable Logic Controller (PLC) including input and output component, memory address, wiring diagram, troubleshooting and design of ladder diagram.

Course Outcomes

CO1 Explain the operation and types of PLC configuration and network systems.

CO2 Construct ladder diagram of a control operating system using PLC program.

CO3 Design and simulate a ladder diagram of a control operating system using PLC program.

DEE3143 Basic Electrical Machines & Power Systems

Credit : 3

Pre-Requisite : DEE1124

Synopsis

This course introduces the fundamental of electrical and power system which are the concepts and principles of transformer and various types of electrical machines. It is intended the students to understand fundamental aspects of rotating electrical machines. This course introduces an overview of power system, generation, transmission lines, distribution, representation of components, basic power system analysis.

Course Outcomes

CO1 Explain the constructions, equivalent circuits and principle operations of transformers and electrical machines.

CO2 Determine the roles of power system components, calculate load factor and demand based on the load profiles and explain the concept of electricity tariff and energy efficiency.

CO3 Analyse the power system component representations using per-unit system.

CO4 Analyse the performance of low voltage switch board for low voltage distribution system operation.

CO5 Understand the importance of power system to the sustainability development.

DEE3224 Microprocessor & Microcontroller Fundamentals

Credit : 4

Pre-Requisite : None

Synopsis

This course an introduction to a microprocessor and microcontroller. Students are exposed to the internal architecture of the microprocessor and microcontroller, various instruction sets, and basic hardware design of microprocessor-based.

Course Outcomes

CO1 Illustrate the architecture of the microprocessor and microcontroller system and its interface.

CO2 Interpret the assembly language instruction sets.

CO3 Develop a program in a microprocessor and microcontroller system by using an assembly language.

CO4 Design and build a simple hardware based on the microprocessor and microcontroller.

CO5 Work in a team and communicate effectively.

DEE3233 Analog Electronics II

Credit : 3

Pre-Requisite : DEE1233

Synopsis

This course introduces the fundamental of other semiconductor devices which are Field-Effect Transistors (FET) and Operational Amplifiers (Op-Amp). It also describes the FET operational characteristic during the DC and AC analysis. Towards the end of this course, students are exposed to the applications of Op-Amp devices. During the laboratory sessions, students are expected to demonstrate and troubleshoot basic FET and Op-Amp circuits.

Course Outcomes

CO1 Describe the characteristics of FETs and analyse their configurations in DC and AC conditions.

CO2 Identify and analyse the frequency response of FETs circuits.

CO3 Analyse various Op-Amps configurations.

CO4 Assemble and analyse FETs and Op-Amps configuration circuit.

CO5 Work effectively as individual, and as a member/leader in a team.

DEE3313 Principles of Control Systems

Credit : 3

Pre-Requisite : None

Synopsis

This course introduces students to the control system technology, mathematical models of feedback systems. The students will be exposed to transient and steady-state analysis, root locus, and frequency response analysis.

Course Outcomes

CO1 Explain basic components of control systems.

CO2 Solve mathematical models of simple electrical and mechanical System.

CO3 Illustrate block diagrams and signal flow graphs of system interconnection.

CO4 Carry out stability analysis of linear time invariant feedback system.

CO5 Work in a team effectively.

DEE3323 Industrial Automation

Credit : 3

Pre-Requisite : None

Synopsis

This course introduces students to gain a working knowledge of an industrial automation, including its purpose and structure from theory & practical viewpoint. Also introducing in this course are the common industrial control system, automation tools, industrial actuators & controller.

Course Outcomes

CO1 Explain the automated system, cell, control devices, various types of controller, sensors and robotic automation used in Industrial Automation and industrial safety.

CO2 Discuss various types of industrial sensors and actuators; and use applied modern tools for solving industrial automation.

CO3 Analyse the robotics systems and functions.

CO4 Work effectively in a team with consideration of industrial automation installation process and cost justification.

CO5 Able to report the assignment given with good organization and source searching.

DEE3413 Principles of Communication Systems

Credit : 3

Pre-Requisite : None

Synopsis

This course introduces the fundamentals of communication systems emphasizing theory, concepts and industrial applications. It discusses the analog and digital modulation techniques that are used nowadays. This includes the amplitude modulation (AM) and frequency modulation (FM). Digital modulation techniques such as pulse code

modulation, delta modulation and including shift keying are also discussed. Various sampling, quantization process and line coding are also introduced in this course. The system performance due to the presence of noise is also presented.

Course Outcomes

CO1 Describe the basic principle of communication system.

CO2 Demonstrate the analog and digital modulation techniques in communication system.

CO3 Apply the principle knowledge to practical applications in telecommunication.

CO4 Understand the application and its affect in environment of various communication systems.

DEE3931 Electro Pneumatics

Credit : 1

Pre-Requisite : None

Synopsis

This subject covers a general introduction to function and operation of pneumatic and electrical equipment used in electro pneumatics control including pneumatic supply, input elements, processing elements, control elements and working elements. The course deals with controlling of pneumatic actuators using electrical sensing and switching devices.

Course Outcomes

CO1 Interpret electro pneumatics components, symbols, circuit diagrams and motion diagrams.

CO2 Design pneumatic and electro pneumatic system for specific tasks to solve the given problem.

CO3 Construct and operate electro pneumatic circuits as per drawing.

CO4 Recognize the importance of the professional practice on the designed solution.

DEE3941 Microcontroller Applications

Credit : 1

Pre-Requisite : None

Synopsis

This course exposes students to the microcontroller in term of programming and hardware configurations. Beginning with understanding of microcontroller architecture, the programming software is applied to configure for several applications such as DI, DO, AI, ADC, and PWM. In addition, students are exposed to the integration between microcontroller and external devices.

Course Outcomes

CO1 Explain the principles, operation and function of microcontroller system.

CO2 Create applications program for specific task.

CO3 Construct interface electronics circuit to control the external devices.

CO4 Develop electronic circuit using microcontroller system.

DEE3713 Mini Project

Credit : 3

Pre-Requisite : None

Synopsis

This course aims to introduce students at entry level to problem solving and innovation in electrical engineering applications.

Course Outcomes

CO1 Identify and propose solution to engineering problem in electrical and electronics engineering project.

CO2 Relate the proposed project design to societal, health, safety, legal or cultural and their consequent responsibilities.

CO3 Demonstrate the impact of electrical and electronics engineering projects into sustainability development.

CO4 Apply the engineering code of ethics in electrical and electronics engineering projects.

CO5 Work in a team effectively as a leader or a team member.

DEE3812 Industrial Training

Credit : 12

Pre-Requisite : None

Synopsis

In industrial training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo an industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty

staff, and the representatives from employer organization.

Course Outcomes

CO1 Identify in-depth the industrial organization, structure, operation, production and utilize engineering knowledge to identify and analyse problem and then, provide the engineering solution.

CO2 Response and comply with the importance of society, environment and sustainability in engineering practices, decisions, and solutions.

CO3 Practice the professionalism and work etiquette that comply to be a good and responsible engineer.

CO4 Demonstrate communication and management/leadership skills to lead or manage effectively in an industrial environment.

CO5 Demonstrate the knowledge and ability to search and retrieve information and materials related to the industrial needs.

CO6 Demonstrate the knowledge and ability to conduct the given industrial activities and project.

FACULTY OF INDUSTRIAL MANAGEMENT

FACULTY OF INDUSTRIAL MANAGEMENT

INTRODUCTION

The Faculty of Industrial Management (FIM) is was established in July 2014 through a rebranding process of the Faculty of Technology which was established in 2011 and was formerly known as Faculty of Manufacturing Engineering and Technology Management. Over the years, FIM continues to grow and change but still keep its original goals in mind whilst developing ones to meet the challenges of the globalized environment.

The aim is to support local and global economic development through education, research, commercialization and consultation. The faculty educational objective is to produce highly competent executives, managers and engineering technologist that are equipped with the right competencies, knowledge and professional acumen strategically aligned and carefully positioned according to the current demand in industrial and commercial sectors.

Academic programmes of **Project Management (PM), Industrial Technology Management (ITM)** and **Business Engineering (BE)** which are offered at Faculty of Industrial Management are developed to enhance graduates' capabilities to secure jobs in government and private sector employment in their corresponding field of specialization.

All our academic programmes are accredited by Malaysian Qualifications Agency (MQA) and numerous universities locally and internationally for graduates opting to further their studies at higher degree level.

VISION

To nurture future innovative leaders through applying business and technological knowledge.

MISSION

To provide enriching teaching and learning experience through creative convergence of business and technology.

PROGRAMMES OFFERED

- Bachelor of Project Management with Hons.
- Bachelor of Industrial Technology Management with Hons.
- Bachelor of Business Engineering with Honours (Collaboration programme with HsRT, Germany)

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020

CAREER OPPORTUNITIES

Bachelor of Project Management with Honours

Graduates from Bachelor of Project Management with Honours have a broad career prospect within the private sectors, industries, local authorities, government agencies as well as other professional bodies. Some of the careers you can pursue with a Bachelor of Project Management degree include:

- Construction Project Executive
- Contract Executive
- Procurement Executive
- IT Executive
- Urban Planning Executive
- Risk and Financial Management Executive
- Facility Management Executive
- Product Development Executive
- Quality Management Executive

Bachelor of Industrial Technology Management with Honours

Career prospect for those who graduate from Bachelor of Industrial Technology Management with Honours is wide, covers in both manufacturing and services oriented company. Industrial operations are at the heart of most organizations. Opportunities are found in the areas of forecasting, inventory management, the design of production facilities, workforce scheduling, and the location and layout of distribution networks. Some of the careers you can pursue with a Bachelor of Industrial Technology Management degree include:

- Production Executive
- Quality Executive
- Production Planner
- Procurement Officer
- Logistic Executive
- Kaizen Officer
- Business Development Executive
- Industrial Engineer
- Manufacturing Superintendent
- Human Resource Executive
- Sales Executive
- Marketing Executive

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020

Bachelor of Business Engineering with Honours *(Collaboration programme with HsRT, Germany)*

Business Engineering graduates will be equipped with both business engineering knowledge and the skills required in innovating business practices. Some of the careers you can pursue with a Bachelor of Business Engineering with Honours degree include:

- Production Executives / Engineer
- Production Planner / Controller
- Process Engineering Engineer
- Industrial Engineer
- Logistics Executives
- Supply Chain Executives / Officer
- Procurement Officer
- Business Development Executives
- Quality Executives / Engineer
- Project Executives
- Other relevant employment areas

ADDRESS

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FACULTY OF INDUSTIAL MANAGEMENT
CURRICULUM STRUCTURE
BACHELOR OF PROJECT MANAGEMENT WITH HONS.

YEAR	FIRST	SECOND	THIRD	FOURTH
COURSES	BPC1113 Principles of Management	BPM2313 Project Financial Management	BPM3313 Project Control	BPC4114 Final Year Project 2
	BPC1143 Industrial Psychology	BPM2323 Project Estimating & Budgeting	BPC3123 Strategic Management	BPC4112 Industrial Training
	BPC1123 Principles of Economics	BPM2333 Planning & Scheduling	BPC3113 Research Methodology	BPE4613/BPE4713 Elective Course 4
	BPC1133 Principles of Marketing	BPM2343 Integrated Project Management 1	BPM3323 Project Risk Management	BPE4623/BPE4723 Elective Course 5
	BPM1313 Project Management	BPC2113 Quality Management	BPP3333 Stakeholder Management	BPE4633/BPE4733 Elective Course 6
	BPC1153 Business Information System	BPC2123 Organizational Behaviour	BPM3343 Project Portfolio Management	
	BUM1123 Mathematics for Management	BPM2353 Procurement Management	BPC3132 Final Year Project I	
		BPM2363 Integrated Project Management 2	BPE3613/BPE3713 Elective Course 1	
		BUM2433 Statistics for Management	BPE3623/BPE3723 Elective Course 2	
			BPE3633/BPE3733 Elective Course 3	
102	**21**	**27**	**29**	**25**
18	**University Courses :** Co-Curriculum I, Co-Curriculum II, Technopreneurship, Falsafah dan Isu Semasa, Penghayatan Etika & Peradaban, Foreign Languages Level 1, Foreign Languages Level 2, Fundamentals of English Language, English for Academic Communication, English for Professional Communication, English for Technical Communication, Soft Skills I, Soft Skills II			
120	**TOTAL CREDIT FOR GRADUATION**			

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020

COURSE STRUCTURE FOR BACHELOR OF PROJECT MANAGEMENT WITH HONS.

CORE FACULTY COURSES

BPC1113
Principles of Management
Credit: 3
Prerequisite: None

Synopsis

This course serves as an introduction to the discipline of management. It is designed to integrate the accepted theories in the area with real world applications to provide students with the basic knowledge and skills needed for managing others. This course begins with a discussion of the current issues in management and then proceeds to cover the traditional functions of management: planning, organizing, leading, and controlling. Contemporary issues and global challenges for future managers will also be discussed to equip students with current trends and best practices in managing a successful organization.

Course Outcomes

CO 1 Apply the Principles of Management in solving various issues and global challenges

CO 2 Identify good practices of management functions in managing event

CO 3 Compare various management styles of contemporary approaches in current setting

BPC1143
Industrial Psychology
Credit: 3
Prerequisite: None

Synopsis

This course provides an overview of different personnel, work environment and organizational issues to be investigated in industrial psychology. The major application of psychology at work place is covered. The management of human capital and their issues like selection, training, evaluation, relationship at work place and related aspects are focused.

Course Outcomes

CO 1 Analyze and understand theories of Industrial Psychology and management of human capital.

CO 2 Demonstrate the issues relating of work behaviour of employees and the human capital management.

CO 3 Describe human resource skills for effective industrial management.

BPC1123
Principles of Economics
Credit: 3
Prerequisite: None

Synopsis

This course is designed to introduce students to key concepts used in microeconomics and macroeconomics, and to facilitate a basic understanding of economic phenomena. The goals will help students to understand fundamental concepts and tools so that students can use them to analyse various economic issues. This course is primarily concerned with Malaysian economy and will help them understand how economy works.

Course Outcomes

CO 1 Explain the basic Macro & Micro economic concepts.

CO 2 Explain the usage of economics concepts for business phenomena.

CO 3 Demonstrate the usage of the economic models for business management decision making.

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BPC1133
Principles of Marketing
Credit: 3
Prerequisite: None

Synopsis

This course serves as an introduction to the discipline of management. It is designed to integrate the accepted theories in the area with real world applications to provide students with the basic knowledge and skills needed for managing others. This course is designed to provide students with an understanding of marketing mix components; explain the environmental factors which influence consumer and organizational decision-making processes; outline a marketing plan; and how marketing works in today's marketing environment.

Course Outcomes

CO 1 Explain the Principles of Marketing in solving various issues.

CO 2 Follow a comprehensive marketing plan to real or imaginary products.

CO 3 Propose persuasive marketing programs

BPC1153
Business Information System
Credit: 3
Prerequisite: None

Synopsis

This course aims to provide firm understanding on the significance and strategic role of information system to the organization particularly in supporting wide range of business functions across the corporate environment. The lecture shall covers theoretical part which cover the foundation of information systems, information technology infrastructure and contemporary issues on information security. Lab session aims to provide students with hands-on and practical experience on the usage of office automation systems, developing database as well as exploring selected approach in information system development.

Course Outcomes

CO 1 Explain the significance and roles of information systems in achieving organizational competitive advantage.

CO 2 Apply various strategies and approaches in information system development.

CO 3 Demonstrate the usage of office automation system in performing operational tasks and managing information resources within organization.

BUM1123
Mathematics for Management
Credit: 3
Prerequisite: None

Synopsis

This course introduces the use of mathematical technique in the field of business administration and management. The topics introduce the inequality, matrices, functions and the key business topics such as simple interest, compound interest, annuity, notes and bank discount, mathematics of buying, markup and markdown.

Course Outcomes

CO 1 Use the basic principle and methodologies of mathematics to solve the mathematical analysis problems.

CO 2 Use scientific calculator to solve the exponential and logarithmic functions.

CO 3 Apply the mathematical concepts and the usage of the mathematical technique in business administration and management.

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BPC2113
Quality Management
Credit: 3
Prerequisite: None

Synopsis

The course will provide students with a comprehensive understanding and focuses on quality management principles, performance management and quality improvement alongside relevant tools, techniques, models and frameworks. It is suitable for undergraduates who require to develop knowledge, understanding and business management skills in the fields of quality management and process improvement.

Course Outcomes

CO 1 Demonstrate a working knowledge of the principles and practice of quality management.

CO 2 Explain the quality tools and techniques for continuous quality improvement.

CO 3 Prepare a quality implementation plans for the strategic issues in quality management.

BPC2123
Organizational Behaviour
Credit: 3
Prerequisite: BPC1143 Industrial Psychology

Synopsis

This course provides an analysis of human behavior at work place. The behavior of individual, interpersonal, team and organizational levels. The development of interpersonal competencies to allow individuals to effectively work as managers or professionals in the rapidly changing, culturally diverse and technologically integrated global climate facing modern organizations. The topics like personality, attitude, perception, leadership are covered.

Course Outcomes

CO 1 Classify the theories of Organizational Behavior.

CO 2 Demonstrate the issues relating of human behavior at work place and related issues.

CO 3 Report human behavior skills for development of organization.

BUM2433
Statistics for Management
Credit: 3
Prerequisite: None

Synopsis

This course discusses on descriptive statistics; graphical summary; common probability distributions; statistical analysis for means; regression and correlation including simple and multiple linear regressions, and goodness of fit test and contingency tables. Statistical packages such as Microsoft Excel, SPSS, R Language, S Plus, EViews and Minitab shall be used in this course.

Course Outcomes

CO 1 Acquire fundamental principle of statistics.

CO 2 Perform statistical analysis by using appropriate statistical theory and methodology.

CO 3 Analyse real life data to solve related problems in various disciplines.

BPC3123
Research Methodology
Credit: 3
Prerequisite: None

Synopsis
This course is designed to introduce students to the research methods that can be applied when conducting research projects. The topics to be covered include Introduction to research, approaches to

research, problem statement, research objective, research question, literature reviews, theoretical framework and hypothesis development, research design, case study research, data collection method, measurement, sampling, data analysis, introduction to Excel/SPSS and writing the research proposal, poster and article.

Course Outcomes

CO 1 Differentiate between qualitative and quantitative research method.

CO 2 Construct research proposals by using appropriate research methods.

CO 3 Propose research methods for problem solving.

BPC3123
Strategic Management
Credit: 3
Prerequisite: None

Synopsis

This course exposes students on the aspects of strategic management in business environment. The covered areas for this course are: the nature of strategic management; external and internal assessment; strategic analysis and choice; strategy implementation; and strategic evaluation and control.

Course Outcomes

CO 1 Analyze the strategic management concepts and techniques.

CO 2 Demonstrate the strategic management concepts and techniques in business environment.

CO 3 Initiate strategy choice for implementation.

BPC3132
Final Year Project I
Credit: 2
Prerequisites: BPC3113 Research Methodology

Synopsis

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final Year Project 1 are: (i) problem background, (ii) problem statement, (iii) research objectives, (iv) research questions, (v) research framework, (vi) literature reviews, and (vii) research methods.

Course Outcomes

CO 1 Produce problem statement and research objective in the chosen industrial management field.

CO 2 Manipulate the reliable sources for exceptional, detail and accurate literature review.

CO 3 Construct noble research work by producing the feasible flow of methodology.

CO4 Build effective skills in report writing and oral presentation-through overall report contents and oral presentation session.

CO5 Demonstrate good attitude to fulfill research requirements.

BPC4114 (Semester 7/4)
Final Year Project 2
Credit: 4
Prerequisite: BPC3132 Final Year Project I

Synopsis

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final

Year Project II are: (i) development of research instruments for data collection, (ii) carrying out data collection, (iii) analyzing data collected, (iv) interpreting data, (v) writing reports.

Course Outcomes

CO 1 Produce validated research instrument.

CO 2 Organize the research findings based on theoretical knowledge.

CO 3 Construct the conclusion of the research and recommendation for improvement.

CO4 Build an effective skill in report writing and oral presentation through overall report contents and oral presentation session.

CO5 Demonstrate a good attitude to fulfill research requirements.

BPC4112
Industrial Training
Credit: 12
Prerequisites: All core faculty and core programme courses from Semester 1 to Semester 7

Synopsis

As part of the Faculty of Industrial Management with an integrated curriculum of the Bachelor of Project Management degree courses, all students are required to undergo industrial training for a minimum period of 24 weeks. Placement of students at various companies will be supervised and coordinated by the Industrial Training Committee set up by the Faculty. Students will be placed at various companies throughout Malaysia. The training at the various companies will expose the students to a real working environment including the companies' organization structures, business operations and technology management. The hands-on experience in the training will reinforce what has been taught at the University. The students are also required to prepare an industrial training report and do the final presentation describing the tasks they are assigned in their placement.

Course Outcomes

CO 1 Expose students to the "real" working environment and get acquainted with the organization structure, business operations and technology management.

CO 2 Build effective communication skills in written and oral presentation.

CO 3 Build hands-on experience in their related field so that students can relate to and reinforce what has been taught at the University.

CO 4 Integrate cooperation and collaboration between industry and the university in promoting a knowledgeable society.

CORE PROGRAMME

BPM1313
Project Management
Credit: 3
Prerequisite: None

Synopsis

This course provides foundation and knowledge of project management. Students will be exposed to various body of knowledge and institutions related to project management in particular to Project Management Institute (PMI). Throughout semester, students be give the well-round knowledge of theories, project management process and the skills required to manage a project effectively. Last but not least, students also will have opportunity to explore various methods and approaches of project management and project management software.

Course Outcomes

CO 1 Explain concept of project management process according

to selected body of knowledge and organizational influence towards project management success and project team's roles and organizational influence towards project management success.

CO 2 Identify best-fit project management software for the organization.

CO 3 Demonstrate understanding of project life-cycle management according to different industries.

BPM2313
Project Financial Management
Credit: 3
Prerequisite: None

Synopsis

With recent spate of companies experiencing financial difficulties, the issue of sound financial management is now more important than ever. The course is designed to provide a basic understanding of the fundamental concepts and principles that influence investment and financing decisions of the projects at the pre-feasibility stage. It examines relevant issues including financial strategy, debt and equity management, the key drivers of shareholders value, risk and return concept in investment and capital budgeting as vehicles to evaluate investment choice.

Course Outcomes

CO 1 Explain basic elements of financial management that consist of financing, operating and investing activities.

CO 2 Demonstrate basic financial calculation for further understanding about financial management analysis.

CO 3 Discuss the use of basic financial information in decision-making process.

BPM2323
Project Estimating & Budgeting
Credit: 3
Prerequisite: None

Synopsis

This course examines estimating practices and techniques in managing a project cost. The focus includes breaking project costs and quantities into labour, material, plant, direct and indirect cost components. The differences in quantity-related, time-related and fixed cost are explored. Students will learn how to develop a project cost estimate, project budget and project budget baseline. A number of approaches and techniques that can be applied in managing cost effectively will be introduced. The course will also look at more strategic estimating areas such as pricing preliminaries and determining margins for profit and overheads.

Course Outcomes

CO 1 Explain the fundamental aspects of project cost estimating and budgeting.

CO 2 Demonstrate the process of estimating in managing costs for a project.

CO 3 Explain appropriate technique and approach in preparing project cost estimate and budget.

BPM2333
Planning & Scheduling
Credit: 3
Prerequisite: None

Synopsis

This course aims to expose students with knowledge and practical experience in scheduling process during project planning. It focuses on approaches and strategies in developing viable schedules influencing project success. Selected project management tools or software are introduced during the lab sessions to grant students with necessary knowledge and

skills in dealing with stages of the project life cycle, to work within organizational and cost constraints, and to manage resources effectively.

Course Outcomes

CO 1 Identify the importance of planning and scheduling in ensuring project success.

CO 2 Display the use of various scheduling tools and techniques.

CO 3 Demonstrate appropriate techniques for resource estimation and allocation for project planning and scheduling.

BPM2343
Integrated Project Management 1
Credit: 3
Prerequisite: None

Synopsis

This course aims to incorporate and integrate courses taught throughout the year of studies. Students are put in groups to complete and solve project tasks. Tasks involved include planning and scheduling from the start until completion date of the project, estimating and budgeting the cost involved, as well as finding reliable sources to finance the project. Throughout the course, students are supervised by the lecturers to guide and ensure they can complete the project as good as possible and achieve the objectives of this course. At the end of the semester, they will be required to submit their recommendation and present their work to a panel of assessors.

Course Outcomes

CO 1 Develop planning and scheduling of a project.

CO 2 Apply the principles of estimating and budgeting in a practical scenario.

CO 3 Demonstrate knowledge and skills to operate as an individual in a team-based environment.

CO4 Perform project tasks in a professional manner.

BPM2353
Procurement Management
Credit: 3
Prerequisite: None

Synopsis

This course focuses on essential understanding and knowledge of principles, concepts and techniques for effective project procurement management. The course begins with introductory sections explaining various definitions of contracts and general principles of the contract law. Students will be exposed with various types of procurement systems and contracts. Then the Project Procurement Management Knowledge Area processes are presented: Plan Procurements, Conduct Procurements, Administer Procurements, and Close Procurements. The processes in Project Procurement Management are initiated early in the project with a procurement management plan and are ongoing throughout the life of the project. At the end of this course, students will be equipped with the skills and necessary knowledge in assessing conflicts and remedies for contract breach as well as contractual implications.

Course Outcomes

CO 1 Demonstrate the fundamental concepts of procurement and law of the contracts.

CO 2 Explain project procurement process in order to select the best procurement practice.

CO 3 Identify the various dispute resolution methods in projects.

BPM2363
Integrated Project Management 2
Credit: 3

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

Prerequisite: BPM2343 Integrated Project Management 1

Synopsis

This course aims to incorporate and integrate courses taught throughout the year of studies. Students are put in groups to complete and solve project tasks. Tasks involved include planning and scheduling from the start until completion date of the project, estimating and budgeting the cost involved, as well as finding reliable sources to finance the project. Throughout the course, students are supervised by the lecturers to guide and ensure they can complete the project as good as possible and achieve the objectives of this course. At the end of the semester, they will be required to submit their recommendation and present their work to a panel of assessors.

Course Outcomes

CO 1 Develop planning and scheduling of a project.

CO 2 Apply the principles of estimating and budgeting in a practical scenario.

CO 3 Demonstrate knowledge and skills to operate as an individual in a team-based environment.

CO4 Perform project tasks in a professional manner.

BPM3313
Project Control
Credit: 3
Prerequisite: None

Synopsis

The purpose of this course is to give an understanding of Project Control and to provide practical guidance to enable the students to perform Project Control in the real world. Project Control is an important component of Project Management, and the success of a project relies on the ability to control the project. Project Control focuses on project scope, schedule and budget, and how to determine when the project is off-course in these areas, and how to get back on track.

Course Outcomes

CO 1 Demonstrate the way project team members carry out the process of project control.

CO 2 Display the use of various control tools and techniques..

CO 3 Explain the close out process for projects.

BPM3323
Project Risk Management
Credit: 3
Prerequisite: None

Synopsis

This course develops student with necessary knowledge and skills in managing risks in becoming a good project manager. In this course, students will be exposed to risk management process used by an organization during the Project Life Cycle. Students will have a firm understanding on the input, output, as well as tools during risk identification, risk analysis, risk response planning and risk control according to PMBOK (5th Edition).

Course Outcomes

CO 1 Explain key project risks.

CO 2 Categorize the impacts of risk to a project in order to finalize the best mitigation strategies to be employed.

CO 3 Explain risk management process.

BPM3333
Stakeholder Management
Credit: 3
Prerequisite: None

Synopsis

This course provides a framework for understanding and managing stakeholders for achieving successful project outcome. The students will explore the importance of the relationships between project stakeholders as a key to project success. In additional, the course aims to provide knowledge on types of project stakeholders, effective communication techniques for managing expectations and support of stakeholders. At the end of the course, students will know how to craft appropriate communication and management strategies for developing and maintaining successful relationships with stakeholders.

Course Outcomes

CO 1 Explain the impact of stakeholders on projects success.

CO 2 Demonstrate appropriate communication skills at various levels involving stakeholders.

C0 3 Integrate stakeholder's actions to project activities which may affect progress of a project.

BPM3343
Project Portfolio Management
Credit: 3
Prerequisite: None

Synopsis

This course aims to provide a perspective in managing projects within organizations. Students will have the opportunity to obtain firm understanding on project portfolio management by improving resource utilization and planning, and making right decision at the right time. Establishing proper methods in evaluating, selecting and prioritizing organizational resources to the projects are discussed extensively. Appropriate tools and techniques shall be practiced in class to assist students in evaluating project that is aligned with corporate strategies and return on investment goals. At the end, students are able to develop necessary skills in monitoring resource utilization, cost and projects across the portfolio.

Course Outcomes

CO 1 Explain the importance of Project Portfolio Management in an organisation.

CO 2 Demonstrate the methods for project selection in an organisation.

CO 3 Analyze the issues and challenges associated with Project Portfolio Management implementation.

ELECTIVE COURSES

BPE3613
Construction Management (E)
Credit: 3
Prerequisite: None

Synopsis

This course is designed to introduce students with management-oriented practice for construction industry. It focuses on a broad range of inter-related disciplines including residential, commercial and civil construction. Topics include basic concepts of construction management, roles of professional in construction industry, construction labour management, project team coordination, site management, material management, and professional ethics in the construction industry. On top of that, students also will be exposed with various professional bodies in the construction industry.

Course Outcomes

CO 1 Apply knowledge and understanding of the general practice in construction management.

CO 2 Distinguish the project team according to their functions and apply the best management practice in construction site.

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CO 3 Identify good ethical practice in construction management.

BPE3623
Construction Technology (E)
Credit: 3
Prerequisite: None

Synopsis

This course focuses on the knowledge of construction technology. The course begins with the construction work organizations and site preparations works. Then, students will be exposed with the design aspects and construction methods for buildings. It includes selected topics on substructure and superstructure works, which give fundamental concepts of the structure of a building. The topics include the construction of frames, walls, floors and roofs. It also covers the construction of stairs, doors and windows including associated glass and glazing, water supply, drainage and external works associated to a building.

Course Outcomes

CO 1 Distinguish the components related to site organization and temporary works in construction of a building.

CO 2 Illustrate the design aspects and construction methods for buildings.

CO 3 Explain the methods of construction sequentially.

BPE3633
Construction Drawings & Measurement (E)
Credit: 3
Prerequisite: None

Synopsis

This course attempts at providing the students with knowledge of and understand the basic concepts of accepted drawing conventions and format together with how to interpret architectural and engineering drawings. Students are also taught on the fundamentals principles for the measurement work items specially focus on building works. It also includes the writing of specification for such items. The Standard Method of Measurement 2 (SMM2) will be used as guidance for the students in preparing the measurement of quantities and specification for billing.

Course Outcomes

CO 1 Explain the basic concept of different types of drawing for construction project.

CO 2 Prepare brief specification on the measured items effectively according to the drawings and SMM2.

CO 3 Measure the quantities for elements in building work using basic measurement technique according to SMM2.

BPE3713
Introduction to Software Engineering (E)
Credit: 3
Prerequisite: None

Synopsis

This course is an introduction to software engineering with an emphasis on the methods, techniques and technology to build and evolve software systems. The emphasis is on software engineering principles, which cover the main activities of building systems (requirements specifications, system architecture and design, system construction, and deployment and maintenance) and the elements that are integral to those activities (evolution, measurement and evaluation, teamwork, and management of project). In addition, this course will also cover the process engineering and project management.

Course Outcomes

CO 1 Distinguish the important terminology and activities involves related to foundation

concepts of software engineering and software development process.

CO 2 Apply appropriate methods for the design and implementation of software systems.

CO 3 Explain the use of modules and interfaces to enable separate development, and design patterns.

BPE3723
Introduction to Computer Network & Security (E)
Credit: 3
Prerequisite: None

Synopsis

This course introduces the overview of network management systems and the five areas of network management. Student will learn a practical means of designing or evaluating a network management system for a particular networking environment. This course also covers the principles of cyber security, as well as issues and approaches in securing systems and data from threats.

Course Outcomes

CO 1 Explain the areas, design and evaluation of a network management system for a particular networking environment.

CO 2 Display theory and principles of information security, types of attacks, cryptography, firewalls, wireless and intrusion detection system.

CO 3 Identify major security issues and trends in the study of cybercrime and computer related security.

BPE3733
System Analysis and Design (E)
Credit: 3
Prerequisite: None

Synopsis

This course explores the concepts and methods of information system analysis and design, with an emphasis on system analysis methods and tools. The course focuses on the issues and management technique involved in analysis, design and implementation of information system.

Course Outcomes

CO 1 Explain the fundamentals of Information Systems (IS) development life cycle and methodologies.

CO 2 Apply the appropriate analysis method and design tool in developing an Information System.

CO 3 Display how project management software packages can be used to assist in representing and managing information system projects.

BPE4613
Construction Economics (E)
Credit: 3
Prerequisite: None

Synopsis

This course enables students to explore the elements of economic theory and its application to the construction and petroleum industries. The topic of this course covers the introduction of micro and macroeconomics together with discussion on the nature of construction market including the concept, definition, profit and marginal analysis, demand and supply. Besides, the focus is on the broad understanding of the project development process and parties involved and consideration of risk and uncertainty in project development. It concludes with an overview of long-term operational costs and environmental impact through the concepts of life-cycle cost planning.

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Course Outcomes

CO 1 Prepare various preliminary estimating and cost analysis methods.

CO 2 Demonstrate the relationship of construction industry to the nation economy.

CO 3 Demonstrate project life-cycle cost studies for construction project management.

BPE4623
Industrial Safety and Health (E)
Credit: 3
Prerequisite: None

Synopsis

This course introduces the principles and concepts of health and safety in construction and petroleum industry. Students will be exposed to the history of health and safety development, the policy involved, procedure in promoting health and safety culture, hazard control and monitoring review and audit for safety. Discussions on main legal requirements for construction and petroleum industrial safety will also be discussed.

Course Outcomes

CO 1 Describe the importance of safety and health in construction and petroleum industry.

CO 2 Demonstrate appropriate actions to be taken in health and safety issues at workplace.

CO 3 Study the challenges in implementing health and safety culture in an organization.

BPE4633
Construction and Sustainable Development (E)
Credit: 3
Prerequisite: None
Synopsis

This course is designed to introduce the fundamental concepts of sustainability in construction and development; the environmental, economic and social components. Additionally, this course will develop basic knowledge about the environmental impacts of various phases of a construction project and the consequences of such impacts including the global warming and resource depletion issues. Topics include basic building designs and systems related to sustainability. Students learn about green design topics such as site plans, water and energy efficiency, material and resources usage, environmental quality and renewable energy source. As an outcome of the course, students are able to incorporate green technologies into building projects.

Course Outcomes

CO 1 Explain the concepts of sustainable construction.

CO 2 Identify the latest green design and technology for building construction and project management.

CO 3 Verify the role of project manager according to knowledge areas in sustainable construction.

BPE4713
Integrated Media Application for Business (E)
Credit: 3
Prerequisite: None

Synopsis

This course introduces the basic elements or typical components of multimedia including text, graphics, sound, video and animation for education and business. Basic design principles are combined with digital image file formats and compression. The students learn to identify the software in creating digital images and videos, and locating sources of royalty-free stock photography to enable them to create

multimedia presentations. At the end of the course, the students are able to handle a project using different multimedia sources incorporating digital images and demonstrate their ideas through a proposal in a professional manner.

Course Outcomes

CO 1 Identify the typical components of multimedia.

CO 2 Design multimedia presentations using text, graphics, sound, video and animation.

CO 3 Propose a project by applying different multimedia sources.

BPE4723
Business Analytics (E)
Credit: 3
Prerequisite: None
Synopsis

This course aims to explore business analytics techniques to formulate and solve business problems in supporting managerial decision making. It provides students with the skills required to meet the demands of industry using different tools and techniques of business analytics. The students are equipped with the knowledge and applied skills in data science, big data analytics and business intelligence.

Course Outcomes

CO 1 Demonstrate the basic knowledge and process of business analytics and its applicability in the context of a project life cycle.

CO 2 Display the skills to use different business analytics tools and techniques.

CO 3 Propose a business analytical report to solve practical problems identified in managing project.

BPE4733
E-Business Strategy and Practice (E)
Credit: 3
Prerequisite: None

Synopsis

This course provides students with the foundations and future development of business when venturing into the new digital economy which is E-Business. It offers complete overview of business models and e-business strategies. The course highlights theory as well as electronic markets practice in dealing with business and social networking between companies. This course examines myriad issues a business must address when venturing into e-business. The course structure is designed to enable students to transform basic companies into e-business enterprises and the digitalization of core company processes.

Course Outcomes

CO 1 Describe the concept of e-business.

CO 2 Point out the main components of E-business.

CO 3 Integrate business models into E-business with the usage of appropriate and relevant tools.

COURSE STRUCTURE FOR BACHELOR OF INDUSTRIAL TECHNOLOGY MANAGEMENT WITH HONS.

<u>CORE FACULTY</u>

BUM1123
Mathematics for Management
Credit: 3
Prerequisites: None

Synopsis

This course introduces the use of mathematical technique in the field of business administration and management. The topics introduce the inequality, matrices, functions and the key business

topics such as simple interest, compound interest, annuity, notes and bank discount, mathematics of buying, markup and markdown.

Course Outcomes

CO 1 Use the basic principle and methodologies of mathematics to solve the mathematical analysis problems.

CO 2 Use scientific calculator to solve the exponential and logarithmic functions.

CO 3 Apply the mathematical concepts and the usage of the mathematical technique in business administration and management.

BPC1113
Principles of Management
Credit: 3
Prerequisites: None

Synopsis

This course serves as an introduction to the discipline of management. It is designed to integrate the accepted theories in the area with real world applications to provide students with the basic knowledge and skills needed for managing others. This course begins with a discussion of the current issues in management and then proceeds to cover the traditional functions of management: planning, organizing, leading, and controlling. Contemporary issues and global challenges for future managers will also be discussed to equip students with current trends and best practices in managing a successful organization.

Course Outcomes

CO 1 Apply the Principles of Management in solving various issues and global challenges

CO 2 Identify good practices of management functions in managing event

CO 3 Compare various management styles of contemporary approaches in current setting

BPC1123
Principles of Economics
Credit: 3
Prerequisites: None

Synopsis

This course is designed to introduce students to key concepts used in microeconomics and macroeconomics, and to facilitate a basic understanding of economic phenomena. The goals will help students to understand fundamental concepts and tools so that students can use them to analyse various economic issues. This course is primarily concerned with Malaysian economy and will help them understand how economy works.

Course Outcomes

CO 1 Explain the basic Macro & Micro economic concepts.

CO 2 Explain the usage of economics concepts for business phenomena.

CO 3 Demonstrate the usage of the economic models for business management decision making.

BPC1143
Industrial Psychology
Credit: 3
Prerequisites: None

Synopsis

This course provides an overview of different personnel, work environment and organizational issues to be investigated in industrial psychology. The major application of psychology at work place is covered. The management of human capital and their issues like selection, training, evaluation, relationship at work place and related aspects are focused.

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

Course Outcomes

CO 1 Analyze and understand theories of Industrial Psychology and management of human capital.

CO 2 Demonstrate the issues relating of work behavior of employees and the human capital management.

CO 3 Describe human resource skills for effective industrial management.

BPC1153
Business Information System
Credit: 3
Prerequisites: None

Synopsis

This course aims to provide firm understanding on the significance and strategic role of information system to the organization particulalrly in supporting wide range of business functions across the corporate environment. The lecture shall covers theoritical part which cover the foundation of information systems, information technology infrastructure and contemporary issues on information security. Lab session aims to provide students with hands-on and practical experience on the usage of office automation systems, developing database as well as exploring selected approach in information system development.

Course Outcomes

CO 1 Explain significance and roles of information systems in achieving organizational competitive advantage.

CO 2 Apply various strategies and approaches in information system development.

CO 3 Demonstrate the usage of office automation system in performing operational tasks and managing information resources within organization.

BPC1133
Principles of Marketing
Credit: 3
Prerequisites:None

Synopsis

This course serves as an introduction to the discipline of management. It is designed to integrate the accepted theories in the area with real world applications to provide students with the basic knowledge and skills needed for managing others. This course is designed to provide students with an understanding of marketing mix components; explain the environmental factors which influence consumer and organizational decision-making processes; outline a marketing plan; and how marketing works in today's marketing environment.

Course Outcomes

CO 1 Explain the Principles of Marketing in solving various issues.

CO 2 Follow a comprehensive marketing plan to real or imaginary products.

CO 3 Propose persuasive marketing programs

BUM2433
Statistics for Management
Credit: 3
Prerequisites: None

Synopsis

This course discusses on descriptive statistics; graphical summary; common probability distributions; statistical analysis for means; regression and correlation including simple and multiple linear regressions, and goodness of fit test and contingency tables. Statistical packages such as Microsoft Excel, SPSS, R

Language, S Plus, EViews and Minitab shall be used in this course.

Course Outcomes

CO 1 Acquire fundamental principle of statistics.

CO 2 Perform statistical analysis by using appropriate statistical theory and methodology.

CO 3 Analyse real life data to solve related problems in various disciplines.

BPC2113
Quality Management
Credit: 3
Prerequisites: None

Synopsis

The course will provide students with a comprehensive understanding and focuses on quality management principles, performance management and quality improvement alongside relevant tools, techniques, models and frameworks. It is suitable for undergraduates who require to develop knowledge, understanding and business management skills in the fields of quality management and process improvement.

Course Outcomes

CO 1 Demonstrate a working knowledge of the principles and practice of quality management.

CO 2 Explain the quality tools and techniques for continuous quality improvement.

CO 3 Prepare a quality implementation plans for the strategic issues in quality management.

BPC2123
Organizational Behaviour
Credit: 3
Prerequisite: BPC1143 Industrial Psychology

Synopsis

This course provides an analysis of human behavior at work place. The behavior of individual, interpersonal, team and organizational levels. The development of interpersonal competencies to allow individuals to effectively work as managers or professionals in the rapidly changing, culturally diverse and technologically integrated global climate facing modern organizations. The topics like personality, attitude, perception, leadership are covered.

Course Outcomes

CO 1 Classify theories of Organizational Behavior.

CO 2 Demonstrate the issues relating of human behavior at work place and related issues.

CO 3 Report human behavior skills for development of organization.

BPC3113
Research Methodology
Credit: 3
Prerequisites: None

Synopsis

This course is designed to introduce students to the research methods that can be applied when conducting research projects. The topics to be covered include Introduction to research, approaches to research, problem statement, research objective, research question, literature reviews, theoretical framework and hypothesis development, research design, case study research, data collection method, measurement, sampling, data analysis, introduction to Excel/SPSS and writing the research proposal, poster and article.

Course Outcomes

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

CO 1 Differentiate between qualitative and quantitative research method.

CO 2 Construct research proposals by using appropriate research methods.

CO 3 Propose research methods for problem solving.

BPC3123
Strategic Management
Credit: 3
Prerequisites: None

Synopsis

This course exposes students on the aspects of strategic management in business environment. The covered areas for this course are: the nature of strategic management; external and internal assessment; strategic analysis and choice; strategy implementation; and strategic evaluation and control.

Course Outcomes

CO 1 Analyze the strategic management concepts and techniques.

CO 2 Demonstrate the strategic management concepts and techniques in business environment.

CO 3 Initiate strategy choice for implementation.

BPC3132
Final Year Project I
Credit: 2
Prerequisites: BPC3113 Research Methodology

Synopsis

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final Year Project 1 are: (i) problem background, (ii) problem statement, (iii) research objectives, (iv) research questions, (v) research framework, (vi) literature reviews, and (vii) research methods.

Course Outcomes

CO 1 Produce problem statement and research objective in the chosen industrial management field.

CO 2 Manipulate the reliable sources for exceptional, detail and accurate literature review.

CO 3 Construct noble research work by producing the feasible flow of methodology.

CO4 Build effective skills in report writing and oral presentation-through overall report contents and oral presentation session.

CO5 Demonstrate good attitude to fulfill research requirements.

BPC4114 (Semester 7/4)
Final Year Project 2
Credit: 4
Prerequisite: BPC3132 Final Year Project I

Synopsis

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final Year Project II are: (i) development of research instruments for data collection, (ii) carrying out data collection, (iii) analysing data collected, (iv) interpreting data, (v) writing reports.

Course Outcomes

CO 1 Produce validated research instrument.

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

CO 2 Organize the research findings based on theoretical knowledge.

CO 3 Construct the conclusion of the research and recommendation for improvement.

CO4 Build an effective skill in report writing and oral presentation through overall report contents and oral presentation session.

CO5 Demonstrate a good attitude to fulfill research requirements.

BPC4112
Industrial Training
Credit: 12
Prerequisites: All core faculty and core programme courses from Semester 1 to Semester 7

Synopsis

As part of the Faculty of Industrial Management with an integrated curriculum of the Bachelor of Project Management degree courses, all students are required to undergo industrial training for a minimum period of 24 weeks. Placement of students at various companies will be supervised and coordinated by the Industrial Training Committee set up by the Faculty. Students will be placed at various companies throughout Malaysia. The training at the various companies will expose the students to a real working environment including the companies' organization structures, business operations and technology management. The hands-on experience in the training will reinforce what has been taught at the University. The students are also required to prepare an industrial training report and do the final presentation describing the tasks they are assigned in their placement.

Course Outcomes

CO 1 Expose students to the "real" working environment and get acquainted with the organization structure, business operations and technology management.

CO 2 Build effective communication skills in written and oral presentation.

CO 3 Build hands-on experience in their related field so that students can relate to and reinforce what has been taught at the University.

CO 4 Integrate cooperation and collaboration between industry and the university in promoting a knowledgeable society.

CORE PROGRAM

BPQ1213
Management Accounting
Credit: 3
Prerequisites: None

Synopsis

This course is an introductory course and enables students to understand the basic concepts and terminology of accounting and financial reporting for modern business enterprises. The students will learn to apply accounting information for business activities decision. The course will equip students with understanding and application on context of management accounting, cost identification and behavior, standard costing, financial planning and control and accounting control systems.

Course Outcomes

CO 1 Solve accounting problems by applying the accounting method in a business setting

CO 2 Display cost for business using the principles of costing systems

CO 3 Explain the business activities base on management accounting principles and concepts

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

BPQ1223
Principles of Operation Management
Credit: 3
Prerequisites: None

Synopsis

The course provides a range of academic knowledge, operations understanding, operational management techniques. It will focus on the main decision areas of operations management and their impact on business functions and the role of the operations manager and the relationship with productivity improvement.

Course Outcomes

CO 1 Apply the fundamental concept and the main areas of operation management

CO 2 Demonstrate operation decisions in solving operational problems

CO 3 Justify operations management requirements

BPQ2213
Financial Management
Credit: 3
Prerequisites:None

Synopsis

This course is an introductory course and enables students to understand the basic concept of finance in an organization. Students will define concepts, characteristics, features and analyzing related financial statements. The course will equip students with understanding and application of finance which cover on financial strategy, debt and equity management, the key drivers of shareholders value, risk and return concept in investment, and capital budgeting as vehicles to evaluate investment choices.

Course Outcomes

CO 1 Analyze financial management problems by using all concepts in financial management

CO 2 Calculate and utilize financial formula to a particular area in financial management

CO 3 Explain the key driven in financial management and its importance in an organization

BPQ2223
Supply Chain & Logistics Management
Credit: 3
Prerequisites: None

Synopsis
The course covers supply chain and logistics management in business environment which includes concepts of SCM, logistics, sourcing strategy, supply chain risk, purchasing, distribution, transportation, facilities location, demand forecasting, inventory, pricing strategy and information technology used in industrial system and operation management.

Course Outcomes

CO 1 Illustrate the roles of supply chain and logistics management in the industry

CO 2 Explain supply chain and logistics management methods and concepts in solving related industrial operation and system problems

CO 3 Present operation information and data from various records and database utilized for industrial supply chain and logistics management application

BPQ2233
Project Management
Credit: 3
Prerequisite: None

Synopsis

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

This course provides foundation and knowledge of project management. Students will be exposed to various body of knowledge and institutions related to project management in particular to Project Management Institute (PMI). Through Out semester, students be give the well-round knowledge of theories, project management process and the skills required to manage a project effectively. Last but not least, students also will have opportunity to explore various methods and approaches of project management and project management software.

Course Outcomes

CO 1 Explain concept of project management process according to selected body of knowledge and organizational influence towards project management success.

CO 2 Identify best-fit project management software for the organization.

CO 3 Demonstrate understanding of project life-cycle management according to different industries

BPQ2243
Fundamental of Manufacturing
Credit : 3
Prerequisites: None

Synopsis

Manufacturing have become important in the industrial environment to produce products for the services of mankind. The knowledge gained from this course is highly essential as it prepares the students to be familiar with modern concepts of manufacturing technologies. Students will be exposed theoretically to the manufacturing processes, safety measures, fundamental of material properties and measurement, tools and equipment used, and the manufacturing system.

Course Outcomes

CO 1 Describe the appropriate material required in manufacturing technology

CO 2 Differentiate the manufacturing technology alternatives based on selected material

CO 3 Identify the appropriate manufacturing technology for modern concepts of manufacturing

BPQ2253
Management of Technology
Credit: 3
Prerequisites: None

Synopsis

This subject is intended to give an understanding on the concept of technology management and its application to an organization particularly business firm. The topics to be covered are: Introduction to Management of Technology, Critical Factors and essential issues in Managing Technology, Technology Life Cycles, Technology Forecasting, Technology strategy and planning tools, Technological Innovation, transfer and Technological Competitiveness.

Course Outcomes

CO 1 Produce the general terms, definitions, principles used in the various topics of management of technology.

CO 2 Analyze the technical tools or models in formulating technology policies and strategies within and between organizations in the development, operation and marketing of goods and/or services.

CO 3 Demonstrate decision making techniques in the management of technology to address problems in the range of sectors.

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

BPQ3213
Production Planning and Control
Credit: 3
Prerequisites: None

Synopsis

The subject covers planning and controlling of production in production and operation management; concepts of production planning techniques, analytical techniques and system designs and concepts of production and process control in industrial management.

Course Outcomes

CO 1 Analyse industrial production planning and control problems

CO 2 Apply production planning and control methods for solving industrial operation problems

CO 3 Respond to production planning and control requirements

BPQ3223
Quality Control
Credit: 3
Prerequisites: BPC2113 Quality Management

Synopsis

The subject is designed to introduce methods for data collection, control chart construction and interpretation, and statistical diagnosis for quality control. The course blends statistical process control (SPC) and principles of statistics for quality control and process improvement purpose. It also covers process capability, acceptance sampling methods and reliability.

Course Outcomes

CO 1 Apply statistics principles in data analysis for quality control.

CO 2 Display results of statistical process control, control charts,with the help of minitab software.

CO 3 Study SPC, control chart, acceptance sampling and reliability technique in solving industrial quality problems for quality control and improvements.

BPQ3233
Business Law
Credit: 3
Prerequisites: None

Synopsis

This subject introduces fundamental legal knowledge in relation to business activities and commercial transactions by focusing on relevant legal theories, principles and aspects and their application within Malaysian legal framework and global business environment. The students will be exposed to the concept of law, legal system and legal liabilities in commercial contracts, commercial crime, tort, consumerism and intellectual property. Upon completing this subject, students will have the understanding on the mechanics of law and its significance to business

Course Outcomes

CO 1 Explain the substantial and procedural aspects of Malaysian business law

CO 2 Analyze appropriate legal frameworks for commercial activities and business ventures.

CO 3 Integrate the application of legal knowledge in commercial decision-making.

BPQ3243
Product Development and Innovation
Credit: 3
Prerequisites: None

Synopsis

The course is intended to give an in-depth understanding of the entire process of new product development, as it should operate within modern production industry which encompassing both the design and development, covering not only of the visual appearance of products but also design for manufacturing, design to meet market needs, design for cost reduction, design for reliability and design for environmental friendliness.

Course Outcomes

CO 1 Apply technical knowledge in problem solving using appropriate software and management techniques for new product development

CO 2 Display new products by utilizing appropriate techniques to stimulate creativity and innovation for product design application.

CO 3 Manage relevant industrial product development information and data from various records, database or publications

ELECTIVE COURSES

BPE3513
Computer Aided Design (E)
Credit: 3
Prerequisites: None

Synopsis

The subject is intended to provide students with introduction and theoretical understanding of computer-aided technologies used in design (CAD). Students are exposed to various problem solving techniques as well as hands-on experience and project-based approach in the aspects of industrial product design and development

Course Outcomes

CO 1 Demonstrate product design and development and computer-aided design (CAD).

CO 2 Construct basic design work and product development functions by using selected CAD software

CO 3 Complete the understanding by solving problems in design and product development using selected CAD software.

BPE3523
ERP Systems (E)
Credit: 3
Prerequisites: None

Synopsis

This course is aimed to teach the students about the basics on modern integrated information systems and how they are deployed in companies. A special emphasis is placed on understanding the connections between business process management and supporting and supporting business processes through integrated information systems.

Course Outcomes

CO 1 Differentiate the theoretical foundations of modern ERP systems and their application in a company

CO 2 Construct ERP systems in real-life situations to solve specific process task (eg. Order processing, production planning, invoicing etc.

CO 3 Demonstrate the connection between business process management and modern ERP systems

BPE3533
Lean Manufacturing (E)
Credit: 3
Prerequisite: None

Synopsis

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

This course introduces the key concepts in lean manufacturing such as continuous improvement, just-in-time, standardization, kanban and others. Lean focuses on eliminating waste in processes, waste being anything that impedes the flow of product as it is being transformed in the value chain. The course will examine the socio-technical interactions within a modern manufacturing organization and develop skills and processes for implementing changes for achieving agile manufacturing and global competitiveness.

Course Outcomes

CO 1 Apply lean principles in initiating a continuous improvement program in an organization

CO 2 Analyze various concepts of lean systems and their applications in the manufacturing and service industry

CO 3 Demonstrate lean approach by applying lean tools and techniques in solving organization or industry problems

BPE3813
Customer Relationship Management (E)
Credit: 3
Prerequisites: None

Synopsis

This course is designed to introduce students to both CRM fundamentals and the utilization of technology in managing customers. The curriculum will introduce students to CRM concepts and functionality for professionals whose organizations utilize CRM or want to gain an understanding of the role of CRM in service management.

Course Outcomes

CO 1 Analyse the key concepts, technologies and best practices of CRM in Service industry.

CO 2 Integrate CRM and technologies practices to enhance the achievement of marketing, sales and service objectives.

CO 3 Explain the impact of CRM on customer experience, satisfaction and loyalty.

BPE3823
Service Management (E)
Credit: 3
Prerequisites: None

Synopsis

The main aim of this subject is to expose the students to the real service market scenario. It considers the complexity of services that bring together a mesh of organisations, people, technologies, strategies and information to deliver value to the customer. The strategic and competitive focus also provides those students who are interested in entrepreneurial endeavours with the foundation necessary to open their own service business.

Course Outcomes

CO 1 Analyse fundamental ideas of managing services

CO 2 Integrate the role of technology, operations, and human behaviour towards a better service management

CO 3 Point out challenges of managing different types of service operations by learning strategies to overcome it.

BPE3833
Knowledge Management (E)
Credit: 3
Prerequisites: None

Synopsis

Knowledge management as an organizational innovation has reached a state of maturity where we can now discern the principles, practices, and tools that make it unique. It has engendered new concepts and categories for us to make sense of the many important ways that organizations use knowledge to create value. So this course is designed to present a thoughtful, systematic view of knowledge management as a coherent body of management theory and practice. The topics will include: introduction to knowledge management in theory and practice, the knowledge management cycle, knowledge management models, knowledge capture and codification, knowledge sharing and communities of practice, knowledge application, the role of organizational culture, knowledge management tools, KM strategy and metrics, the KM team, and future challenges for KM.

Course Outcomes

CO 1 Compare the definitions and perspectives of knowledge and knowledge management.

CO 2 Manipulate knowledge management tools to suit various organizational contexts in facilitating the business operation.

CO 3 Prepare framework of implementing knowledge management to address problems in organizations.

BPE4513
Manufacturing Technology (E)
Credit: 3
Prerequisites: BPQ2243
Fundamental of Manufacturing

Synopsis

This subject is intended to introduce manufacturing processes as used by industries to transform raw material to a final product: covering basic principles in metal forming, casting, joining and machining processes. The subject also covers other essential processes such as bulk deformation processes, powder metallurgy and surface treatments. Besides theoretical learning, students are also will be expose to the practical experiences related to basic manufacturing works which are common to the production industries.

Course Outcomes

CO 1 Analyze the fundamentals of manufacturing technology applicable to industrial production processes

CO 2 Manipulate the compatibility of manufacturing technology alternative with product specification for industrial production processes

CO 3 Demonstrate basic manufacturing work as practiced by production industries

BPE4523
Computer Modelling & Simulation (E)
Credit: 3
Prerequisites: None

Synopsis

This course demonstrates how to construct a computer representation of a real world system. A developed simulation model can be used to aid decision making by providing information and predicts how the real-world system behaves under a variety of circumstances. Students will develop both discrete event simulation and system dynamics models with the aid of ARENA and iThink simulation software.

Course Outcomes

CO 1 Design logical models to represent real world systems

CO 2 Simulate real world systems using simulation software

CO 3 Analyze data and output of the simulation model

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BPE4533
Industrial Control and Automation (E)
Credit: 3
Prerequisites: None

Synopsis

This course will provide the students with basic skills useful in identifying the concepts of automated machines and equipment and describe the terms and phrases associated with industrial automation in manufacturing applications. Topics to be covered include automation technologies and control, industrial automation instruments and devices, process control system classification and programmable logic control applications.

Course Outcomes

CO 1 Explain the general function of industrial automation systems

CO 2 Demonstrate basic Programmable Logic Control (PLC) skills

CO 3 Differentiate types of process control devices

BPE4813
Service Marketing (E)
Credit: 3
Prerequisites: None

Synopsis

This course focuses on the Formulation, Implementation and Evaluation of Service Marketing Execution. From understanding service products, consumers and markets, applying the marketing Principles on services; to managing the customer interface and finally implementing profitable service strategies, this course immerses students into the current issues of services marketing.

Course Outcomes

CO 1 Distinguish the differences between goods and services marketing.

CO 2 Identify the various components of the “services marketing mix” (three additional P’s) as well as key issues required in managing service quality.

CO 3 Analyze various methods of achieving competitive advantages in services marketing practice.

BPE4823
Innovation Management (E)
Credit: 3
Prerequisites: None

Synopsis

This course intends to provide an understanding of the innovation management concepts by developing a deeper understanding of the steps involved in the development of new products and services, and the strategies in managing product and service innovation to deliver superior value to customers. Specific course objectives address innovation, services & product management issues starting from product development, innovation management up to product marketing approach.

Course Outcomes

CO 1 Review various options for the marketing and management of product and service innovation using both theoretical and practical approaches

CO 2 Plan the implementation of the entire process related to the launch of a selected product or service

CO 3 Critically appraise the viability of a new product or service launch

BPE4833
Retailing (E)
Credit: 3
Prerequisites: None

The information provided by Faculty of Industrial Management are based on University’s Regulation and endorsement until 23 March 2020.

Synopsis

This course intends to provide an understanding of fundamentals of retailing. The topics covered include introduction of retailing, operation management, developing merchandise plan, financial. Students will be exposed to various case studies on successful domestic and international business

Course Outcomes

CO 1 Assemble knowledge of contemporary retail management business opportunities

CO 2 Integrate key contents and structure of retail plan

CO 3 Develop retailing business plan for small to medium size enterprise which integrates marketing, sale, operation, finance and business management

COURSE STRUCTURE FOR BACHELOR OF BUSINESS ENGINEERING WITH HONOURS (COLLABORATION PROGRAMME WITH REUTLINGEN UNIVERSITY, GERMANY)

CORE PROGRAMME

BPN1013
Principles of Management
Credit: 3
Prerequisites : None

Synopsis:
Principles of management aim to provide students with information and knowledge on theoretical management and applied practiced in managing a successful organization. Students will discuss the major principles of management: Planning, Organizing, Leading and Controlling. Contemporary issues and global challenges for future managers will also be discussed to equipped students with current trends and best practices in managing a successful organization.

Course Outcomes:
CO 1 Explain the basic principles of management
CO 2 Identify the best practices in management
CO 3 Apply the basic principles of management in solving contemporary issues and global challenges in business management

BPN1022
Business Law
Credit: 2
Prerequisites : None

Synopsis:
This course aims to introduce students to the subject of business law in Malaysia. Business Law is a combination of several branches of law related to business and trade. This course will discuss contract law, agency law, negotiable instruments, law of sales of goods and hire purchase law. The discussion on the cases will help to produce students who are able to understand the important principles in business law and apply theories to the facts on business situations.

Course Outcomes:
CO 1 Define the theories and basic principles in business law
CO 2 Describe the existing legal cases related to business activities
CO 3 Apply the theories and relevant case laws to the facts of described situations or problems

BPN1032
ACCOUNTING I:
FINANCIAL ACCOUNTING
Credit: 2
Prerequisites : None

Synopsis:
To introduce students to the concepts and terminology of accounting and financial reporting for modern business enterprises. They will also learn to use accounting information to make conclusions about business activities and to communicate these conclusions to others, basic

accounting concepts, how accounting information reflects basic activities of businesses and organizations and how accounting information is used to make decisions about these entities.

Course Outcomes:

CO 1 Apply the fundamental knowledge of financial framework, concepts, principles, and procedures that govern how the financial statements are prepared

CO 2 Acquired the ability to prepare and analyse financial statements, as well as to solve accounting related problems

BPN1043
Introduction to Computer Science
Credit: 3
Prerequisites : None

Synopsis:
Fundamental principles and concepts of C programming, with definitions of data, expressions, control-flow constructions, functions, input and output, preprocessing, command line arguments. Basic problem solving and programming techniques, structured programming ideas, fundamental algorithms and data structures

Course Outcomes:

CO 1 Understand the computer programming using C++

CO 2 Develop appropriate basic programming techniques and structures

CO 3 Design the appropriate algorithms and apply in data structures

BUM1113
Technical Mathematics
Credit: 3
Prerequisites : None

Synopsis:
This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Students are exposed to complex number, functions and graphs, trigonometric functions, analytic geometry, polar coordinates, 3 dimensional spaces and vector. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcomes:

CO1 Acquire fundamental principle of discrete structure.

CO2 Analyze mathematical problems using discrete structure knowledge.

CO3 Provide solution to discrete structure problems arise in computer science and engineering fields.

BPN1062
Fundamentals of Project Management
Credit: 2
Prerequisites : None

Synopsis:
This course provides foundation and conceptual framework of project management. Students will be expose to all body of knowledge in particular with Project Management Institute (PMI). Throughout semester, students will have opportunity to discuss various topics; project integration, project initiation, organizational influence to project performance, project manager's role, project management context and project management process groups. Last but not least, students also will have opportunity to explore various methods and approaches of project documentation and project management software.

Course Outcomes:

CO 1 Describe core concept of all knowledge areas of project management

CO 2 Understand and analyze project life-cyle

CO 3 Develop project charter and proper project documentation with project management tools and techniques

BPN1072
Accounting II:
Cost Accounting
Credit: 2
Prerequisites : None

Synopsis:
A study of accounting information as a management decision tool. Topics include

production costs, activity-based costing, job costing, budgets, standard costs, and variances. The course focuses on the manufacturing environment, but there is some coverage of merchandising and service sectors.

Course Outcomes:

CO 1 Ability to apply the concept of the various costing systems

CO 2 Acquired the ability to analyse accounting information and making economic decisions

BPN1083
Engineering Mechanics
Credit: 3
Prerequisites : None

Synopsis:
This course introduces introduction to mechanics, force vector, equilibrium of particle, force system resultants, equilibrium of rigid body, structural analysis, friction, centroids and center of gravity.

Course Outcomes:

CO 1 Apply Newton's Law of motion and SI system of unit

CO 2 Solve vector operation and resultant system problems

CO 3 Evaluate the equilibrium of particle and rigid body problem using the equilibrium equation and its free body diagram concept

CO 4 Calculate the resultant forces, moment with multiple forces in structural problems, centroids and moment of inertia of objects. Analyze the effect of friction of rigid bodies in equilibrium situations

BPN1093
Technical Design / CAD
Credit: 3
Prerequisites : None

Synopsis:
This subject is designed to introduce to the students the principle of computer-aided design. Topics includes Drafting Overview, Drawing Set-up, Basic CAD, Commands Geometric Construction, Orthographic Projection, Basic Drawing, Tools, Pictorial Drawings, Sectional Views, Advance CAD Commands, Modifying CAD Drawings, Dimensioning, Tolerances, Working Drawings, Threads and Fasteners

Course Outcomes:

CO 1 Analyze problem in technical drawing and understand drawing

CO 2 Use basic geometric construction techniques to create objects in CAD

CO 3 Project a 3 dimensional object in 2 dimensional space with the proper utilization of views in CAD

CO 4 Read & create dimensioned drawings using conventional techniques in CAD

CO 5 Identify and understand the components of working drawings & the standards that apply

BUM1223
Calculus
Credit: 3
Prerequisites : None

Synopsis:
This subject discusses Differentiation and applications, techniques of integration and applications, numerical integration and Taylor polynomial, Taylor Series & Maclaurin Series

Course Outcomes:

CO 1 Acquire fundamental principle of differentiation.

CO 2 Apply appropriate calculus concepts to solve various technological problems.

CO 3 Use appropriate software and tool to solve the graphical and computational problems in calculus

BPN2032
Fundamentals of Marketing
Credit: 2
Prerequisites : None

Synopsis:
The purpose of the course is to provide the students with a keen understanding of the

marketing function in business firms and of the methods of using this knowledge in developing and implementing successful marketing strategies.

Course Outcomes:

CO 1 Define marketing and describe the components of marketing process
CO 2 Understand the marketplace and Consumers
CO 3 Design a Customer-Driven Marketing Strategy and Marketing Mix

BPN2023
Industrial Engineering
Credit: 3
Prerequisites : None

Synopsis:
This course introduces Industrial engineering, manufacturing engineering, facilities planning, ergonomic, work study, time study, production planning and control, inventory management, quality management system and productivity.

Course Outcomes:

CO 1 Explain the application, scope and function of Industrial engineering
CO 2 Conduct work study and work measurement using different techniques
CO 3 Apply layout design procedure in selecting optimum location and basic layout design

BPN2043
Fundamentals of Electrical Engineering
Credit: 3
Prerequisites : None

Synopsis:
Fundamentals of DC and AC circuits, network laws and theorems, passive circuit components, semiconductors, electric machines, and digital systems

Course Outcomes:

CO 1 Apply electricity and electronic fundamentals Cognitive PO1-70%
CO 2 Conduct electronic experiment and solve electronic circuit problem Psychomotor PO3-5%, PO2-10%
CO 3 Work effectively in a team to complete a task successfully Affective PO5-15%

BPN2123
Corporate Finance & Investment
Credit: 3
Prerequisites : None

Synopsis:
This course also emphasizes the application of financial tools and models that produce better decisions for the firm in short and long term. Asset selection, risk management, inventory management, credit and capital acquisition, and overall value enhancement are covered. Emphasis is put on the quantitative tools and the practices of existing corporations. Students will build both broad financial knowledge and specific understanding of corporate finance. Case studies will address both large and small organizations.

Course Outcomes:

CO 1 Examine major financial concept applications and its analysis to business environment
CO 2 Measure and relate investment tools to investment decision making
CO 3 Appraise capital investment project and compare for project decision making

BPN2013
Quality Management
Credit: 3
Prerequisites : None

Synopsis:
This course intends to provide and understanding of fundamentals of Quality Management. The topics covered include Introduction to Quality Management, Quality's Guru, Quality Tools and Concept, different quality approaches, quality control tools and statistical process controls. Students will be exposed to various case studies on quality concept, locally and internationally.

Course Outcomes:

CO 1 Define and able to explain the fundamental concept and definition of total quality management as a career of choice
CO 2 Identify the basic knowledge of quality management and quality control in production and manufacturing
CO 3 Demonstrate and evaluate new concept of quality control for production and manufacturing, and quality practices in service sector which integrates fundamental aspects of quality management.

BPN2053
ERP Systems & Business Process Management
Credit: 3
Prerequisites : None

Synopsis:
The aim of the course is to teach the basics about modern integrated information systems and how they are deployed in companies. A special emphasis is placed on understanding the connections between business process management and supporting business processes through integrated information systems. It also addresses the methods and techniques required to analyze, design, implement, automate, and evaluate business processes. Structured along the phases of Business Process Management life cycle, student will learn to identify appropriate technologies support, assess the role of standards, analyze organizational performance from process perspective, redesign processes, and gauge the organizational impact of process change management activities.

Course Outcomes:
CO 1 Understand and describe the theoretical foundations of modern ERP systems and their application in a company environment
CO 2 Understand the connection between business process management and modern ERP systems
CO 3 Apply ERP systems in real-life situations to solve specific process tasks (e.g. order processing, production planning, invoicing, etc.

BUM2413
Applied Statistics
Credit: 3
Prerequisites : None

Synopsis:
This course discusses on statistical problem-solving methodology and descriptive statistics; sampling distribution and confidence interval; hypothesis testing; analysis of variance (ANOVA); goodness-of fit test and contingency tables; regression and correlation including simple and multiple linear regressions. Microsoft Excel software will be used in this course as a statistical package (other statistical packages are SPSS, R Language, S Plus, EViews and Minitab shall be used in this course).

Course Outcomes:
CO 1 Acquire fundamental principle of statistics
CO 2 Perform statistical analysis by using appropriate statistical theory and methodology
CO 3 Analyse real life data to solve related problems in various disciplines

BPN2076
Individual Field Project – Business & Engineering
Credit: 6
Prerequisites : None

Synopsis:
The individual field project offers the possibility to apply theoretical concepts and tools in a practical setting. Under supervision and with guidance of a faculty member the student works on a practical task that is typical for operational activities in production and logistics. This task can be suggested by the student, the faculty mentor or by an outside company and should involve student's at least occasional presence in a company. In any case it must be taken from a discipline covered in the semesters 1 to 4 and must clearly be application-oriented (applying theoretical

know-how to real-life business & engineering situation, no theoretical task).

Course Outcomes:

CO 1 Organize themselves and their work in an efficient manner given a clearly defined practical task

CO 2 Gain experience in how theoretical know-how can be applied in operational tasks in a business environment

CO 3 Integrate themselves into an existing organizational setup within a company as far as this is required to solve the assigned task

BPN2092
Corporate Social Responsibility (CSR) Project
Credit: 2
Prerequisites : None

Synopsis:
The Corporate Social Responsibility (CSR) Project familiarizes students with the theoretical concept of CSR and shows its relevance in today's business world. Students not only learn the theoretical foundations of CSR, but also actively apply the concept in a real-life example project that exemplifies the idea of making a positive and sustainable impact to society as a whole and individual stakeholder.

Course Outcomes:

CO 1 Understand and explain the concept of CSR, its elements and its importance for today's business

CO 2 Show individual behaviour that is in line with the principles of CSR exemplified in a real-life project

BPN2103
Cross-Module Seminar I
Credit: 3
Prerequisites : None

Synopsis:
The Cross Module Seminar I gives students the opportunity to create a comprehensive business plan for the market introduction of a new product line of a fictitious case company. Working in virtual, cross-cultural teams of functional experts, students apply knowledge from various business and engineering disciplines and have to deal with complex, unstructured information. The Module is structured into a series of decision phases (work out proposals) and evaluation phases (reflect proposals and own performance) guided by continuous mentoring and documented both in written documents and in a Web-based journal / project team diary. Performance is assessed both in terms of output (quality of business plan) and in terms of development of personal skills (collaboration, use of technologies, intercultural competencies, etc.). Encompassing a wide variety of disciplines covered in the previous semesters the Cross Module Seminar I is the culmination point of students' first half of studies.

Course Outcomes:

CO 1 Think, act and collaborate in an interdisciplinary way

CO 2 Work effectively in a virtual, cross-cultural team environment

CO 3 Make efficient use of modern information and communication technologies to solve a complex task

CO 4 Apply knowledge from various disciplines to develop a consistent and convincing business plan

BPN3023
Operations Research
Credit: 3
Prerequisites : None

Synopsis:
This course introduces students to the application of quantitative methods and techniques for effective decision making in solving business problem. Various tools and theories to solve real-world problems through determining optimal solution subject to the constraints of time, labour, resources and business rules are included. The topics included are: Linear Programming, Multicriteria Decision Making, Non-Linear Programming, Queuing Theory and Simulation.

Course Outcomes:

CO 1 Describe operation research concepts and techniques
CO 2 Apply the operation research concepts and techniques in solving business problems
CO 3 Analyze business problems and formulate operation research model to solve the problems

BPN2113
Supply Chain Management
Credit: 3
Prerequisites : None

Synopsis:
The subject is intended to introduce the strategic role of a supply chain from vendor to customer and the methods used to manage these supply chains.

Course Outcomes:
CO 1 Describe the supply chain goals and managerial actions that improve supply chain performanc
CO 2 Explain strategic framework for supply chain decisions which involves planning, designing and operating processes
CO 3 Apply technical knowledge in problem solving situation in supply chain management

BPN3012
Industrial Training
Credit: 12
Prerequisites: None

Synopsis
As part of the Faculty of Industrial Management with an integrated curriculum of the Bachelor of Business Engineering degree courses, all students are required to undergo industrial training for a minimum period of 24 weeks. Placement of students at various companies will be supervised and coordinated by the Industrial Training Committee set up by the Faculty. Students will be placed at various companies throughout Malaysia. The training at the various companies will expose the students to a real working environment including the companies' organization structures, business operations and technology management. The hands-on experience in the training will reinforce what has been taught at the University. The students are also required to prepare an industrial training report and do the final presentation describing the tasks they are assigned in their placement.

Course Outcomes
CO 1 Expose students to the "real" working environment and get acquainted with the organization structure, business operations and technology management.
CO 2 Build effective communication skills in written and oral presentation.
CO 3 Build hands-on experience in their related field so that students can relate to and reinforce what has been taught at the University.
CO 4 Integrate cooperation and collaboration between industry and the university in promoting a knowledgeable society.

BPN4013
Individual Study Project
Credit: 3
Prerequisites : None

Synopsis:
The individual study project focuses the student's attention on one single company or organization. The student can suggest the company and must then analyze it in a holistic manner taking into account at least the following dimensions: innovativeness (of products and processes), strategy, degree of implementation of lean philosophy, commercial position, corporate social responsibility, image / public relations.
The student must combine knowledge from various disciplines and must apply different research techniques in order to prepare a comprehensive, interdisciplinary and critical report on the selected company.

Course Outcomes:
CO 1 Combine data and information from various sources into a structured analytical description of a company (analytical thinking)
CO 2 Critically reflect information and put it into relation to other sources

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in order to develop a personal critical view point on a given company or organization (critical thinking)

CO 3 Arrive at own suggestions for improving the position of the company analyzed (creative thinking)

BPN4026
Thesis
Credit: 6
Prerequisites : None

Synopsis:
The thesis should show that the student is able to independently work on a problem from the subject areas of the programme using academic methods. It should deal in a self-contained manner with a practical problem based on empirical data and/or theory. The problem should be systematically presented and developed and solutions proposed.

Course Outcomes:
CO 1 Apply the principles of academic writing and empirical research to a defined topic
CO 2 Organize him-/herself in an adequate way to achieve the planned output within given time and resource constraints
CO 3 Critically reflect available theory as well as own achievements when working on a given research question

BPN4033
Cross-Module Seminar II
Credit: 3
Prerequisites : None

Synopsis:
The Cross Module Seminar II combines the topics of the student's Major Specialization classes in a complex, realistic application scenario (logistics/SCM and production, respectively). The application scenario is fictitious, but closely aligned to real-life situations. Students work in small teams and develop a solution that is both technically feasible and commercially viable. They have to prepare a written solution proposal that comprises both technical (drawings and layouts, process flows) and commercial aspects.

Course Outcomes:
CO 1 Think, act and collaborate in an interdisciplinary way
CO 2 Apply knowledge from various disciplines to develop a feasible solution proposal in their field of expertise
CO 3 Develop critical thinking when assessing the suitability of theoretical concepts to practical problems

ELECTIVE COURSES

BPE4123
Supply Chain Control & Management Control Systems
Credit: 3
Prerequisites : None

Synopsis:
The course familiarizes students with the basic concepts and tools of management accounting and focuses on their use within in supply chains. Special emphasis is put on the particular problems of applying these tools and concepts in an inter-organizational setting.

Course Outcomes:
CO 1 Describe the role of the concept of supply chain control and management control systems
CO 2 Illustrate strategic framework for supply chain control and management control systems
CO 3 Use analytical knowledge in problem solving situation of supply chain control

BPE4133
Advanced Project Management & Control
Credit: 3
Prerequisites : None

Synopsis:
This course provides a broader perspective of knowledge, skills, methods, and techniques of modern day project

management. The application of advanced project management information system also aims to include the value of automated tool for planning, scheduling and controlling project. On completion of the course, students will have the core knowledge needed in project management and develop problem solving approach in managing triple constraint of time, cost, and quality in array of multidisciplinary industrial projects.

Course Outcomes:

CO 1 Examine the fundamental theory and advanced concepts used in the current practices of project management.

CO 2 Analyze standardized tools and techniques involved in effective delivery of projects.

Co 3 Practice and utilize the project management information system to plan, execute and control broad range of projects.

BPE4143
Lean Management
Credit: 3
Prerequisites : None

Synopsis:
After getting the theoretical background of lean management, the students will apply the learned subject in exercises and business cases. At the end of the course, it is the task of the students to act as consultants and to provide a concept for a holistic supply chain optimization.

Course Outcomes:

CO 1 Understand the strong interrelationship between the elements within a supply chain network, the Lean Philosophy and the Lean Enterprise Management strategy

CO 2 Apply a large variety of tools and techniques to create lean value streams within manufacturing and administration

CO 3 Understand how to manage the process of change towards a lean enterprise and which tools can be used to face resistance against change

CO 4 Reflect to which extend their personal behavior, the style of communication and the way addressing people is a key factor for the success of a lean project

BPE4163
Technical Planning Case
Credit: 3
Prerequisites : None

Synopsis:
Students use their knowledge to plan a virtual logistics network based on real data in a virtual planning team which is active worldwide. They deal with: developing a logistics strategy, planning factory and warehouses, calculating profitability.

Course Outcomes:

CO 1 Develop solutions for a complex logistics planning task

CO 2 Work towards a target in virtual teams

CO 3 Evaluate the potential and risks of using IT and communications technology of the digital factory

CO 4 Deal with communications and social conflicts in virtual teams

BPE4153
Simulation Game
Credit: 3
Prerequisites : None

Synopsis:
By taking part in a simulation model students have the opportunity to use teamwork to develop alternative strategies and to test and implement them in the context of a company operating worldwide. The companies are managed by students and have their headquarters in Europe and sell various consumer goods in 4 world markets

Course Outcomes:

CO 1 Evaluate the activities of a company in a holistic manner

CO 2 Link together the contents of different disciplines learnt in their studies

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CO 3 Recognise and map out the framework conditions for business success
CO 4 Deal with situations involving complex decisions

BPE4213
Intra Logistics
Credit: 3
Prerequisites : None

Synopsis:
This course will cover tools and techniques used in the industrial logistics operations. It focuses on logistics system which includes inventory management, transportation and shipping, material management, warehousing, logistics information technology framework, international logistics and logistics system control.

Course Outcomes:
CO1 Explain the logistics strategics and appropriate logistic approach in industrial operation
CO2 Analyse industrial logistic problems in industrial operation management
CO3 Solve industrial logistics problems in industry using appropriate operation management technique

BPE4223
Distribution Logistics
Credit: 3
Prerequisites : None

Synopsis:
The focal point of distribution logistics is the shipment of goods from the manufacturer to the consumer.It comprises all activities related to the provision of finished products and merchandise to a customer. It also involves many different parties along the chain such as distributor, warehouser, retailer etc.

Course Outcomes:
CO1 Appreciate logistics importance to modern business
CO2 Explain strategic framework for logistics decisions which involves planning, designing and operating processes
CO3 Apply technical knowledge in problem solving situation in logistics distribution

BPE4233
International Transport Logistics
Credit: 3
Prerequisites : None

Synopsis:
This course will cover tools and techniques used in the industrial logistics operations. It focuses on logistics system which includes inventory management, transportation and shipping, material management, warehousing, logistics information technology framework, international logistics and logistics system control.

Course Outcomes:
CO 1 Explain the international logistics strategies and global supply chain
CO 2 Analyze global freight transportation and management
CO 3 Solve international logistics problems using appropriate operation management technique

BPE4243
Warehouse & Inventory Planning
Credit: 3
Prerequisites : None

Synopsis:
The subject is intended to introduce the role of warehouse and logistics planning.

Course Outcomes:
CO 1 Describe the role of warehousing
Co 2 Explain strategic framework for logistics decisions which involves planning, designing and operating processes.
CO 3 Apply analytical knowledge in problem solving situation of logistics management

BPE4112
Innovation & Technology Management
Credit: 2

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

Prerequisites : None

Synopsis:
This subject is intended to give an understanding on the concept of technology management and its application to an organization particularly business firm. The topics to be covered are : Introduction to Management of Technology, The Role of Technology in the Creation of Wealth, Critical Factors in Managing Technology, Technology Life Cycles, The Process of Technological Innovation, Business Strategy and Technology Strategy, Competitiveness, Technology Planning and Technology Transfer.

Course Outcomes:
CO 1 Recognise the general principles, terms, definitions, technical tools used in the management of technology
CO 2 Analyze the role of technology policies, strategies and management within and between organizations in the development, operation and marketing of goods and/or services
CO 3 Apply decision making techniques in the management of technology to address problems in the range of sectors

BPE4122
HR Management
Credit: 2
Prerequisites : None

Synopsis:
This course provides an overview of many issues related to managing human capital in organisation. Topics are designed to gain an understanding of how individuals in organisation grow and progress in their organisation, and what are the formal dimensions that impinge upon employees and employers, and their relationship to planning, mobility, goal-achievement, motivation and performance.

Course Outcomes:
CO 1 Understand key principles underlying effective job analysis, recruitement, selection, training & development, appraisal, compensation, incentive rewards and employment law issues
CO 2 Develop problem-solving skills by applying different approaches relevant to managing human capital
CO 3 Acquire abilities of analyzing and examing the effects of human resource policies, strategies and management on employees' and organization's performance in reality

BPE4132
International Business Environment
Credit: 2
Prerequisites : None

Synopsis:
This course aims to expose students to the macro-environment issues that contribute to the formation of international business. Students will develop the ability to evaluate the key issues that will impact the success or failure of an international business venture.

Course Outcomes:
CO 1 Examine countries differences, economics and politics of international trade and investment and global monetary system arising in the international business environment
CO 2 Analyse the challenges, opportunities and threats of going global
CO 3 Produce a feasibility report for entering into a foreign market

BPE4212
Database Systems
Credit: 2
Prerequisites : None

Synopsis:
This course covers fundamentals of database architecture, database management systems, and database systems. Students learns how database management systems can support business processes and are made familiar with the fundamental concepts of data mining / data retrieval. They apply the

concepts in a realistic enterprise scenario (capstone project).

Course Outcomes:

CO 1 Examine user needs and process requirements in order to develop a suitable enterprise data model

CO 2 Apply modern data query languages

CO 3 Integrate basic data mining tools for example business scenarios

BPE4222
Sustainability/Energy Efficiency
Credit: 2
Prerequisites : None

Synopsis:
This subject is designed to introduce to the students the importance of energy in peoples' life and in national as well as global economic development. Student will be exposed to the different types of fossil energy supply; supply and consumption trends both at global as well as national level; as well as energy consumption in residential, commercial and industrial sectors. The course also includes discussions on the impacts of energy use on the environment and the growing need for new and renewable energy technologies.

Course Outcomes:

CO 1 Recognize the importance of energy to human life and to economic development; energy supply and consumption trends; and how escalating energy costs will disrupt national as well as global economy.

CO 2 Demonstrate the understanding of the national energy mix; energy use in domestic, commercial and industrial sectors; the importance of energy efficiency and conservation programmes; introduction of energy audits.

CO 3 Relate the impact of escalating energy costs to national and global economy; and impact of energy production-to-consumption chain towards local and global environment

CO 4 Identify the impact of the current unsustainable use of energy to future world energy scenario; and importance of developing alternative energy technologies to supplement fossil-fuel based technologies.

BPE4232
Power Management (Electrical Grid)
Credit: 2
Prerequisites : None
Synopsis:
This course introduces the emerging concepts, technologies, applications, management and
the energy systems related to electrical grid and power transmission. It also covers a Smart Grid system which is more climate and consumer friendly for future sustainable energy usage.

Course Outcomes:

CO 1 Apply the basic concept of electrical grid

CO 2 Explain the architecture of smart grid systems and the relations among the stakeholders

CO 3 Design a future grid system for sustainable energy usage

BPE4313
Production Accounting & Control
Credit: 3
Prerequisites : None

Synopsis:
The Module familiarizes students with the basic concepts and tools of management accounting and focuses on their use at the shop floor level of manufacturing enterprises and the manufacturing environment in general. Special emphasis is put on shop floor performance management and manufacturing cost management.

Course Outcomes:

CO 1 Critically reflect and apply the main tools of management accounting in simplified real-life settings.

CO 2 Analyze the particular problems arising when management accounting & control is performed at the shop floor.

CO 3 Develop a suggestion for a management accounting & control system in a particular manufacturing setting.

BPE4413
Production Planning & Methods
Credit: 3
Prerequisites : None

Synopsis:
The subject covers planning and controlling of production in production and operation management; concepts of JIT, MRP, MRPII, ERP, production system design, analytical techniques and concepts of production and process control in industrial management.

Course Outcomes:
CO 1 Discover production planning and control approach applied in industry.
CO 2 Display appropriate production planning and control methods in solving the industrial problems.
CO 3 Demonstrate relevant industrial production planning information and data from records, database or operation processes.

BPE4423
Technical Application and Machines
Credit: 3
Prerequisites : None

Synopsis:
Introduction to the techniques, and equipments of Industrial manufacturing. Emphasis on technical application such as machining, welding, casting, and forming operations.

Course Outcomes:
CO 1 Understanding the basic concepts of industrial processes
CO 2 Introduction to and analysis of common processing techniques
CO 3 Develop the capability to make scientific decision involving industrial processes

BPE4433
Materials Science
Credit: 3
Prerequisites : None

Synopsis:
The purpose of this course is to provide a general background of the field of material science and engineering. Fundamental topics such as chemical bonding in materials, crystal structure and defects, diffusion and phase diagram will be introduced. Then mechanical properties of materials will be covered and information of types of material and their applications be provided.

Course Outcomes:
CO 1 Introduce the fundamentals of chemistry of engineered materials
CO 2 Expand the understanding of the classes of materials
CO 3 Develop the capability to make scientific decision involving material selection and processing

BPE4443
Product Engineering
Credit: 3
Prerequisites : None

Synopsis:
Maintaining the competitiveness of companies requires going into foreign markets and being differentiated from the competition by something more than simply differences in costs. In this context, being capable of introducing new products into the market at high quality levels, constitutes the best strategy. This course helps the students to understand the strategic and operational aspects that a company has to command in order to have an efficient and effective development process for new products.

Course Outcomes:
CO 1 Understanding the strategic and operational aspects of the process of product development.
CO 2 Having knowledge of the most advanced tools and practicing on it.
CO 3 Attain a balance between theory and practical.

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BPE4453
Electrical Drives
Credit: 3
Prerequisites : None

Synopsis:
Electric motors are extensively used in many stages of industrial processes. Since 70% of global electricity generation is consumed by electric motors, it is essential to design efficient electric drives to increase system reliability and to lower operational costs in a plant. Substantial energy savings can be obtained by employing advanced control and semiconductor power converter technologies combined with a suitable selection of electric motor type and rating. This course is intended primarily to provide a fundamental knowledge of modeling, analysis and integration of mechanical and electrical components and to introduce various aspects of design and control techniques in electrical drive applications, such as manufacturing lines, electric transportation, air-conditioning and ventilating, crane and hoist applications, etc. The energy systems related to electrical grid and power transmission. It also covers a Smart Grid system which is more climate and consumer friendly for future sustainable energy usage.

Course Outcomes:
CO 1 To demonstrate knowledge of classical electric machines
CO 2 To analyze equivalent circuit representatives for modelling the drive characteristics
CO 3 To integrate principal methods of control in variable-speed drive systems

The information provided by Faculty of Industrial Management are based on University's Regulation and endorsement until 23 March 2020.

FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY

FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY

INTRODUCTION

Faculty of Industrial Sciences and Technology offers six academic programmes in the field of Applied Sciences (Industrial Chemistry, Industrial Biotechnology, and Material Technology), and Occupational Safety and Health.

The programmes are designed to align with the industry needs and the national policy towards complying with the 4th Industrial Revolution (IR 4.0). The faculty has established a linkage with reputable universities and industries at national and international levels. Six month industrial internship at the end of the study period is compulsory for all the students. Faculty also offers a special programme known as Structured Early Industrial Exposure Program (SEIEP) to expose our students with real working environment in industry. Our graduates are eligible to apply for professional body membership e.g. Malaysia Board of Technologists (MBOT) and Malaysian Institute of Chemistry (IKM). Students have the opportunity to go for student exchange programme at local and oversea institutions. All our degree programmes have been fully accredited by the Malaysian Qualifications Agency (MQA).

The faculty has successfully achieved graduate employability exceeding 95% for at least three consecutive years. Our graduates have been employed by numerous reputable national and multinational companies (80% of employment); as reported in 2019.

PROGRAMMES OFFERED

- Bachelor of Applied Science in Industrial Chemistry with Honours.
- Bachelor of Applied Science in Industrial Biotechnology with Honours.
- Bachelor of Applied Science in Material Technology with Honours.
- Bachelor of Occupational Safety and Health with Honours.
- Diploma in Occupational Safety and Health.
- Diploma in Industrial Sciences *First intake in June 2021.

CAREER OPPORTUNITIES

Bachelor of Applied Science in Industrial Chemistry with Honours:
- Chemist
- Process Development Chemist /Engineer
- Product Specialist
- QA/QC/Lab Executive
- Manufacturing Engineer / Officer
- Research / Science Officer
- Technical Service Personnel
- Technical Regulatory Affairs Officer
- R&D Consultant
- Marketing and Sales Executive
- Technopreneur
- Academician
- Any related position

Bachelor of Applied Science in Industrial Biotechnology with Honours:
- Clinical Researcher
- Diagnostic Executive
- Marketing and Sales Personnel
- Medical Laboratory Technologist
- Project Manager
- Production Engineer
- Quality Control Analyst
- Research / Science Officer
- Scientist (Biochemist, Microbiologist, Molecular Biologist etc.)
- Technical Service Personnel
- Technical Regulatory Affairs Officer
- Technopreneur
- Safety Officer
- Academician
- Any related position

Bachelor of Applied Science in Material Technology with Honours:
- Compounding Engineer
- Material Technologist
- Material Analyst
- Manufacturing Officer
- Marketing and Sales Personnel
- Production Engineer
- Packaging Development Engineer
- QA / QC Executive
- Research / Science Officer
- Technopreneur
- Academician
- Any related position

Bachelor of Occupational Safety and Health with Honours:
- Site Safety Supervisor (SSS)
- Safety and Health Officer (SHO)
- OSH/Health, Safety and Environmental Engineer (HSE)
- Environment, Health and Safety (EHS) Coordinator
- OSH/HSE/EHS Executive
- OSH/HSE/EHS Manager
- OSH/HSE/EHS Advisor
- Fire and Emergency Executive
- Occupational Ergonomist
- Industrial Hygienist
- Risk Surveyor/Engineer
- Academician and Researcher
- Trainer and Consultant
- Entrepreneur
- Any related position

Diploma in Occupational Safety and Health:
- Fire Technician
- Permit to Work (PTW) System Coordinator
- Site Safety Supervisor (SSS)
- Occupational Safety and Health Coordinator (OSHC)
- Safety and Health Officer (SHO)
- Any related position

Diploma in Industrial Sciences:
- Technician
- QA/QC/Lab Executive
- Medical Laboratory Technologist
- Assistant Application Specialist
- Laboratory Assistant
- Laboratory Technologist
- Production Assistant
- Technical Writer
- Facilities Technician
- Assistant Environmental Officer
- Assistant Safety & Health Officer
- Assistant Chemist
- Any related position

FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY
CURRICULUM STRUCTURE
BACHELOR OF APPLIED SCIENCE IN INDUSTRIAL CHEMISTRY WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEM	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
FACULTY & PROGRAMME COURSES	UHL2422 ENGLISH FOR TECHNICAL COMMUNICATION	UHC1012 FALSAFAH DAN ISU SEMASA	UHL2412 ENGLISH FOR ACADEMIC COMMUNICATION	UHL2432 ENGLISH FOR PROFESSIONAL COMMUNICATION	UHF2**1 FOREIGN LANGUAGE II	BSK3143 UNIT OPERATION	BSK4153 ADVANCED INSTRUMENTATION TECHNIQUE	BSK4812 INDUSTRIAL TRAINING
	BCS1023 PROGRAMMING TECHNIQUES	UQB1**1 CO-CURICCULUM I	UHS1011 SOFTSKILL I	UGE2002 TECHNO-PRENEURSHIP	UHL4012 ELECTIVE SOCIAL SCIENCES	BSK3472 UNIT OPERATION LABORATORY	BSK4314 FINAL YEAR PROJECT II	
	BSK1103 ORGANIC CHEMISTRY	BSK1143 INORGANIC CHEMISTRY	UHF1**1 FOREIGN LANGUAGE I	UQ*2**1 CO-CURRICULUM II	UHS2011 SOFTSKILL II	BSK3153 ORGANIC CHEMISTRY PROCESS	BSK3**3 ELECTIVE IV	
	BSK1402 ORGANIC CHEMISTRY LABORATORY	BSK1422 INORGANIC CHEMISTRY LABORATORY	BSK2143 INSTRUMENTATION METHOD	UHC2022 PENGHAYATAN ETIKA DAN PERADABAN	BSK3103 ORGANIC SPECTROSCOPY	BSK3302 FINAL YEAR PROJECT I	BSK3**3 ELECTIVE V	
	BSK1133 PHYSICAL CHEMISTRY	BSK1153 ANALYTICAL CHEMISTRY	BSK2442 INSTRUMENTATIO N METHOD LABORATORY	BSK2133 SEPARATION TECHNIQUE	BSK3462 ORGANIC SPECTROSCOPY LABORATORY	BSK3**3 ELECTIVE II		
	BSK1412 PHYSICAL CHEMISTRY LABORATORY	BSK1432 ANALYTICAL CHEMISTRY LABORATORY	BSK2183 THERMO DYNAMICS	BSK2123 MATERIAL CHEMISTRY	BSK3163 INORGANIC CHEMISTRY PROCESS	BSK3**3 ELECTIVE III		
	BUM2123 APPLIED CALCULUS	BUM2413 APPLIED STATISTICS	BSF2112 INDUSTRY QUALITY MANAGEMENT	BSK2452 MATERIAL CHEMISTRY LABORATORY	BSK3**3 ELECTIVE I			
		BSF1222 INDUSTRY SAFETY MANAGEMENT	BPQ1223 PRINCIPLES OF OPERATION MANAGEMENT	BSK2223 LABORATORY QUALITY MANAGEMENT & VALIDATION				
TOTAL CREDIT	18	18	18	17	15	16	13	12
TOTAL CREDIT FOR GRADUATION	127							

The information provided by Faculty of Industrial Sciences and Technology are based on University's Regulation and Endorsement until 11 May 2021

COURSE SYNOPSIS FOR BACHELOR OF APPLIED SCIENCE IN INDUSTRIAL CHEMISTRY WITH HONOURS

BSK1153
Analytical Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course will provide students with a basic understanding of analytical chemistry and major aspects of quantitative chemical analysis. The course is an introductory part of a series of analytical chemistry courses for industrial chemistry program. It will concentrate upon descriptive analytical chemistry and analytical methods based on chemical equilibrium which include precipitation and volumetric analysis.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the theory and basic technique in analytical chemistry.
CO2: Solve problems involving both the qualitative and quantitative analysis.
CO3: Apply the essential facts, concepts, principles and theories relating to analytical chemistry to solve the real chemical analysis problems.

BSK1432
Analytical Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

The objective of this course is to provide students with the basic skills in analytical chemistry field, the science of chemical characterization and measurement. The course is an introductory part of a series of analytical chemistry courses for industrial chemistry majors. It will concentrate upon descriptive analytical chemistry and analytical methods based on chemical equilibriums which include precipitation, volumetric and thermal analysis. A brief introduction to instrumental methods, separation methods, instrument calibrations and method validations, process analytical chemistry as well as good laboratory practice will also be practice in lab.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the relationship of the chemical and physical properties of a system to the analytical process undergone.
CO2: Demonstrate the several chemical monitoring using several analytical methods and evaluate the obtained data with group member.
CO3: Express the optimal analytical chemical method in terms of the application or analyte to group member.

BSK1103
Organic Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses the fundamental theory of properties, synthesis and organic reactions where use the functional group as framework. Focus on the key concepts of organic chemistry through a study of the reactions of selected functional groups. A particular emphasis is placed on the underlying some mechanistic pathways that are involved. The stereochemistry of the molecular structure is also considered. The development of key skills is facilitated by a program of consultancy and practical.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the chemical structures, properties of common organic compounds and their reaction.
CO2: Explain the fundamental organic reactions, mechanism and reaction conditions.
CO3: Apply the fundamental organic chemistry in various industrial application.

BSK1402
Organic Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

The practical course comprises several laboratory experiments related to organic chemistry. In organic chemistry experiments, students are exposed to melting point determination, extraction, distillation, isolation, crystallization, determination of

optical activity and identification of an organic functional groups.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply the knowledge of organic chemistry to solve the problem.
CO2: Report and discuss the data and information of the experiment.
CO3: Communication by explain questions given based on experiments.

BSK1143
Inorganic Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

The objective of this course is to give the student a basic understanding of theoretical inorganic chemistry and to apply this understanding to problem solving involving critical thinking. The topics covered in this course include periodic trends, foundations of bonding theory, basic coordination chemistry, chemistry of the main group elements and block d elements. Some of the important concepts in bioinorganic chemistry as well as nanomaterials, nanoscience and nanotechnology will be discussed. This basic understanding is to prepare the student for additional coursework, either in chemistry or in other disciplines, and to help the student function in a technological society.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain certain key introductory concepts in inorganic chemistry (e.g. crystal field theory, common structural types, bonding) as well as the physical and chemical properties of inorganic compounds.
CO2: Use these concepts in problem solving, describe the chemistry of main group elements and transition metals.
CO3: Use resources to follow the current interests in inorganic chemistry.

BSK1422
Inorganic Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This course will provide the students a clear idea of the reactivity of the elements in different groups.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain the chemical reactions of the main group elements.
CO2: Ability to design, conduct experiments as well as to analyse and interpret data in relation to laboratory works.
CO3: Use resources to explain the chemical reactions.

BSK1133
Physical Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

The course discusses the concepts and fundamental principles of physical chemistry. These include the properties of solid, liquid and gas, chemical equilibrium, dissolution and solution properties, chemical colloid and surface, thermodynamics, chemical kinetics and catalyst. In order to achieve technical development in the advanced technologies that requires the ultimate precision of atomic level, it is indispensable to understand the physical phenomena involved in the Industrial technology on the basis of fundamental principles.

Course Outcome

By the end of semester, students should be able to:
CO1: Define the various laws in terms of chemical reactions.
CO2: Analyse/solve the given problem from physical chemistry.
CO3: Applications the important physical laws in industrial processes.

BSK1412
Physical Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

Practical comprises laboratory experiments involving theory in the physical chemistry course. Students will be exposed to chemical equilibrium, thermochemistry, calorimetry, electrochemistry and kinetic theory of gases

and various experiments related to physical chemistry concepts.

Course Outcome

By the end of semester, students should be able to:
CO1: Understanding the theory of physical chemistry.
CO2: Ability to conduct experiments, analyse and interpret data from laboratory works.
CO3: Problem solving skills thru laboratory experimental data.

BSK2143
Instrumentation Method
Credit Hour: 3
Prerequisite: BSK1133

Synopsis

This course is designed to introduce the modern instrumental methods that are used to solve analytical problems in chemistry. Qualitative and quantitative analysis which were studied in Analytical Chemistry course will be further explored. The course will begin with the explanation on instrumentation method concepts and the tools for quantitative analysis. Students will be introduced to spectroscopy (AAS, HPLC, GC, IC, MS, UV/VIS, FTIR, and NMR) and will deal with the methods of electroanalytical chemistry.

Course Outcome

By the end of semester, students should be able to:
CO1: Demonstrate the knowledge of instrumental analysis principles.
CO2: Select the most appropriate instrumental analysis technique to solve an analytical problem.
CO3: Able to discuss new application in instrumental analysis technique relevant to the fast progressing of chemical analysis area.

BSK2442
Instrumentation Method Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This course exposes students to modern instrumental methods including UV-visible spectrophotometers (UV/VIS), Atomic Absorption Spectrometer (AAS), High performance Liquid chromatography (HPLC), and Gas Liquid Chromatography (GC) with various detectors that are used to solve analytical problems in chemistry. Students will develop skills like being a team player through working in groups and technical writing skills through report writing.

Course Outcome

By the end of semester, students should be able to:
CO1: Show appropriate experimental technique in instrumentation laboratory.
CO2: Understanding the principles in instrumentation laboratory.
CO3: Write scientific report with relevant reference materials.

BSK2123
Material Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces students to the science of materials, including the scopes of physics, chemistry and basic engineering which complement the so-called interdisciplinary area of materials science. Emphasis is given on three main elements: Structures, Properties and Performances, with an additional material's applications. Atomic/sub-atomic structures, bonding, crystal structure and defects will be described. Properties (electrical, mechanical, optical) and Performances (processes and deformation) will be included. The uses of selected materials will also be considered.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental knowledge of each material that covers in this course.
CO2: Apply calculation related to mechanical, electrical, magnetic, thermal and optical properties of materials and their composites.
CO3: Correlate the material chemistry logic and knowledge to industrial landscape.
CO4: Recognize the needs for, and possess the capability in life-long learning.

BSK2452
Material Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This course exposes students to the handling of various materials and their laboratory preparations and characterizations. The students will learn the skills and experimental techniques for the synthesis. The determination of their properties and characterizations of some important materials will be discussed in the Material Chemistry course.

Course Outcome

By the end of semester, students should be able to:
CO1: Practice the procedures in handling of industrial materials and the role of materials scientist in the future development of industry.
CO2: Analyse the mechanical, electrical, magnetic, thermal and optical properties of materials and their composite as well as the influence of fillers on these properties.
CO3: Acquire a working knowledge on the relationship between the raw material properties and the processing.
CO4: Perform creativeness ideas as well as teamwork and communication skills.

BSK2183
Thermodynamics
Credit Hour: 3
Prerequisite: BSK1113

Synopsis

This course discusses thermodynamic in greater detail. Changes in physical properties will be extensively discussed in each law of thermodynamics. A special emphasis will be placed on the basic concepts of work, heat, internal energy, heat capacity and enthalpy changes in First Law of Thermodynamic. In the Second Law, entropy changes in reversible and irreversible processes will be discussed. Absolute entropy will be discussed in Third Law. Also discussed in this course is thermal equilibrium in the Zeroth Law, principles and applications of ionic interactions and electrochemical systems.

Course Outcome

By the end of semester, students should be able to:
CO1: Elaborate on thermodynamic concept.
CO2: Use thermodynamic concepts to explain chemical phenomena.
CO3: Calculate thermodynamic variables.

BSK2133
Separation Technique
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the basic principles and instrumentation of separation methods in chemistry. The major separation method used in chemical analysis, including chromatography and electrophoresis, will be discussed. Characterization, mechanism involved in separation, instrumental systems, advantages and limitation of methods will also be discussed. Students will be exposed to development and application of knowledge in explaining the concepts and principles of separation.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain the relationship of the chemical and physical properties of a system to the separation process undergone.
CO2: Planning the separation method by using several separation mechanisms.
CO3: Adopt the optimal separation method for the application or targets.

BSK2223
Laboratory Quality Management and Validation
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the Good Laboratory Practice (GLP) and ISO 17025 Principles and Requirements for high-stakes testing and calibration laboratories. The quality infrastructure supporting testing and research laboratory management will be introduced with many aspects of laboratory quality management and the way to achieve recognition and certification. In addition, different perspectives and theories of method validation including issues in validating, testing, research method and measurement of uncertainty will be addressed.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the GLP Principles and the ISO 17025 requirements to Laboratory Quality Management and certification.
CO2: Solve the theoretical problems on method validation and uncertainty comprehensively.
CO3: Demonstrate teamwork skills in assigned task.

BSK3143
Unit Operation
Credit Hour: 3
Prerequisite: BSK2183

Synopsis

This course discusses material balance on steady and recycle states and material balance based on chemical processes. Emphasis will be placed on energy balance concept based on chemical processes including calculation of heats of reactions and application of the steam table. Also covered in this course are fluid pressure and fluid dynamics, liquid flow measurement, heat transfer and heat exchangers.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply the equation in solving problems of energy balance, materials balance, fluid mechanics and heat transfer.
CO2: Respond to a given problem based on unit operation.
CO3: Propose the concept of energy balance, material balance, fluid mechanics and heat transfer to overcome chemical processes problems.

BSK3472
Unit Operation Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

Laboratory experiments are designed and structured for the course is related to several unit operations in an open laboratory concept. Laboratory practice are based on pilot-scale apparatus i.e. tray drier, mixers, fixed and fluidised unit, batch and continuous distillation column unit, liquid-liquid extraction unit etc.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply theory in project scale-up of bench-scale laboratory into pilot scale environment.
CO2: Follow good laboratory skill in an open laboratory concept and relate into several industrial processes.
CO3: Display effective communication in written (lab reports) with compile experimentally generated data into concise, clearly written laboratory reports, present the reports within the timeline.
CO4: Work as a team member to finish the given task.
CO5: Build a company which produce the product by applying unit operation knowledge.

BSK3163
Inorganic Chemistry Process
Credit Hour: 3
Prerequisite: None

Synopsis

This course gives an overview of modern inorganic chemical processes in the framework of global, sustainable and technical innovation involving major inorganic chemistry industries, traditional and novel inorganic processes, new chemical science and engineering technology, process design and development, manufacturing and operation, the future of inorganic chemical processes and the R&D activities for new inorganic processes.

Course Outcome

By the end of semester, students should be able to:

CO1: Discuss confidently the technology progress and related development related in inorganic chemistry processes.
CO2: Develop skills of innovative practices in industrial inorganic processes.
CO3: Seek information on the state of art and express innovative suggestions for betterment of inorganic processes.

BSK3153
Organic Chemistry Process
Credit Hour: 3
Prerequisite: None

Synopsis

This course reviews the whole spectrum of today's most commonly used industrial organic chemicals. It explains their origins, uses, preparations. It answers questions of today of chemical industry, such as, what are the industrial chemicals and where do they come from? How are they made? What are the factors that affect their level of production and pricing? The course covers the sources, their competitive process and commercial uses of main building blocks starting from 1 carbon structure to other cycle building blocks as well as other important industrial products such as organic pigments, oils and fats, soap & detergents etc.

Course Outcome

By the end of semester, students should be able to:

CO1: Elaborate the basic concept of the industrial organic chemical process, their chemistry and basic chemicals reactions their sources used in the production of large-scale industrial chemicals products.
CO2: Explain the synthesis and applications of various industrial chemicals products and their commercial importance.
CO3: Communicate the knowledge, their benefits, daily life use of industrial chemicals compounds effectively.
CO4: Identify and select appropriate problems and work independently in the chemical industry.

BSK3103
Organic Spectroscopy
Credit Hour: 3
Prerequisite: None

Synopsis

This course deals with the four major instrumental methods such as ultra-violet/visible, infrared, mass spectroscopy and nuclear magnetic resonance spectroscopy. It provides a concise introduction to the physical background of each, describing how molecules interact with electromagnetic radiation or how they fragment when excited sufficiently, and how this information may be applied to the determination of chemical structures of organic compounds. It also includes simple descriptions of instrumentation and emphasizes modern methodologies such as the Fourier transform approach to data analysis. Each chapter is related with a set of problems to be solved in the tutorial lectures to test the understanding of organic spectroscopy.

Course Outcome

By the end of semester, students should be able to:

CO1: Point out detail the concepts, theories and application of spectroscopy in organic chemistry.
CO2: Utilize the concepts and understanding of spectroscopy in organic structure determination and for quantitative purposes.
CO3: Communicate effectively in written and oral form through group discussion and presentation session.
CO4: Build up a strong knowledge in qualitative analysis in relations with various type of spectrum.

BSK3462
Organic Spectroscopy Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

The aim of this course is to provide students with a basic understanding of spectroscopic analysis suitable for the determination of the structure of organic molecules. The course will concentrate upon the most commonly used techniques in organic structure determination, i.e. infrared spectroscopy (IR), ultraviolet-visible (UV-Vis) spectroscopy and gas-chromatography-mass spectrometry (GC/MS). The amount of time devoted to each technique in this course is meant to be representative of their current usage for structure determination.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the basic concept of spectroscopic analysis in determining the chemical structure of organic molecules.
CO2: Show the appropriate analytical method in conducting the respective experiments and interpret the spectral data acquired.
CO3: Explain the principles of spectroscopy and determine the chemical structure using spectrum.

BSK4153
Advance Instrumentation Techniques
Credit Hour: 3
Prerequisite: None

Synopsis

This course is designed to produce graduates who have knowledge of advanced instrumentation involved in chemical-related industries and sectors (i.e. oil and gas, material, bio-related, commercial testing laboratory, environment). Topics discussed in this course cover physical and chemical testing, surface analysis, trace element analysis, thermal analysis and molecular testing. Students will learn the theory of the selected advanced instrumentation techniques, their operation and apply them into different chemical-related applications. Upon completion, students should be able to interpret and analyse the data obtained from each instrument.

Course Outcome
By the end of semester, students should be able to:
CO1: To explain the theory of advanced instruments used in chemical-related industries and sectors.
CO2: To relate the advanced instruments to the applications in chemical-related industries and sectors.
CO3: To interpret the results from various advanced instrumentation techniques.

BSK3302
Final Year Project I
Credit Hour: 2
Prerequisite: None

Synopsis

To expose and encourage student in doing research, define problems, give an opinion on how to overcome the problems and get related information regarding the problems. The topics that will discuss in this subject are literature review and methods that has been used by previous research, research report (proposal), research ethics and project management.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve related problems in a project topic using the appropriate principles.
CO2: Analyse the appropriate concepts learned and suitable solutions to be applied.
CO3: Defend ideas effectively in both oral and written forms
CO4: Initiate and commit to participate in gaining and sharing knowledge.

BSK4314
Final Year Project II
Credit Hour: 4
Prerequisite: None

Synopsis

The students are required to conduct the research, collect and analyse data, discuss the findings and form the conclusions. At the end of the semester, each student is required to present their findings and submit a dissertation. Evaluation is based on oral presentation and submitted dissertation.

Course Outcome

By the end of semester, students should be able to:
CO1: Analyse, interpret and relate experimental data with fundamental theories.
CO2: Demonstrate good organization of laboratory logbook in recording experimental methods and data.
CO3: Assemble research proposal in professional format such as oral presentation.
CO4: Report satisfactory project progress within the timeline.

BSK4812
Industrial Training
Credit Hour: 12
Prerequisite: All faculty and programme courses

Synopsis

This course aims to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make a regular entry describing the work they are undertaking. Then, student need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to be submitted to the university supervisor. Student need to perform final presentation for assessment. Students are supervised by industrial and university supervisors to guide and ensure they can

perform their work as good as possible and achieve the objective for this course.

Course Outcome

By the end of semester, students should be able to:

CO1: Adapt working culture in project, consultant, construction and related industry.
CO2: Organize the industrial training knowledge, experience and skill in the preparation of the industrial training report.
CO3: Build effective communication skills in written and oral presentation.

BSF1222
Industry Safety Management
Credit Hour: 2
Prerequisite: None

Synopsis

This course exposes students to basic concepts in industrial and laboratory safety. Topics include quality systems (Good laboratory Practice and ISO/IEC 17025) for laboratory management, occupational health & safety and acts and related regulations. Students will be introduced to laboratory and industrial safety, laboratory and industrial accident, safety policy and procedure, emergency response plan, introduction to basic toxicology and first aid.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the basic concepts of industrial and laboratory safety.
CO2: Apply the information of quality systems and safety policies, procedures and laboratory safety manual based on a task given.
CO3: Relate hazard communication and emergency preparedness and response.
CO4: Report the laboratory and industry functions to comply with safety rules and regulations, write a laboratory safety manual and work in a team for a task given.

BPQ1223
Principles of Operation Management
Credit Hour: 3
Prerequisite: None

Synopsis

The course provides a range of academic knowledge, operations understanding, operational management techniques. It will focus on the main decision areas of operations management and the role of the operations manager for productivity improvement.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply the fundamental concept and the main areas of operation management.
CO2: Demonstrate operation decisions in solving operational problems.
CO3: Justify operation management requirements.

BSC1023
Programming Technique
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses on understanding problems and translating them into computer solution techniques using programming language. This course enables students to apply programming techniques, write programming codes from given problems and execute programming codes successfully.

Course Outcome

By the end of semester, students should be able to:

CO1: Demonstrate various techniques in solving a problem.
CO2: Construct and run programs.
CO3: Differentiate various techniques in solving a problem.

BUM2123
Applied Calculus
Credit Hour: 3
Prerequisite: None

Synopsis

Calculus is widely used in solving problems in science and engineering applications.

Students are exposed limits and continuity; the derivative; the derivative in graphing and applications; integration; applications of the definite integrals in geometry, science and engineering; exponential, logarithmic, and inverse trigonometric functions; principle of integral evaluation; interpolation, extrapolation, errors.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse and apply appropriate calculus concepts to solve various science and engineering problems.
CO2: Use appropriate software and tool to solve the graphical and computational problems in calculus.
CO3: Analyse and think critically a wide range of problem and solve it using ideas and methods in calculus.
CO4: Relate and applied the concepts and methods studied into other courses.

BUM2413
Applied Statistics
Credit Hour: 3
Prerequisite: None

Synopsis

Students are introduced to statistics including statistical problem-solving methodology and descriptive statistics, probability distribution commonly used, sampling distribution and confidence interval, hypothesis testing, analysis of variance (ANOVA), goodness of fit and contingency tables and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse data using statistical theory and methodology, and recommend a conclusion or suggestion based on the analysed data.
CO2: Perform statistical data analysis by using appropriate software and scientific calculator.
CO3: Apply statistical concepts and methods learned to solve any related problems in various disciplines.

BSP2112
Industrial Quality Management
Credit Hour: 2
Prerequisite: None

Synopsis

This course focuses on the management of quality for manufacturing and service sectors to achieve global competitiveness. Emphasis is placed on new techniques for managing quality. This course is divided into two parts. Part one introduces quality assurance principles, including (i) Good Manufacturing Practices (GMP), (ii) ISO 9000 family and (iii) various continuous improvement techniques and (iv) audit process. Part two focuses on the quality control system, which is concerned with (i) quality control tools used in industries, (ii) acceptance sampling, (iii) statistical data analysis, (iv) reliability and maintainability, and (v) cost of quality.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the concept of industrial quality management which comply with Good Manufacturing Practice and other related regulations.
CO2: Apply philosophies of quality in an industrial management system.
CO3: Demonstrate leadership characteristic in assigned task.

BSK3593
Environmental Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the concepts of environmental science, environmental analysis, and environmental issues. It covers some fundamental aspects of the science of atmosphere, waters, and soil. This course covers environment quality guidelines used in Malaysia. It also covers the environmental monitoring strategies and analysis of inorganic and organic analyte in environment.

Course Outcome

By the end of semester, students should be able to:

CO1: Construct well-reasoned solutions to environmental predicaments, testing them against relevant criteria and standards.
CO2: Classify and explain the complex physical, chemical and biochemical systems of natural environments and

different types of environmental monitoring strategies.
CO3: Show the ability to communicate effectively through group assignment or presentation.
CO4: Read appropriate reference materials regarding environmental issues to solve the problem.

BSK3573
Flavour and Fragrance Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course is an introduction to aroma chemicals, essential oils, fragrances and flavour compositions for the food, cosmetics and pharmaceutical industry. The present state-of-the-art technology, the future use of resources and approaches for the production of the respective chemical compounds will be discussed. Another section is devoted to the description of the renewable resources of flavours: spice plants, fruits from moderate to tropical climates, vegetables, fermented and heated plants. Analytical methods, such as gas chromatography coupled to human or electronic noses or to a mass spectrometer, will be outlined. Consumer trends, legal and safety aspects will also be discussed. Novel renewable resources are sourced from biotechnology; enzymes, for example, bio-transform cheap substrates to produce flavours de novo.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain fundamental process formation and formulation fragrance from plants.
CO2: Propose extraction, analysis and application of fragrance based on essential oil.
CO3: Seek information on the contemporary fragrance industries and technology independently.

BSK3633
Medicinal Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

The medicinal chemistry course discusses the introduction of medical plants, their role in drugs discovery. This course describes the Extraction of lead compounds, their chemistry, isolation and purification of novel drugs. This course focusing on the key concepts of drugs and their synthesis application human health. Med. Chem. course targeting the chemistry of drugs and their metabolism, and how a drug can act in human body. These contents of course have potential understanding about enzymes inhibitions and mechanism in drugs synthesis and application. This course also focusing on the key concepts of Structure Activity Relationship of drugs and affects and importance. Finally, the course will help to the students can work pharmaceutical industry. This course comprises about Nucleic acid, DNA and RNA and medicinally importance in genetic and role in mutation.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain the medicinal plants, drugs discovery, extraction of lead bioactive compounds, to understand their chemistry and isolation and purification novel drugs.
CO2: Formulate the drugs, synthesis, their mechanism of action, enzymes inhibitions and mechanism in drugs application antibiotics, antibacterial drugs effects on cell wall inhibition.
CO3: Apply the knowledge of medicinal chemistry into pharmaceutical industry, Structure Activity Relationship of various drugs. The role of importance of nucleoside and nucleotides, the role RNA and DNA in cell.

BSK3513
Petrochemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course gives an overview on related processes and issues involved in petroleum and petrochemical industry. The first part of the course will introduce the concept of petroleum refining including the main processes such distillation, reforming, cracking, coking and blending. The parameter affecting each process will be discussed. The characterization and analysis of various petroleum feedstocks and products using basic and advanced instruments will be introduce in this course. The second part of the course will cover the downstream processes to produce fine chemicals and other petro-based products from different feedstock

i.e. C1 to C4 alkanes, olefins and aromatics hydrocarbon. Besides, this course will also introduce alternative hydrocarbon feedstocks other than petroleum including bio-based feedstock. Lastly, some of the environmental aspects and pollution prevention in petroleum refining and petrochemical industry will be discussed.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the different parts in petroleum refining, petrochemical and other hydrocarbons related processes as well as the factor affecting the overall process and its safety aspects.
CO2: Analyse the relationship between the properties of feedstocks and products in chemical transformations of petroleum and other hydrocarbons including their reaction pathways.
CO3: Propose suitable method and/or instrument for analysing and testing any petroleum and petrochemicals related samples.
CO4: Seek information on the contemporary processes/methods in petroleum and petrochemical industries independently.

BSK3533
Polymer Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

The course highlights the fundamental principles of polymer chemistry and technology. The discussion covers the reactions mechanism and types of polymers based on reactions category. The general characteristics of polymer, polymerization process, polymer synthesis, specific characteristic of polymer including thermal, morphological and rheological properties. The progress / development of industrial polymers using the advanced technologies. The role played by polymer in the universe, earth, living system and human society is realized and a better understanding of polymeric materials in daily life.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the fundamental principle of polymerisation reactions in terms of various reaction categories.
CO2: Analysing the rheological properties of advanced polymeric materials to improve the applications demand in market.
CO3: Build up awareness on polymers and plastic materials useful in daily life.

BSK3583
Electrochemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course gives an overview of electrode processes, showing the way in which, the fundamental components of the subject come together in an electrochemical experiment. There are individual discussions of thermodynamics and potential, electron-transfer kinetics and mass transfer in electrochemical system. Concept from these basic areas are integrated together in treatments of various methods. The interfacial structure, adsorption and modified electrode will also be discussed. By mastering the fundamental in electrochemical processes, their applications in various aspects will be discussed.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain fundamental electrode processes in terms of thermodynamics and kinetics.
CO2: Propose electrochemical methods to solve industrial-based problem.
CO3: Seek information on the contemporary electrochemical method independently.

BSK3503
Functional Food
Credit Hour: 3
Prerequisite: None

Synopsis

This course focuses on the usage and application of plant and animal-based food products with their important functional properties and health benefits. Students will learn about constituents that make the food product functional and they will learn about chemistry and physiological effects of functional food.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify the chemical constituents in functional food that affects the health benefits.

CO2: Describe the structure and function of chemical constituents in the functional foods.

CO3: Select functional food products and describe their health benefits with other group members for market.

BSK3523
Oleochemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course covers various aspects of oils and fats, including oleochemical derivatives. Oleochemical compounds are environmentally friendly chemicals that can be produced from raw material of oils and fats from plant, animal and petroleum by cracking process, or modification. In recent times, depleting sources from fossil origin, oils and fats of non-fossil origin have started to make great re-entries into various industries including the fuel sector. The advantage of such oils and fats is that their sources are renewable. Research in the field of oleochemistry has been progress rapidly in Malaysia. This allows our country to continue to emerge as a developed country that is competitive and continues to lead the global oleochemical industry. In this course, recent trends in research and development of oleochemistry will be discussed.

Course Outcome

By the end of semester, students should be able to:

CO1: Understand the general concept of oleochemistry (lipids, triacylglycerols, fatty acids etc.)

CO2: Studied the oleochemical feedstocks, production, analyses, biocatalyst, structures and applications.

CO3: Appreciating the application of oleo chemistry

COURSE SYNOPSIS FOR BACHELOR OF APPLIED SCIENCE IN INDUSTRIAL BIOTECHNOLOGY WITH HONOURS

BSF2222
Laboratory Quality Management
Credit Hour: 2
Prerequisite: None

Synopsis

The purpose of this course is to introduce to you the comparable GLP and ISO 17025 Principles and Requirements for high-stakes testing and calibration laboratories. The course will address the quality infrastructure supporting testing and research laboratory management so one become familiar with many aspects of laboratory quality management and how to achieve recognition and certification. Upon successful completion of this course, students will have a firm grasp of the technical and philosophical aspects of laboratory quality management and will have the skills to initiate laboratory quality management for high-stakes testing and research programs.

Course outcome

By the end of semester, students should be able to:

CO1: Demonstrate understanding of 12 Essentials of Lab Quality Management System.
CO2: Communicate effectively of 12 Essentials of Lab Quality Management System.
CO3: Demonstrate awareness of the important of Lab Quality Management System to the institution, environment and community.

BSB2133
Cell and Molecular Biology
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses fundamental concepts of cell biology, structure and function of cellular organelles and it's their biomolecules. Emphasis will be given on compositions, structures and functions of cell membrane and concepts of cell division. The course also includes discussions on applications of cell biology such as cancer, pathogen infections and stem cells. Concepts of molecular biology, gene expressions and its control are also discussed. Brief introductions on techniques of molecular biology such as DNA/RNA extraction, polymerase chain reaction (PCR), and gene cloning also explained in this course.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the principle of cell and molecular biology.
CO2: Apply cell and molecular biology principle to solve related problems.
CO3: Analyse cell structures, biological mechanisms and their related investigation techniques.
CO4: Convey ideas clearly and effectively, as well as giving feedback on given topics.

BSB2472
Cell and Molecular Biology Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

In this course, students will be introduced and practice modern biotechnology laboratory techniques and theories. The topics that will be covered are proper laboratory equipment handling and techniques such as nucleic acid isolation and purification for Deoxyribonucleic Acid (DNA) cloning, polymerase chain reaction (PCR) and gel electrophoresis analysis. In addition, students will be exposed to basic tools for analysis of genes.

Course Outcome

By the end of semester, students should be able to:

CO1: Relate the fundamental theories with laboratory experiments
CO2: Demonstrate skills in performing cell and molecular biology experiments
CO3: Demonstrate skills in handling cell and molecular biology-related equipment
CO4: Analyse, Interpret and relate experimental data with the fundamental theories
CO5: Communicate through report writing
CO6: Work in team during laboratory session.

BSB1113
Biochemistry
Credit Hour: 3
Prerequisite: None

Synopsis

The course is designed to study the physical and biochemical characteristics of biomolecules including nucleic acids, proteins, carbohydrates and lipids. Important pathways for biosynthesis and degradation of nucleic acids, proteins, carbohydrates and lipids will be discussed. Production of energy from carbohydrate and lipids and the related metabolisms will also be discussed. Besides that, the principle of cellular signalling in living organisms also will be described in this course.

Course Outcome

By the end of semester, students should be able to:
CO1: Describe the structure, properties and biochemical roles of the biomolecules
CO2: Illustrate the energy productions in cell by glucose and its intermediates.
CO3: Explain biomolecules biosynthesis and degradation in metabolism
CO4: Compare the functionality of various metabolic pathways and importance of their integrations in organisms
CO5: Present idea in verbal and written form effectively and provide feedback on the given topic
CO6: Demonstrate structure illustrations of various biochemical compounds

BSB2173
Bioanalytical Chemistry
Credit Hour: 3
Prerequisite: BSB1102, BSB1113 and BSB1402

Synopsis

This course introduces spectroscopic methods for matrix characterization, principles of electrophoresis, isoelectric focusing, capillary electrophoresis, centrifugation methods, chromatography and mass spectrometry of biomolecules.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain and interpret the principles of different bioanalytical methods for their appropriate application
CO2: Apply fundamental knowledge of analytical biochemistry for their applications
CO3: Compare and contrast the function of each analytical instrument with their potential application in research as well as industries
CO4: Work in group to solve biochemical calculation assignment related to analytical instrument

BSB1402
Biochemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

The course introduces student with the basic calculation and techniques that are commonly used in a biochemical lab. The principle of spectrophotometry and the application of spectrophotometry in biochemistry. Several quantitative and qualitative tests on important biomolecules such as Lowry assay, Bradford assay and DNS assay.

Course Outcome

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments
CO2: Demonstrate skills in performing biochemistry experiments
CO3: Demonstrate skills in handling basic biochemistry-related equipment
CO4: Analyse, Interpret and relate experimental data with the fundamental theories
CO5: Communicate through report writing.
CO6: Work in team during laboratory session

BSB2442
Bioanalytical Chemistry Laboratory
Credit Hour: 2
Prerequisite: BSB1102, BSB1113 and BSB1402

Synopsis

This course introduces spectroscopic methods for matrix characterization, principles of electrophoresis, isoelectric focusing, capillary electrophoresis, centrifugation methods, chromatography and mass spectrometry of

biomolecules.

Course Outcome

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments
CO2: Demonstrate an array of biotechnology equipment efficiently with the knowledge of functionalities and calibration
CO3: Demonstrate skills in handling analytical instrument
CO4: Analyse, interpret and relate experimental data with the fundamental theories
CO5: Communicate through report writing
CO6: Work in team during laboratory sessions

BSB1102
Biophysical Chemistry
Credit Hour: 2
Prerequisite: None

Synopsis

The goal of this course is to emphasize the principle and biochemical calculation that are commonly used in biological studies including preparation of buffers and solutions, acids and bases chemistry, aqueous ionic equilibrium, bioenergetics and kinetics. All of the assignments in this course are carried out in group to develop team work skills among the students. Besides that, this course emphasized on information managing skills and lifelong learning by gathering the information on biophysical chemistry application from various sources.

Course Outcome

By the end of semester, students should be able to:
CO1: Describe the principle of physical chemistry in biological studies
CO2: Apply biochemical calculation for biological studies
CO3: Construct graph based on data calculated using specific formula
CO4: Work in group to answer biochemical calculation tasks.
CO5: Summarize information related to biophysical chemistry applications from multiple sources

BSB1112
Industrial Biotechnology
Credit Hour: 2
Prerequisite: None

Synopsis

This multi-disciplinary course provides student to introduction policy, scope and research area in industrial biotechnology sector in Malaysia and global scenario. This subject focus on interaction between scientific discovery, applications and challenge impact in biotechnology. There are four focus field includes industrial microbiology, agricultural, healthcare, biomaterial, enzyme and bioinformatics potential process will be discussed. Students also will be exposed to important and related components in commercialization such as issues, biosafety, bioethics, regulations, intellectual rights, facilities and expertise needed in biotechnology industries.

Course Outcome:

By the end of semester, students should be able to:
CO1: Explain the important principles and applications of industrial biotechnology related fields
CO2: Relate biotechnology related products with their suitable applications
CO3: Discuss current issues related to industrial biotechnology
CO4: Be aware on biosafety, bioethics and important of IP for biotechnology related products
CO5: Identify commercialization potential of biotechnology related products

BSB2143
Enzyme Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides the theory and knowledge relevant to the enzymology principles including fundamental properties of enzymes, enzyme catalytic mechanisms and enzyme kinetics. Techniques employed in enzymes purification and characterization are also emphasized in this course. Students will also be introduced to the theory as well as applications of enzyme technology in food, medical, and household industries. Finally, this course serves to provide an awareness of the current and possible future applications of

enzyme technologies. This course also emphasizes on the development of attitude and capability of the students to work in a group and gather information on the related field for
lifelong learning.

Course Outcome:

By the end of semester, students should be able to:
CO1: Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms
CO2: Apply biochemical calculation for enzyme kinetics
CO3: Compare methods for production, purification, characterization and immobilization of enzymes
CO4: Discuss various application of enzymes that can benefit human life
CO5: Discover the current and future trends of applying enzyme technology for the commercialization purpose of biotechnological products.
CO6: Plot graphs based on kinetics data

BSB2452
Enzyme Technology Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

An introduction in theory, techniques and practical in modern enzyme technology laboratory. Emphasis will be given in concept and technique on basic laboratory and instrumentation handling, extraction and purification process, and polyacrylamide gel electrophoresis for enzyme/protein separation.

Course Outcome:

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments
CO2: Demonstrate skills in performing enzymology experiments
CO3: Demonstrate skills in handling enzymology-related equipment
CO4: Analyse, Interpret and relate experimental data with the fundamental theories
CO5: Communicate through report writing
CO6: Work in team during laboratory session

BSB2193
Industrial Microbiology
Credit Hour: 3
Prerequisite: BSB1173 and BSB1432

Synopsis

This course introduces various industrial applications of microorganisms in traditional fermentation process and advanced contemporary applications such as productions of biological materials and vaccines, biopharmaceutical, bio emulsifier, biopolymers, and biodegradation. Discussion includes biotechnology unit operation, bioprocess design, process modulation, kinetics and analysis. In addition, students will be introduced to work flow and operation of an industry through a site-visit to a related industry.

Course Outcome:

By the end of semester, students should be able to:
CO1: Understand and apply the basic concept of industrial microbiology.
CO2: Describe the flow of product development and discuss the various emerging areas that can benefit human life.
CO3: Apply concept of primary and secondary metabolites pathways for the biosynthesis of microbial products.
CO4: Analyse the microbial production of food, beverage, biomass, fuel and Chemicals and health-care products.

BSB1133
Organic Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

In this course, we will be introduced to the basic fundamental principles of organic chemistry. Structure, properties and stereochemistry of organic molecules and basic organic reaction to prepare common functional groups will be studied.

Course Outcome:

By the end of semester, students should be able to:
CO1: Describe characteristics and physical properties of organic molecules
CO2: Classify chemical compounds based on their structures

CO3: Recognize the main functional groups in organic chemistry and predict their reactions
CO4: Analyse of organic structure backbones with their functional groups
CO5: Cooperate in group to complete the assigned tasks in a given time

BSB2462
Industrial Microbiology Laboratory
Credit Hour: 2
Prerequisite: BSB1173 and BSB1432

Synopsis

This course covers practical in the application of microbes in industries. Emphasis will be given on techniques for screening of potential industrial microbes, identification of microorganisms, water and food analyses, fermentation processes and antibiotic tests.

Course Outcome:

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments.
CO2: Analyse, Interpret and relate experimental data with the fundamental theories.
CO3: Demonstrate written communication skill through report writing.
CO4: Work in team during laboratory session.

BSB1412
Organic Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This practical course comprises several laboratory experiments related to organic chemistry. In organic chemistry experiments, students are exposed to melting point determination and mixture melting points, extraction, distillation, isolation and crystallization.

Course Outcome:

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments
CO2: Demonstrate skills in performing organic chemistry experiments
CO3: Demonstrate skills in handling organic chemistry-related equipment
CO4: Analyse, Interpret and relate experimental data with the fundamental theories
CO5: Demonstrate written communication skill through laboratory writing
CO6: Work in team during laboratory session

BSB3163
Plant and Mammalian Cell Technology
Credit Hour: 3
Prerequisite: None

Synopsis

Topics will be discussed in this course includes concepts, techniques and applications of plant and mammalian cell culture; principle of totipotency; essential equipment of a tissue and cell culture facility; growth media preparation; methods for growing and store suspension and adhesion cultures; different cell type such as embryogenic culture, callus, independent cell, and stem cells; as well as benefits from clone reproduction in agriculture, livestock, medicine, and other related fields. Principle and benefit of cryo-preservation and germplasm collection also will be discussed further.

Course Outcome:

By the end of semester, students should be able to:
CO1: Describe the principle and techniques of plant and mammalian cell/tissue culture
CO2: Discuss plant and mammalian cells technology approaches to be used in related biological applications.
CO3: Compare the advantages, disadvantages and application of each techniques used in culturing plant and mammalian cell/tissues
CO4: Relate the current scenario/challenges in commercialization of cell/tissue culture products

BSB3492
Plant and Mammalian Cell Technology Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces techniques and skills required in both plant and animal cell/tissue culture laboratories. Aseptic techniques and sterilization are emphasized in this course. For plant cell and tissue culture practical, students are exposed to media preparation and several tissue culture techniques including callus induction, organogenesis, shoot and root induction, and acclimatization of tissue cultured plantlets. While in animal cell practical, students are exposed to the techniques of handling mammalian cells, preparation of primary cell culture, calculating viability of cells and also cell toxicity studies.

Course outcome

By the end of semester, students should be able to:

CO1: Relate the fundamental theories with laboratories experiments
CO2: Demonstrate skills in performing plant and animal cell/tissue culture practices
CO3: Analyse, interpret and relate experimental data with the fundamental theories
CO4: Demonstrate written communication skill through report writing
CO5: Work in team during laboratory section

BSB3113
Gene Technology
Credit Hour: 3
Prerequisite: BSB2133 and BSB2472

Synopsis:

Topics discussed include the advanced techniques in gene technology including application of polymerase chain reaction (PCR) and real-time PCR, recombinant technology, genomic and cDNA libraries, molecular markers, DNA hybridization, functional genomic and genetic engineering in plants and animals. This course emphasizes on the application of gene technology in agriculture, medical and forensic. Students are also trained to participate in group discussion and present on the application of gene technology and related ethical issues.

Course Outcome:

By the end of semester, students should be able to:

CO1: Describe the principle of advanced techniques in gene technology
CO2: Relate the application of advanced techniques in gene technology with their requirement in agriculture, medicine and forensics
CO3: Compare the principle and applications of gene technology techniques
CO4: Recommend suitable gene technology techniques for medicine, agriculture and forensics applications
CO5: Discuss related ethical issues on genetically modified organisms (GMOs)

BSB3312
Final Year Project I
Credit Hour: 2
Prerequisite: None

Synopsis:

To expose and encourage student in doing research, define problems, give an opinion on how to overcome the problems and get related information regarding the problems. The topics that will discuss in this subject are literature review and methods that has been used by previous research, research report (proposal), research ethics and project management.

Course Outcome:

By the end of semester, students should be able to:

CO1: Originate problem statement, objective, scope of the research and methodology based on literature review.
CO2: Demonstrate good organization of laboratory logbook in recording experimental methods and data.
CO3: Assemble research proposal in professional format such as oral presentation.
CO4: Report satisfactory project progress within the timeline.

BSB3472
Gene Technology Laboratory
Credit Hour: 2
Prerequisite: BSB2133 and BSB2472

Synopsis:

Students will be exposed to the techniques in gene technology such as total DNA/RNA extraction, gene detection and analysis using conventional PCR contrasting with analysis using real-time PCR. In addition, DNA

molecular marker techniques also will be also be covered in this course. Students will also be exposed to the application of bioinformatics software for gene analysis and sequence confirmation. The mini project included in this course exposed students to the essential workflow of molecular and gene analysis studies.

Course Outcome:

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments
CO2: Demonstrate skills in performing gene technology experiments
CO3: Demonstrate skills in handling gene technology-related equipment
CO4: Analyse, Interpret and relate experimental data with the fundamental theories
CO5: Communicate through report writing
CO6: Manage experiment in laboratory following rules and regulations

BSB3123
Bioprocess Technology
Credit Hour: 3
Prerequisite: None

Synopsis:

The course discusses on the basic operational in bioprocess technology, unit, dimension, mass transfer at the equilibrium phase, stoichiometry of microbial growth and product formation. This course explicates the connection between microbial growth, product formation, mass transfer and environment. Likewise, this course gives an overview of the bioprocess from raw material to product. Upstream and downstream processing will be discussed. This course explains the processes and techniques used for extraction and purification of a product from culture medium. Also, bioprocess consideration in using animal and plant cell cultures will discuss using different techniques.

Course Outcome
By the end of semester, students should be able to:
CO1: Describe the principle and applications of bioprocess technology.
CO2: Apply fundamental calculation in bioprocessing.
CO3: Compare and contrast the principle and application of different types of bioreactors for large scale production.
CO4: Recommend suitable condition or bioprocessing flowsheet for different types of cells, tissues and organisms.
CO5: Discuss the important aspects I bioprocess technology for commercialization purpose of biotechnological products.
CO6: Illustrate schematic diagram for upstream and downstream processing.

BSB3583
Advanced Enzyme Technology
Credit Hour: 3
Prerequisite: None

Synopsis:

This course provides the advanced knowledge and information on enzyme technology. It will emphasize on the production of enzyme, industrial enzymes and innovative application of some specialized enzyme. Techniques employed in enzymes engineering and hybridization are also emphasized in this course. Students will also be introduced to the theory as well as applications of enzyme technology in food, medical, and diagnostic industries. Finally, this course serves to provide an awareness of the social/ ethical issues related to possible future applications of enzyme technologies.

Course outcome:

By the end of semester, students should be able to:
CO1: Explain the concept and applications of enzymes technology in biotechnology-related industries.
CO2: Choose the best strategies to produce the enzymes suitable for biotechnology-related industries.
CO3: Differentiate enzymes production and currently industrial enzymes that are used in biotechnology-related industries.
CO4: Propose a strategy of industrial enzymes production suitable for industrial scale application.
CO5: understand and be aware of commercial, ethical, legal and socio-cultural impacts on the advanced application of enzyme in food, medicine and industry.
CO6: Illustrate the new application of enzymes as biosensor in a schematic diagram.

BSB3482
Bioprocess Technology Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis:

This laboratory course covers a few practical related to bioprocess in industries. It emphases on the basic techniques the determination of glucose and some experiments on the fermentation kinetics.

Course Outcome

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments.
CO2: Demonstrate skills in performing bioprocess experiments.
CO3: Demonstrate skills in handling bioprocess-related equipment.
CO4: Analyse, interpret and relate experimental data with the fundamental theories.
CO5: Communicate through report writing.
CO6: Manage experiment in laboratory following rules and regulations.

BPQ1223
Principles of Operation Management
Credit Hour: 3
Prerequisite: None

Synopsis

The course provides a range of academic knowledge, operations understanding, operational management techniques. It will focus on the main decision areas of operations management and the role of the operations manager for productivity improvement.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply the fundamental concept and the main areas of operation management.
CO2: Demonstrate operation decisions in solving operational problems.
CO3: Justify operations management requirements.

BSB4173
Extraction and Bioseparation
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the basic principle of extraction, separation and purification of bioproducts together with theory and principle of related separation instrument. In extraction parts, students will be exposed on extraction methods of nucleic acids, proteins and metabolic compounds. While in bioseparation parts, students will be exposed on separation and purification principles, techniques including separation by liquid chromatography, filtration, precipitation, sedimentation, crystallization and drying process.

Course Outcome:

By the end of semester, students should be able to:
CO1: Explain the principle of extraction and bioseparation of bioproducts
CO2: Apply fundamental calculation in extraction and bioseparation
CO3: Compare and contrast different bioseparation approaches of biological materials
CO4: Recommend suitable extraction and bioseparation approaches for small- and large-scale production of biological materials
CO5: Discuss the important aspects in extraction and bioseparation of biotechnological products for commercialization purpose

BSB4812
Industrial Training
Credit Hour: 12
Prerequisite: All faculty and programme courses

Synopsis

This course aims to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make a regular entry describing the work they are undertaking. Then, student need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to hand in to the university supervisor. Student need to do final presentation for assessment. Students are supervised by industrial and university supervisors to guide and ensure they can do their work as good as possible and achieve the objective for this course.

Course Outcome

By the end of semester, students should be able to:
CO1: Adapt working culture in project, consultant, construction and related industry.
CO2: Organize the industrial training knowledge, experience and skill in the preparation of the industrial training report.
CO3: Build effective communication skills in written and oral presentation.

BSB4422
Extraction and Bioseparation Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This course exposes students to the principle of extraction, separation and purification of bioproducts together with related separation instrument. Students will be exposed to the methods of extraction of nucleic acids, proteins and metabolic compounds. Students will also be exposed to various separation and purification techniques.

Course outcome:

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments.
CO2: Demonstrate skills in extraction and separation procedure of bioproducts.
CO3: Demonstrate skills in handling equipment related to extraction and bioseparation.
CO4: Analyse, Interpret and relate experimental data with the fundamental theories.
CO5: Communicate through report writing.
CO6: Manage experiment in laboratory following rules and regulations.

BSB4324
Final Year Project II
Credit Hour: 4
Prerequisite: None

Synopsis:

This course is intended as the second part of Final Year Project I (BSB3302). The students are required to conduct the research, collect and analyse data, discuss the findings and form the conclusions. At the end of the semester, each student is required to present their findings and submit a dissertation. Evaluation is based on oral presentation and submitted dissertation.

Course outcome:

By the end of semester, students should be able to:
CO1: Analyse, interpret and relate experimental data with fundamental theories.
CO2: Demonstrate good organization of laboratory logbook in recording experimental methods and data.
CO3: Assemble research finding in professional format in the form of oral presentation. Assemble research finding in professional format in the form of oral presentation.
CO4: Report satisfactory project progress within the timeline.

BSB3503
Biomanufacturing
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides a brief description about process plant design and basic fundamental of Good Manufacturing Practice (GMP). It is important to know all processes in plant and distinguish between them. Nowadays, GMP is known as an essential backbone for compliance in good manufacturing practices. Therefore, students will learn how to design flow sheets in process plant and able to explain all processes that involved in manufacturing for example up streaming, scale up and down streaming process. Other than that, students will learn how to construct a feedback and feedforward system in biomanufacturing. Students also will be introduced to aspects of GMP such as facilities related documentation as well as will be exposed to important and related components in commercialization such as issues, biosafety, regulations, facilities and expertise needed in biotechnology industries.

Course Outcome

By the end of semester, students should be able to:
CO1: Describe diagrams, techniques, control systems, processes and regulatory procedures that are used

in biomanufacturing industries.
CO2: Illustrate proper GMP-compliance facilities, control systems, processes, hazard analysis and documentation that are applied in biomanufacturing industries.
CO3: Compare and contrast different types of diagrams, techniques, control systems, processes and regulatory procedures that are used in biomanufacturing industries.
CO4: Develop an environmental-friendly product using biomanufacturing technology that addresses challenges or concerns in biotechnology.
CO5: Discuss related ethical, commercial and social issues of biomanufacturing technology including impact to human and environment.
CO6: Demonstrate the use of environmental-friendly product of biotechnology with their suitable business and industrial applications.

BSB3593
Biosensor Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses current concepts, terms and applications of biosensor technology. This course integrates knowledge from various fields such as genetic engineering, immune-techniques and protein engineering for the production of biosensor devices in multitude of applications such as medical, food analysis, clinical diagnostics and environmental monitoring. The course also focuses on the classification and the principles of the various types of biosensors, various measurements involved, biological materials or bioreceptors, transducer descriptions, biosensor characteristics and their recent applications.

Course Outcome

By the end of semester, students should be able to:
CO1: Classify the components of a biosensor and differentiate methods for immobilization that can be used for surface derivatization. Classify the components of a biosensor and differentiate methods for immobilization that can be used for surface derivatization.
CO2: Relate the application of biosensor in industry.
CO3: Compare and contrast the principle and applications of biosensors.
CO4: Design a hypothetical biosensor device which can be used in a related field based on the fundamental knowledge learned in biosensor technology.
CO5: Discuss related ethical issues in biosensor technology including rules and regulation as well as impact to human and environment.
CO6: Demonstrate the newly designed hypothetical biosensor in related applications

BSB3563
Bioremediation
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces various advanced applications of plants and microorganisms in evaluating whether bioremediation is a viable strategy for remediation of a contaminated site, factors that influence the rate and extent to which environmental contaminants are metabolized by microorganisms in the environment as well as bioremediation techniques for clean-up the mess according to bioremediation classifications as Biotransformation, Biodegradation and Mineralization. In addition, the student will be able to dealing with an effective innovative technology for treatment of a wide variety of contaminants. This technology includes phytoremediation (plants) and rhizoremediation (plant and microbe interaction). Rhizoremediation, which is the most evolved process of bioremediation, involves the removal of specific contaminants from contaminated sites by mutual interaction of plant roots and suitable microbial flora.

Course Outcome:

By the end of semester, students should be able to:
CO1: Describe the fundamental principles and applications relating to bioremediation.
CO2: Relate the concept of bioremediation technology to real-life.
CO3: Compare and contrast various advantages, disadvantages and limitations approaches of bioremediation in a commercial setting.
CO4: Discuss the impact and interactions

between contaminants, soil, water and its bioavailability for biodegradation.

BSB3543
Nutraceuticals and Functional Foods
Credit Hour: 3
Prerequisite: None

Synopsis

There is a global growing awareness on the contributions of nutraceutical and functional food that promotes health benefits. This course gives an overview of the bioactive compounds that are currently regarded as functional foods and nutraceuticals. The identification and related assessment methods of these bioactive compounds are discussed. This course includes new and innovative technologies for the processing of functional foods and nutraceuticals. These technologies are developed to address consumers' concerns on quality and safety issues. The safety guidelines and regulations in the development of nutraceutical and functional food are also highlighted in this course.

Course Outcome:

By the end of semester, students should be able to:

CO1: Explain the concept and applications of nutraceuticals and functional foods in biotechnology related industries.
CO2: Illustrate the process of large-scale production of nutraceuticals and functional food products for biotechnology related industries
CO3: Distinguish between nutraceuticals and functional food products those are currently used in biotechnology-related industries
CO4: Illustrate and propose the latest bioavailability and bioequivalence requirements to benefit human life
CO5: Understand and be aware of commercial, ethical, legal and socio-cultural impacts on the advanced application of nutraceuticals and functional foods in food, medicine and industry.
CO6: Illustrate the future trends of nutraceutical and functional food industries

BSB3553
Bioinformatics
Credit Hour: 3
Prerequisite: None

Synopsis
Bioinformatics is the science of storing, extracting, organizing, analysing, interpreting, and utilizing biological information. Bioinformatics use biological information to solve biological problems. This course will deliver descriptions of this rapidly evolving field, and facilitate user access to and manipulation of the biological data. Topics will include an introduction to bioinformatics, biological databases and relevant tools available to retrieve and analyse the information within these. Descriptions of various techniques, such as evolutionary analysis, data mining, protein structure/function.

Course Outcome:

By the end of semester, students should be able to:

CO1: Explain the principle and theoretical basis of the bioinformatics tools.
CO2: Identify the bioinformatics tools for data analysis.
CO3: Compare the advantages and disadvantages of bioinformatics tools.
CO4: Recommend suitable approach to solve biological problems.
CO5: Aware on ethical, moral and professionalism in the usage of bioinformatics tools.
CO6: Convey ideas verbally on bioinformatics related issue as well as giving feedback on giving topics.

BSB3513
Immunotechnology
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides a comprehensive overview on basic immunology, which covers the innate immune responses and acquired immunity. Topics include specific interactions of target cells and T cells, generation and molecular structure of B and T cell antigen receptors, signalling through immune receptors, development of antigen specific T and B cells, and specific roles of cytokines /lymphokines. This course emphasizes T and B cell-mediated immunity and topics of clinical relevance, such as microbial immunity, allergy, autoimmunity, tumor immunology, transplantation immunology, and immunotherapy. In addition, generation and

application of monoclonal antibodies will be discussed.

Course Outcome

By the end of semester, students should be able to:
CO1: Describe the concept of immune system
CO2: Explain the contemporary approaches to manipulate the immune system in term of transplantation and immunotherapy
CO3: Differentiate the structure of antibody, MHC and their roles in an immune system

BSB3523
Bionanotechnology
Credit Hour: 3
Prerequisite: None

Synopsis

This course will be focused on basic principle of nanotechnology such as fabrication and collection from building blocks. This topic also introduces biological devices including principle, operation and practical reality in building and application. Other topics will be discussed includes biomolecules, nano fabrication, protein array technology, medical application of bionanotechnology, ethical and policy in bionanotechnology and the future prospect of bionanotechnology.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain principle of bionanotechnology
CO2: Describe synthesis of various nanoparticles
CO3: Describe current and future application of bionanotechnology

BSB3533
Biopharmaceuticals
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides student to introduction of biopharmaceuticals, application of biotechnology especially on transforming proteins and genes into therapeutics, innovation models in the biopharmaceutical sector, history of plant-made biopharmaceuticals and also risk analysis and safety of plant made biopharmaceuticals.

Course Outcome

By the end of semester, students should be able to:
CO1: Describe the application of biotechnology in therapeutics production
CO2: Describe the models used in biopharmaceutical sector
CO3: Explain about plant-made biopharmaceuticals, their risk and safety

BSB3573
Reactor Design
Credit Hour: 3
Prerequisite: None

Synopsis

The course will emphasize on the basic design of a fermenter which include the principle and concept of the process control involved. This course introduces two basic concepts: (i) reaction mechanisms and kinetic rate expressions for homogeneous and heterogeneous reacting systems, including enzyme catalysed reactions and cell growth kinetics, and (ii) reactor design for the homogeneous reaction systems. The design principles for ideal homogeneous reactors are introduced, followed by the concept of RTD (residence time distribution) to diagnose and account for the non-idealities in flow patterns. For heterogeneous reactions, the role of transport (diffusion) effects, Thiele modulus, and catalyst effectiveness factor are introduced.

Course Outcome

By the end of semester, students should be able to:
CO1: Analyse the kinetic parameters of different fermentation process and choose suitable bioreactor for the growth of organism and product formation at industrial scale
CO2: Recognise, compare and draw the schematic diagram for specific types of bioreactors
CO3: Describe process economic weakness of a fermentation process and indicates its logical for process optimization
CO4: Design a scale-up bioreactor on geometric similarities and level it to industrial approaches

COURSE SYNOPSIS FOR BACHELOR OF APPLIED SCIENCE IN MATERIAL TECHNOLOGY WITH HONOURS

BSP1153
Mechanics & Thermodynamics
Credit Hour: 3
Pre-requisite: None

Synopsis:

This course introduces basic Physics principle in mechanics and thermodynamics field. Topics covered in this course including measurement, vectors, kinematics, Newton's law of motion, work, energy, power, fluid mechanics, static equilibrium, temperature, heat and also first law of thermodynamics. Learners need to sit for four quizzes (either offline quizzes during class or online quizzes during class week), two tests and one final examination. An assignment is also given to encourage the learners to have sufficient depth of study. First test will be held before semester break and second test before study week; which will cover certain topics. There are two main topics will be delivered to the learners; i.e., mechanics and thermodynamics. Students centred learning (SCL) approach will be applied during the class; which the learners will be the main role, whereas the lecturer's role is limited as a facilitator. Learners should be able to (i) explain theories learned to solve problems of mechanics including kinematics and dynamics and also thermodynamics, (ii) analyse the appropriate concepts learned using the right principle and laws and (iii) respond and contribute to the need of group work in assigned task; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the basic conceptual knowledge of physics
CO2: Explain theories learned to solve problems of mechanics including kinematics and dynamics and also thermodynamics
CO3: Solve related problems in physics using the appropriate principles
CO4: Analyze the appropriate concepts learned using the right principle and laws of physics
CO5: Present and contribute to the need of group work in assigned task

BSP1163
Electricity, Magnetism & Optics
Credit: 3
Pre-requisite: None

Synopsis:

Learning topics are focused on three fields: (i) electricity, (ii) magnetism, and (iii) optics physics. The stated focus is planned to be delivered during lectures; which cover twelve main chapters. For electricity, the chapters covered are: (i) electric charge & electric field, (ii) Gauss's law (iii) electric potential, (iv) capacitance & dielectric, and (v) current & resistance and (vi) DC circuit. Magnetism part is covered in (i) magnetic field and forces, (ii) sources of magnetic field, and (iii) electromagnetic induction; whereas for optics; i.e., (i) the nature of light and the law of optics, (ii) Interference and (iii) diffraction. An assignment is designed to encourage the learners to incorporate social and teamwork skills; and cultivate good presentation skills. Learners need to sit for mid-term, final semester examinations, and four quizzes (i.e., two offline quizzes during class, and two online based quizzes); to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) explain theories learned to solve problems of electricity, magnetism and optics, (ii) analyse the appropriate concepts learned using the right principle and laws and (iii) respond and contribute to the need of group work in assigned task; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the basic conceptual knowledge of physics
CO2: Explain theories learned to solve problems of electricity, magnetism and optics
CO3: Solve related problems in physics using the appropriate principles
CO4: Analyze the appropriate concepts learned using the right principle and laws of physics
CO5: Present and contribute to the need of group work in assigned task

BSP1113
Physical Chemistry
Credit: 3
Pre-requisite: None

Synopsis:

The course discusses the concepts and fundamental principles of physical chemistry. These include the properties of solid, liquid and gas, chemical equilibrium, dissolution and solution properties, chemical colloid and surface, thermodynamics, chemical kinetics and catalyst. In order to achieve technical development in the advanced technologies that requires the ultimate precision of atomic level, it is indispensable to understand the physical phenomena involved in the Industrial technology on the basis of fundamental principles

Course Outcome

By the end of semester, students should be able to:

CO1: Define the various laws in terms of chemical reactions.
CO2: Analyze /solve the given problem from physical chemistry.
CO3: Demonstrate a good ethics and professionalism in completing the given task

BSP1133
Organic Chemistry
Credit: 3
Pre-requisite: None

Synopsis:

The course is focused on basic fundamental principles of organic chemistry. The main focus is on the structure, properties and stereochemistry of organic molecules and basic organic reaction (including oxidation & reduction and radical) to prepare common functional groups. The stated focus is planned to be delivered during lectures; which emphasize on several organic compounds including (i) alkanes, (ii) alkenes, (iii) alkynes (iv) alkyl halides, (v) alcohols, ethers & epoxides and (vi) benzene & aromatic compounds. Two assignments (mini project) is designed to encourage students to evaluate individual & teamwork skills (e.g., group activities, data handling and evaluation, work coordination and vocal presentation). A test, four quizzes and final semester examination is designed to assess student's understanding of the course. Students should be able to (i) solve the characteristics and physical properties, (ii) classify and differentiate chemical compounds based on their structures and (iii) the practice and cultivate teamwork co-operation during mini project/presentation; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe characteristics and physical properties of organic molecules
CO2: Classify chemical compounds based on their structures
CO3: Recognize the main functional groups in organic chemistry and predict their reactions
CO4: Analyze of organic structure back bonds with their functional groups
CO5: Cooperate in group to complete the assigned tasks in a given time

BSP1173
Inorganics Chemistry
Credit: 3
Pre-requisite: None

Synopsis:

Learning activities are focused on foundations of bonding theory, periodic trends, synthesis and application of elements. This subject was divided to three parts. Part I consist of fundamental on atomic structures, arrangement of elements in periodic table and bonds formation in the compounds. Part II contains a systematic study of the elements and some of their compounds. This includes the systematic survey of descriptive inorganic chemistry of the main group elements (1 to 18) including physical and chemical properties, preparation of hydride, halides, carbonates, bicarbonates, sulphates and nitrates. Part III emphasizes on the chemistry of the d-block elements including occurrence and chemical reactions. In Part I and II, the students will also expose to some glimpse at the practical uses of important classes of inorganic compounds and their industrial applications.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the basic conceptual knowledge of inorganic chemistry.
CO2: Explain theories learned to solve problems of inorganic chemistry in related task given.
CO3: Solve related problems in inorganic chemistry using the appropriate principles
CO4: Analyze the appropriate concepts learned about inorganic chemistry comprehensively.
CO5: Present and contribute to the need of group

work in assigned task

BSP1422
Physics Laboratory
Credit: 2
Pre-requisite: None

Synopsis:

Learners are introduced to practical and hands-on activities; inclusive of (i) manipulation of instruments to conduct guided experiments, and (ii) composition of technical report. Learners need to conduct and perform the experiments based on the theory and principle learned in Mechanics & Thermodynamics and Electricity, Magnetism & Optics. Learners are expected to perform eight out of ten experiments (in group); vis., Heat Capacity of Metals with Cobra-3, Thermal Expansion in Solids and Liquids, Density of Liquids, Projectile Motion, Newton's Law of Motion with Cobra-3, Diffraction of Light at a Slit an Edge experiments, Kirchhoff's Law, Small Resistance, Dielectric Constant of Different Materials and Transformer. Experiment demonstration, and safety talk is scheduled to be delivered by senior academician, and trained technical staff respectively; during second week of academic semester. Laboratory manual is given to each learner; which consists of theory, background of experiment, series of instructions, objectives, equipment/apparatus and references. An online forum platform (accessible via kalam.ump.edu.my) is developed for discussions purposes. Learners are divided in group of three and will be assessed based on (i) peer review, (ii) technical report, and (iii) ability to manipulate instruments (which will be carried out during a practical test). Learners are aimed to be able to (i) conduct the experiments correctly and be able to explain each of the function of the instruments used, and (ii) contribute to the need of group work.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve related problems in material science and technology using the appropriate principles
CO2: Identify and explain the function of equipment
CO3: Follow the guided experiments using the correct procedures
CO4: Present and contribute to the need of group work in assigned task

BSP1432
Chemistry Laboratory
Credit: 2
Pre-requisite: None

Synopsis:

Learners are introduced to practical and hands-on activities; inclusive of (i) manipulation of instruments to conduct guided experiments, and (ii) composition of technical report. Learners need to conduct and perform the experiments based on the theory and principle learned in organic, inorganic and physical chemistry. Learners are expected to perform eight experiments (in group); inclusive of, (i) melting point determination of mixed chemical, (ii) Technique of crystallization (iii) esterification of butanol with acetic acid, (iv) reactivity of group I A elements, (v) reactivity of nitrogen and its compounds, (vi) reactivity of halogens, (vii) dissociation of a weak acid by potentiometric titration, (viii) Hess' Law and the heat of formation of magnesium oxide. Experiment demonstration, and safety talk is scheduled to be delivered by senior academician, and trained technical staff respectively; during second week of academic semester. Laboratory manual is given to each learner; which consists of theory, background of experiment, series of instructions, objectives, problem statement, and references. An online forum platform (accessible via kalam.ump.edu.my) is developed for discussions purposes. Learners are divided in group of three and will be assessed based on (i) peer review, (ii) technical report, and (iii) ability to manipulate instruments (which will be carried out during a practical test). Learners are aimed to be able to (i) conduct the experiments correctly and be able to explain each of the function of the instruments used, and (ii) contribute to the need of group work.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve related problems in organic, inorganic and physical chemistry using the appropriate principles
CO2: Identify and explain the chemical reactions of the main group elements
CO3: Follow the guided experiments using the correct procedures
CO4: Present and contribute to the need of group work in assigned task

BUM2123
Applied Calculus

Credit: 3
Pre-requisite: None

Synopsis:

This course introduces Polar Coordinates and Vector, Vector-Valued Functions, Partial Derivatives, and Multiple Integrals. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental calculus concepts of equations and vectors
CO2: Solve and analyze various problems involving derivatives and integrals
CO3: Provide solution for a wide range of problems in science and engineering by using concept of calculus

BUM2413
Applied Statistics
Credit: 3
Pre-requisite: None

Synopsis:

This course discusses on statistical problem-solving methodology and descriptive statistics; sampling distribution and confidence interval; hypothesis testing; analysis of variance (ANOVA); goodness-of-fit test and contingency tables; regression and correlation including simple and multiple linear regressions. Statistical packages such as Microsoft Excel, SPSS, R Language, S Plus, EViews and Minitab shall be used in this course.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of statistic
CO2: Perform statistical analysis by using appropriate statistical theory and methodology.
CO3: Analyse real life data to solve related problems in various disciplines.

BSF1212
Laboratory Safety Management
Credit: 2
Pre-requisite: None

Synopsis:

This course exposes students to basic concepts of industrial and laboratory safety. Topics include quality systems (Good laboratory Practice and ISO/IEC 17025) for laboratory management, occupational health & safety and acts and related regulations. Students will be introduced to laboratory and industrial safety, laboratory and industrial accident, safety policy and procedure, emergency response plan, introduction to basic toxicology and first aid.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain the basic concept of Laboratory and Industrial safety management that comply the good practices and related regulations practices and related regulations
CO2: Apply the information related to quality system, policies, procedures and safety manuals
CO3: Present and contribute to the need of group work related to laboratory and industrial safety in assigned task

BSF2112
Industry Quality Management
Credit: 2
Pre-requisite: None

Synopsis:

This course focuses on the management of quality for manufacturing, service and public sectors to achieve global competitiveness. Emphasis is placed on new techniques for managing quality. This course is divided by two parts. Part one introduces quality assurance principles, including (i) Good Manufacturing Practices (GMP), (ii) ISO 9000 family and (iii) various continuous improvement techniques such as six sigma, lean manufacturing, 5S and total quality management and (iv) audit process.
Part two focuses on the quality control system, which is concerned with (i) quality control tools used in industries, (ii) acceptance sampling, (iii) statistical data analysis, (iv) reliability and maintainability, and (v) cost of quality.
Lectures will be conducted two hours per week; with one assignment throughout the semester. Learners are required to sit for one test, and series of quizzes to ensure sufficient fundamental knowledge. Upon completion of the course, the learners should be able to (i) hypothesize alternative approaches to solve problems related to industrial quality management systems, and (ii) gather information from multiple sources related to

quality assurance and quality control in industries

Course Outcome

By the end of semester, students should be able to:
CO1: Describe the basic concept of quality assurance (QA) and quality control (QC) in industries
CO2: Analyze suitable approach to solve problems related to industrial quality management
CO3: Gather information from multiple sources related to quality assurance and quality control in industries

BPQ1223
Principles of Management
Credit Hour: 3
Prerequisite: None

Synopsis

The course provides a range of academic knowledge, operations understanding, operational management techniques. It will focus on the main decision areas of operations management and the role of the operations manager for productivity improvement.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply the fundamental concept and the main areas of operation management.
CO2: Demonstrate operation decisions in solving operational problems.
CO3: Justify operations management requirements.

BCS1023
Programming Technique
Credit: 3
Pre-requisite: None

Synopsis:

This course discusses on understanding problems and translating them into computer solution techniques using programming language. This course enables students to apply programming techniques, write programming codes from given problems and execute programming codes successfully.

Course Outcome

By the end of semester, students should be able to:
CO1: Demonstrate various techniques in solving a problem.
CO2: Construct and run programs.
CO3: Differentiate various techniques in solving a problem.

BSP2173
Solid State Physics
Credit: 3
Pre-requisite: None

Synopsis:

This course is designed to expose origin of properties of crystalline materials. The emphasis is on semiconductors, superconductors, dielectrics, and ferroelectrics; which are the basis of multibillion electronic and magnetic devices. There are five (5) headlines in this course, viz., semiconductor crystals, Fermi surface and metals, Superconductivity, Dielectrics, and Ferroelectrics. The stated focus is planned to be delivered during lectures. A problem-based assignment is designed to encourage the learners to incorporate the ethics and professional values. Learners need to sit for two tests, final semester examinations, and four quizzes to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) develop new ideas and identify alternative approaches for problem solving related to electrical properties of crystalline solids, and (ii) demonstrate a good ethics and professionalism in completing a given task; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply the basic knowledge about crystal structure and wave mechanics and explain the properties of the crystals using various model learned
CO2: Display problem solving and critical thinking skills that associated with the learned properties in the given assignment
CO3: Analyse the appropriate concepts learnt about solid state physics.
CO4: Develop new ideas and identify alternative approaches for problem solving appropriate to solid state physics
CO5: Demonstrate the ethical values and professionalism character in completing a given task

BSP2153
Material Science & Technology
Credit: 3
Pre-requisite: None

Synopsis:

This course is designed to expose the concept of structure and scaling. There are seven (7) headlines in the course; atomic structure, bonds and crystal structure, defect structure and strengthening mechanisms, failure, diffusion, material properties (mechanical, electrical, magnetic & optic), economic, and environmental issues. Student will be taught in lecture room; and the assessments which include quiz, test, assignment and final exam will be carried out throughout the semester. At the end of semester, students are expected should be able to explain, solve, analyze and develop new ideas during problem solving; related to material science and technology. Furthermore, students also should be able to demonstrate good ethics and professional skills.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve problems of Material Science and technology in related task given
CO2: Solve related problems in material science and technology using the appropriate principles
CO3: Analyze the appropriate concepts learned about Material Science and Technology comprehensively
CO4: Develop new ideas and identify alternative approaches for problem solving appropriate to material science and technology
CO5: Demonstrate a good ethics and professionalism in completing the given task

BSP2163
Colloid & Surface Science
Credit: 3
Pre-requisite: None

Synopsis:

The course contains two part i.e., (i) colloid, and (ii) surface science. The first section discusses about behaviour of suspension of small particles in another substance; whereas the latter discusses about properties of colloidal system e.g., surface tension, interfacial tension, and contact angle. Five state of the art methods of contact angle measurement are included in the syllabus i.e., Wilhelmy plate, Du Nuoy ring, drop-weight, spinning-drop, and maximum bubble pressure methods. Lectures will be conducted three hours per week; with two assignments throughout the semester. Learners are required to sit for two tests, and series of quizzes to ensure sufficient fundamental knowledge. Upon completion of the course, the learners should be able to (i) hypothesize alternative approaches to solve problems in respective field using fundamental approach, and (ii) demonstrate good ethics and professionalism during accomplishment of tasks.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve problems related to colloid and surface science in related task given.
CO2: Solve related problems in colloid and surface science using the appropriate principles.
CO3: Analyze the appropriate concepts learned about colloid and surface science comprehensively
CO4: Develop new ideas and identify alternative approaches for problem solving appropriate to colloid and surface sciences
CO5: Demonstrate a good ethics and professionalism in completing the given task

BSP2123
Material Characterization
Credit: 3
Pre-requisite: None

Synopsis:

This course will introduce materials characterization techniques along with the analyses required for each instrument. Learning activities cover three main aspects in materials characterizations: (i) working principles, (ii) specimen preparation and (iii) analysis. Students will learn the basic principles in optical microscopes prior to learn advanced characterization like X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM) and also Scanning Probe Microscopy. The spectroscopy techniques like Energy Dispersive X-ray, Infrared and Fourier Transform Infrared will be taught too. Characterization techniques using UV-Visible

Spectrometer, Differential Scanning Calorimetry (DSC) and Thermogravimetric Analysis (TGA) are expected to enhanced the knowledge for chemical analysis and thermal analysis. Lectures will be conducted three hours per week; with two problem-based assignments throughout the semester. Students are required to sit for two tests, and series of quizzes to ensure sufficient fundamental knowledge. Upon completion of the course, the students should be able to (i) have a thorough understanding of the various types of materials analytical methods, leading to high quality characterization and measurement results, (ii) hypothesize alternative approaches to solve problems related to materials characterization techniques, and (iii) demonstrate good ethics and professionalism during accomplishment of tasks.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain theories related to principles of material's surface characterization techniques
CO2: Solve the theories and knowledge learned related to the technique in surface analysis
CO3: Analyze the appropriate problems related to the material's surface characterization comprehensively
CO4: Develop new ideas and identify alternative approaches to characterizing material's surfaces
CO5: Demonstrate the ethical values and professionalism character in completing the given task

BSP2193
Rheology
Credit: 3
Pre-requisite: None

Synopsis:

Learning activities are focused on rheological concepts in daily life; along with definition some scientific terminologies such as (i) flow deformation, (ii) Newtonian and Non-Newtonian fluid behavior, (iii) viscometry characteristics, (iv) polymer rheology, and (v) food and surfactant behavior. The stated focus is planned to be delivered during lectures; which cover with industrial application (i.e., oil and gas production, food production, and packaging production). Industry visit to food and packaging-based companies (e.g., Grandeur Chocolate Industries & Yakult (M) SDN BHD) is scheduled; to ensure sufficient industrial exposure to the learners. Assignment is given to further strengthen the understanding of the course. The activities incorporated in this course are to create an active participation (psychomotor/ critical thinking & problem solving) during the lecture sessions. Learners need to sit for mid-term, final semester examinations, and four quizzes; to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) hypothesize alternative approaches to solve problems using the knowledge of rheology, and characterizations in industry and research domains, and (ii) practice and cultivate entrepreneurial skills during presentation of idea; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Maintaining good ethics and professionalism in completing the given task.
CO2: Analyze the appropriate concepts learned about rheology.
CO3: Explain the theories involved to solve the problems associated with rheology along with necessary principles.
CO4: Solve the problem with the appropriate concepts learned about rheology and theological properties.
CO5: Develop and identify alternative approaches for problem solving appropriate to rheology.

BSP2422
Material Science & Solid-State Lab
Credit: 2
Pre-requisite: None

Synopsis:

This course introduces students to fundamentals of experiment in material science and solid-state field; which includes mechanical, electrical and optical measurements. Students will experience hands on learning using related experimental set ups and methods, quantitative and qualitative characterization of materials, and composition of scientific report. Experiment demonstration, and safety talk is scheduled to be delivered by senior academician, and trained technical staff respectively; during second week of academic semester. Laboratory manual is given to each learner; which consists of theory, background of experiment, series of instructions, objectives,

problem statement, and references. An online forum platform (accessible via kalam.ump.edu.my) is developed for discussions purposes. Learners are divided in group of nine; required to perform nine experiments, which will be assessed based on (i) peer review, (ii) technical report, and (iii) ability to manipulate instruments for characterizations (which will be carried out during a practical test). Learners are aimed to develop psychomotor skills in manipulation of instruments to characterize properties of the synthesized/prepared materials using various laboratory instruments and advanced machineries.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve related problems in material science and technology using the appropriate principles
CO2: Follow the guided experiments using the correct procedures
CO3: Organize and complete with confidence the experiments using the correct procedures
CO4: Initiate and commit to participate in gaining and sharing knowledge.

BSP2432
Rheology & Colloid Lab
Credit: 2
Pre-requisite: None

Synopsis:

In this course, learners will study on material properties through laboratory experiments. This course consists of two related field of study, colloidal systems and rheology. Learning activities are focused on the practical and hands-on activities; inclusive of (i) manipulation of instruments to perform synthesis/preparation of materials, quantitative and qualitative characterization of materials, and (ii) composition of scientific report. Learners need to prepare, and characterize Newtonian and non-Newtonian fluids; melting temperature of polymer, surface tension, contact angle of fluid, colloidal behaviour and hydrophobic and hydrophilic behaviour. Experiment demonstration, and safety talk is scheduled to be delivered by senior academician, and trained technical staff respectively; during second week of academic semester. Laboratory manual is given to each learner; which consists of theory, background of experiment, series of instructions, objectives, problem statement, and references. An online forum platform (accessible via kalam.ump.edu.my) is developed for discussions purposes. The class is divided into groups. Each group will perform different experiment each week which will be assessed based on (i) peer review, (ii) technical report, and (iii) ability to manipulate instruments for characterizations (which will be carried out during a practical test. Learners are aimed to develop psychomotor skills in manipulation of instruments to characterize properties of the synthesized/prepared materials; i.e., DATAPHYSICS Contact angle using sessile drop method, Brookfield Viscometry, Melt Flow Indexer and De Nouy Ring Surface Tension.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyze an experimental data and be able to relate with theories learned.
CO2: Follow the guided experiments using the correct procedures
CO3: Conduct and complete with confidence the experiments using the correct procedures
CO4: Initiate and commit to participate in gaining and sharing knowledge

BSP3112
Ceramics
Credit: 2
Pre-requisite: None

Synopsis:

This course exposes students to ceramic materials in general. Learning activities cover several main aspects of ceramics: i.e. (i) The crystal structure of ceramics, (ii) the grain growth of ceramics during sintering, (iii) oxide and non-oxide ceramics, (iv) defects in ceramics, (v) interfaces in polycrystal ceramics, (vi) phase boundaries and (vii) mechanical properties of ceramics. Lectures will be conducted two hours per week; with two assignments throughout the semester. Learners are required to sit for two tests, and series of quizzes to ensure sufficient fundamental knowledge. Upon completion of the course, the learners should be able to (i) hypothesize alternative approaches to solve problems related to ceramics using fundamental approach, and (ii) demonstrate good ethics and professionalism during accomplishment of tasks.

Course Outcome

By the end of semester, students should be

able to:
CO1: Explain theories learned to solve problems of ceramic in related task given.
CO2: Solve related problems in ceramic using the appropriate principles
CO3: Analyze the appropriate concepts learned about ceramic comprehensively
CO4: Develop new ideas and identify alternative approaches for problem solving appropriate to ceramic
CO5: Complete the given task by relate with empathy, responsibility, integrity and social issues related to ceramic

BSP3153
Polymers
Credit: 3
Pre-requisite: None

Synopsis:

Polymers study requires a good understanding of fundamental knowledge of sciences; which involves investigation of structure, properties, polymerization process, characterization, viscoelasticity, rheology and molecular weight. This course also will cover industrial polymers and technology, including engineering and specialty polymers, industrial polymerization technique and polymer processing. Learning activities are planned to be delivered during lectures which will focused on (i) Introduction to polymers (i.e., classification, structure and molecular weight), (ii) Polymerization process (i.e., step-growth polymerization, chain growth polymerization, polymerization conditions and polymer reactions), (iii) Polymerization techniques (i.e., bulk, solution, suspension, emulsion), (iv) Characterization (i.e., measurement of molecular weight, analysis and testing of polymers), (v) Solid-state properties of polymers (i.e., Amorphous state, crystalline state, thermal transition properties and mechanical properties), (vi) (Viscoelasticity and rubber elasticity (i.e., mechanical models of viscoelastic behaviour, introduction to rubber elasticity), (vii) Thermoplastic, thermosets and elastomers (i.e., general purposes thermoplastic, engineering thermoplastic, thermosets and elastomers (natural rubber and synthetic rubber), (viii) (Polymer processing (i.e., extrusion, moulding, calendering additives and compounding). Industry visit to polymers-based company (i.e., Polyplastic, Kaneka, MTBE Petronas, Gebeng) is scheduled; to ensure sufficient exposure to polymers manufacture and processing in industry to the students. Two problem-based assignments are designed to develop students' ability to analyze and carry out polymer investigations, apply theoretical knowledge, and write a good technical report. Students need to sit for test 1, test 2, final semester examinations, and four quizzes (i.e., two offline quizzes during class, and two online-based quizzes); to ensure sufficient theoretical and fundamental knowledge. Students should be able to (i) apply comprehensive knowledge, identify problems and formulate creative and innovative solutions in polymer manufacture, and processing in industry, and (ii) practice empathy, responsibilities, integrity, and professionalism in their endeavours; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve problems of polymer in related task given.
CO2: Solve related problems in polymers using the appropriate principles
CO3: Analyze the appropriate concepts learned about polymers comprehensively
CO4: Develop new ideas and identify alternative approaches for problem solving appropriate to polymers.
CO5: Complete the given task by relate with empathy, responsibility, integrity and social issues related to polymers.

BSP3162
Composites
Credit: 2
Pre-requisite: None

Synopsis:

This course exposes students to composites materials in general. Learning activities cover several main aspects of composites: i.e. (i) composites matrices and their properties, (ii) specialty and high-performance thermosets, (iii) thermoplastic composites, (iv) ceramic and metal matrix composites, (v) reinforcement, (vi) composite design and (vii) the application of composites. Lectures will be conducted two hours per week; with two assignments throughout the semester. Learners are required to sit for two tests, and series of quizzes to ensure sufficient fundamental knowledge. Upon completion of the course, the learners should be able to (i) hypothesize alternative approaches to solve problems related to composites using fundamental approach, and (ii) demonstrate good ethics and professionalism during accomplishment of

tasks.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain theories learned to solve problems of composites in related task given.
CO2: Solve related problems in composites using the appropriate principles
CO3: Analyze the appropriate concepts learned about composites comprehensively
CO4: Develop new ideas and identify alternative approaches for problem solving appropriate to composites
CO5: Complete the given task by relate with empathy, responsibility, integrity and social issues related to composites

BSP3183
Failure Analysis
Credit: 3
Pre-requisite: None

Synopsis:

Learning activities are focused on principles and general procedures of failure analysis in metallic, polymeric, ceramic, and electronic materials. The stated focus planned to be delivered during lectures are;(i) basic features and characteristics of different failure mechanisms, and (ii) methods and procedures to determine the cause of the failures. Industry visit to companies is scheduled; to ensure sufficient knowledge of failure analysis procedure in industry to the learners. A hands-on assignment is designed to enhance learner's skills in identifying the material's flaw, surface and sub-surface (e.g., cracks, seams, shrinkages, porosity, incomplete root penetration, undercut, lack of fusion). Learners need to sit for mid-term, final semester examinations, and four quizzes (i.e., two offline quizzes during class, and two online-based quizzes); to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) explain and compare the basic features and characteristics of different failure mechanisms, (ii) solve related problems of failures using appropriate methodology and tools, and (ii) develop new idea and create alternative approaches for problem solving of various case studies; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain and compare the basic features and characteristics of different failure mechanisms.
CO2: Solve related problems of failures using appropriate methodology and tools.
CO3: Differentiate and analyze the procedures that can help determine the cause of the failures.
CO4: Develop new idea and create alternative approaches for problem solving of various case studies.
CO5: Complete the given task by cooperating in group while perform good ethics and professionalism during discussion.

BSP2133
Metals & Alloys
Credit: 3
Pre-requisite: None

Synopsis:

Metals and alloys study require a good understanding of fundamental knowledge of sciences; which involves investigation of chemical and physical properties of metallic elements, compounds and alloys. The course will cover metal-related technologies and metalworking processes such as casting, forging and sintering. Learning activities are planned to be delivered during lectures which will focused on (i) fundamental of crystal bonding and defects (i.e., atomic bonding in solids, imperfection, and diffusions), (ii) phase diagrams (i.e., interpretation of phase diagram, eutectic system, eutectoid system, and iron-carbon diagram), (iii) heat treatment processes (i.e., annealing, tempering, and surface hardening), (iv) ferrous and non-ferrous metals (i.e., steels classification, cast iron, and alloys), (v) metal fabrications, and (vi) mechanical properties and testing of metals. Industry visit to metal-based company (i.e. Asturi Metal Builder (M) Sdn Bhd) is scheduled; to ensure sufficient exposure of metal fabrication and processing in industry to the leaners. Two problem-based assignments are designed to develop learners' ability to analyze and carry out metallurgical investigations, apply theoretical knowledge, and write a good technical report. Learners need to sit for test 1, test 2, final semester examinations, and four quizzes (i.e., two offline quizzes during class, and two online-based quizzes); to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) apply comprehensive knowledge, identify problems and formulate creative and innovative solutions in metals and alloys processing, and fabrications in industry, and

(ii) practice empathy, responsibilities, integrity, and professionalism in their endeavours; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain theories learned to solve problems of metal and alloy in related task given
CO2: Solve related problems in metal and alloy using the appropriate principles
CO3: Analyze the appropriate concepts learned about metal and alloy comprehensively
CO4: Develop new ideas and identify alternative approaches for problem solving appropriate to metal and alloy
CO5: Demonstrate a good ethics and professionalism in completing the given task

BSP3173
Corrosion
Credit: 3
Pre-requisite: None

Synopsis:

Learning activities are focused on (i) introduction to corrosion (i.e., main reasons to study corrosion), (ii) mechanism (i.e., polarization, passivation, and corrosion rate,) (iii) types of corrosion, and (iv) corrosion control (material selection, corrosion inhibitor, cathodic and anodic protection). This course will be delivered via lectures; which begin with explanation on the principle of corrosion including elated electrochemical reactions, polarization and passivity as well as applications of thermodynamics to corrosion and electrode kinetics. All types of corrosion namely aqueous and non-aqueous corrosion, atmospheric corrosion, biological corrosion, and corrosion in selected environments such as soil, concrete, marine and sulphur bearing solutions are discussed. Introduction on basic principle of corrosion control for all types of corrosion are also discussed. A problem-based assignment is designed to develop learners' ability to analyze and carry out corrosion investigations, apply theoretical knowledge, and develop technical report writing skills. Learners need to sit for mid-term, final semester examinations, and four quizzes (i.e., two offline quizzes during class, and two online-based quizzes); to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) apply comprehensive knowledge, identify problems and formulate creative and innovative solutions to corrosion problems in industry, (ii) practice empathy, responsibilities, integrity, and professionalism in their endeavours, and (iii) apply managerial, entrepreneurial skill, and demonstrate leaderships characteristics; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain theories learned to solve problems of corrosion & corrosion control in related task given
CO2: Solve related problems in corrosion & corrosion control using the appropriate principles
CO3: Analyze the appropriate concepts learned about corrosion & corrosion control comprehensively
CO4: Develop new ideas and identify alternative approaches for problem solving appropriate to corrosion & corrosion control
CO5: Demonstrate a good ethics and professionalism in completing the given task

BSP3462
Polymer & Composite Lab
Credit: 2
Pre-requisite: None

Synopsis:

This course consists of three related field of study, polymer, composite. Learners are introduced to practical and hands-on activities; inclusive of (i) manipulation of instruments to perform synthesis/preparation of materials, quantitative and qualitative characterization of materials, and (ii) composition of scientific report. Learners need to synthesis, prepare and characterize polymer and composite; using step-growth, free radical, resin transfer moulding, press laminating and extruder. Experiment demonstration, and safety talk is scheduled to be delivered by senior academician, and trained technical staff respectively; during second week of academic semester. Laboratory manual is given to each learner; which consists of theory, background of experiment, series of instructions, objectives, problem statement, and references. An online forum platform (accessible via kalam.ump.edu.my) is developed for discussions purposes. The class is divided into groups. Each group will perform different experiment each week which will be assessed based on (i) peer review, (ii) technical report,

and (iii) ability to synthesis polymers (which will be carried out during a practical test). Learners are aimed to develop psychomotor skills in manipulation of instruments to characterize properties of the synthesized/prepared materials; i.e., FTIR, DSC, TGA, UTM, XRD, compression, tensile and impact.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve problem using experimental procedure to accomplish given objectives during material synthesis and characterization, and device fabrication
CO2: Follow the guided experiments using the correct procedures
CO3: Manipulate instruments to accomplish given objectives using correct procedure
CO4: Demonstrate the ability to deliver and participate in knowledge sharing

BSP3472
Metal & Ceramic Lab
Credit: 2
Pre-requisite: None

Synopsis:

This course consists of two related field of study, metal and ceramic. Learners are introduced to practical and hands-on activities; inclusive of (i) manipulation of instruments to perform synthesis/preparation of materials, quantitative and qualitative characterization of materials, and (ii) composition of scientific report. Learners need to synthesis, prepare and characterize metal and ceramic; using sol-gel, solid state reaction and metallography. Experiment demonstration, and safety talk is scheduled to be delivered by senior academician, and trained technical staff respectively; during second week of academic semester. Laboratory manual is given to each learner; which consists of theory, background of experiment, series of instructions, objectives, problem statement, and references.

An online forum platform (accessible via kalam.ump.edu.my) is developed for discussions purposes. The class is divided into groups. Each group will perform different experiment each week which will be assessed based on (i) peer review, (ii) technical report, and (iii) ability to conduct experiment and synthesis metal and ceramic (which will be carried out during a practical test). Learners are aimed to develop psychomotor skills in manipulation of instruments to characterize properties of the synthesized/prepared materials; i.e., UTM, XRD, metallurgical microscopy and vickers hardness.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve problem using experimental procedure to accomplish given objectives during material synthesis and characterization, and device fabrication
CO2: Follow the guided experiments using the correct procedures
CO3: Manipulate instruments to accomplish given objectives using correct procedure
CO4: Demonstrate the ability to deliver and participate in knowledge sharing

BSP3452
Advance Material Lab
Credit: 2
Pre-requisite: None

Synopsis:

Learners are introduced to practical and hands-on activities; inclusive of (i) manipulation of instruments to perform synthesis/preparation of materials, quantitative and qualitative characterization of materials, and (ii) composition of scientific report. Learners need to synthesis functional materials i.e., quantum dots, nanowires, nanoparticles, liquid crystals, organic dyes, organometallic frameworks, and solid polymer electrolytes; using wet chemical process, electrospinning machine, and microwave technique. Demonstration, and safety talk is scheduled to be delivered by senior academician, and trained technical staff respectively; during second week of academic semester. Laboratory manual is given to each learner; which consists of theory, background of experiment, series of instructions, objectives, problem statement, and references. An online forum platform (accessible via kalam.ump.edu.my) is developed for discussions purposes. Learners are divided in group of three; required to perform ten experiments, which will be assessed based on (i) peer review, (ii) technical report, and (iii) ability to manipulate instruments for characterizations (which will be carried out during a practical test). Learners are aimed to develop psychomotor skills in manipulation of instruments to characterize properties of the synthesized/prepared materials; i.e., Ball Miller, Ultra Violet-Visible absorption spectrometer, Photoluminescence spectrometer, Fourier Transformed Infra-Red

spectrometer, Polarized Light Microscope, Thermogravimetric Analysis, Potentiostat-Galvanostat, X-Ray Diffractometer, and Ab-Initio Density Functional Theory calculations.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve problem using experimental procedure to accomplish given objectives during material synthesis and characterization, and device fabrication
CO2: Follow the guided experiments using the correct procedures
CO3: Manipulate instruments to accomplish given objectives using correct procedure
CO4: Demonstrate the ability to deliver and participate in knowledge sharing

BSP4172
Material Selection & Processing
Credit: 2
Pre-requisite: None

Synopsis:

The course is designed to offer a generic and broad view of material selection and processing technology. Learning activities are focused on industrial scale-material selection and processing concepts; such as (i) product identification, (ii) design and concept education, (iii) materials selection (iv) product development, and (v) product presentation. This course will provide learners an opportunity to develop personal skills and knowledge while working with metal, polymer, ceramic and composite materials which commonly used in the manufacturing and construction industries. Industry visit to polymer and metal production-based companies (e.g., Top Glove Sdn Bhd, Asturi Sdn Bhd & Amsteel Sdn Bhd) is scheduled; to ensure sufficient industrial exposure to the learners. Assignment is given to further strengthen the understanding of the course. The activities incorporated in this course are to create an active participation (psychomotor/ critical thinking & problem solving) during the lecture sessions. Learners need to sit for mid-term, final semester examinations, and four quizzes; to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) hypothesize alternative approaches to solve problems using the knowledge of rheology, and characterizations in industry and research domains, and (ii) practice and cultivate entrepreneurial skills during presentation of idea; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the theories involved to solve the problems associated with material selection and processing.
CO2: Solve the problem with the appropriate concepts learned about materials processing and theological properties.
CO3: Analyze the appropriate technique of material selection and processing
CO4: Develop and plan a solution for the existing technology of material selection and processing.
CO5: Propose a scientific report effectively in written form

BSP3302
Final Year Project I
Credit: 2
Pre-requisite: None

Synopsis:

Learning activities are focused on developing workable research proposal comprising identification of (i) problem statement, (ii) research objectives and question, (iii) literature reviews and (iv) research methodology. Each student is assigned to an advisor (lecturer); based on field of expertise. The stated focus is planned to be delivered by direct active/engaged learning with the advisor (weekly basis); to understand the direction of project. Students are also required to gather information through reading of recently published articles on related field. Identification of chemicals and suitable characterization tools to ensure completion of project will be finalized and justified with guidance of advisor. A problem-based assignment is designed to encourage the students to incorporate managerial skills (e.g., project management, research ethics, time management and log book keeping). Students are assessed based on written proposal, and efficiency of communications of research strategies during oral presentation. Students will continue lab work upon approval of proposal by faculty members. Learners should be able to analyze appropriate techniques and suitable solutions to be applied for their project upon completion of the course.

Course Outcome
By the end of semester, students should be able to:

CO1: Apply appropriate principles of material science and technology to the given

research project.
CO2: Analyze the appropriate techniques and suitable solutions to be applied in research project.
CO3: Explain effectively in written and oral form through project proposal presentation.
CO4: Organize in a given research task and identify own responsibility in a project and behave accordingly.
CO5: Demonstrate a good ethics and professionalism in completing the given task.

BSP4314
Final Year Project II
Credit: 4
Pre-requisite: BSP4314 Final Year Project I

Synopsis:

This course is a continuation of BSP3023– Final Year Project II. Learning activities are directed on completion of individual research project (by advisor monitoring), thesis preparation and project presentation. The stated focus is planned to be delivered by active/engaged learning with advisor, practical laboratory work, self-reading and draft preparation. Students will gather suitable data to answer research objectives; handling data analysis and discussion prior thesis writing. Students are assessed based on complete draft of thesis; effective communications of their findings during oral presentation and log book arrangement. At the end of this term, each student is expected to submit a fully developed and presented project that reflects the student's command of the tools and processes of material technology knowledge.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply appropriate principles of material science and technology to the given research project.
CO2: Construct the experiment independently in a given task.
CO3: Develop new ideas and identify alternative approaches for problem solving appropriate to research project.
CO4: Explain effectively in written and oral form through project proposal presentation.
CO5: Identify new ideas and information from multiple sources independently and organize into meaningful categories.

BSP4812
Industrial Training
Credit Hour: 12
Prerequisite: All faculty and programme courses

Synopsis

This course aims to give chances for the student to practise and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Student are supervised by industrial and university supervisors to guide and ensure they can do their work as good as possible and achieve the objective for this course. Then, student need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to hand in to the university supervisor. Student need to do final presentation for assessment.

Course Outcome

By the end of semester, students should be able to:
CO1: Adapt working culture in project, consultant, construction and related industry.
CO2: Organize the industrial training knowledge, experience and skill in the preparation of the industrial training report.
CO3: Build effective communication skills in written and oral presentation.

BSP3503
Solar Cell Technology
Credit: 3
Pre-requisite: None

Synopsis:

Learning activities are focused on (i) fundamental of photoelectric conversion (i.e., charge excitation, transportation, separation, and collection), (ii) mechanisms (i.e., electron injection efficiencies, energy loss, and multi exciton generation), (iii) fabrications, and (iv) characterizations of solar cell. The stated focus are planned to be delivered during lectures; which cover four main technologies (i.e.,mono-crystalline, thin film, dye sensitized, and quantum dots solar cell). Industry visit to solar cell-based companies (e.g., AUO Sunpower Sdn Bhd, RadTech Sdn Bhd, and HBE Gratings Sdn Bhd) is scheduled; to

ensure sufficient exposure of Silicon-based solar cell processing in industry to the learners. A problem-based assignment is designed to encourage the learners to incorporate technopreneurial skills (e.g., identifying new materials for solar cell, proposing a business plan, and installation of solar cell during community service activity). Learners need to sit for mid-term, final semester examinations, and four quizzes (i.e., two offline quizzes during class, and two online-based quizzes); to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) hypothesize alternative approaches to solve problems in solar cell fabrications, and characterizations in industry and research domains, and (ii) practice and cultivate entrepreneurial skills during presentation of idea; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve related problems in solar cell technology using appropriate principles
CO2: Analyze the appropriate concepts learned about solar cell technology comprehensively
CO3: Develop new ideas and identify alternative approaches for problem solving in solar cell technology
CO4: Identify the ability to incorporate entrepreneur skills in assigned task
CO5: Demonstrate leadership characteristics in assigned task

BSP3513
Electronic Ceramic
Credit: 3
Pre-requisite: None

Synopsis:

This course introduces and discusses the types and properties of electronic ceramics. The course covers ceramic materials for such applications; i.e., conductor, magnetic materials, electro-optic materials, superconductor, pyroelectric and piezoelectric materials as well as their fabrication and characterizations. Industrial visit is planned to introduce students in depth understanding for electronic ceramics applications. Students will be assigned to have a topic of electronic ceramics application and give a presentation to incorporate with technopreneurial skills. Written test such as quizzes (both offline and online), mid-term test and final test will be given to evaluate the students learning. Upon completion of the course, the students are able to solve the basic problem of electronic ceramics development and applications as well the capability in analyzing and providing the alternative solution of problem regarding the electronic ceramics applications.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve the basics problems associated with electronic ceramic
CO2: Analyze the appropriate concepts learned about electronic ceramic.
CO3: Plan a solution for the existing technology and discuss the method involved to solve problem in electronic ceramic
CO4: Identify the ability to incorporate entrepreneur skills assigned work
CO5: Demonstrate leadership characteristics in assigned work

BSP3523
Liquid Crystal Technology
Credit: 3
Pre-requisite: None

Synopsis:

This course covers the basic concept of liquid crystals along with technology review such as anisotropic fluids, phase of liquid crystals, chemistry of liquid crystal, alignment of liquid crystals, photoisomerization effects in liquid crystals, and the future aspects of LCD. Industrial visit is planned to introduce students in depth understanding for development and current issue of LCD. Industrial visit is planned to introduce students in depth understanding for the LCD technology and recent issues. Students will be assigned to have a topic of electronic ceramics application and give a presentation to incorporate with technopreneurial skills. Written test such as quizzes (both offline and online), mid-term test and final test will be given to evaluate the students learning. Upon completion of the course, the students are able to solve the basic problem of LCD development as well the capability in analysing and providing the alternative solution of problem regarding the LCD technology development.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve the basics problems associated

with liquid crystals and liquid crystal technology
CO2: Analyze the appropriate concepts learned about liquid crystals and liquid crystal technology
CO3: Plan a solution for the existing technology and discuss the method involved to solve
CO4: Identify the ability to incorporate entrepreneur skills assigned work
CO5: Demonstrate leadership characteristics in assigned work

BSP3533
Supercapacitor Technology
Credit: 3
Pre-requisite: None

Synopsis:

The course is focused on (i) fundamental of energy storage protocols (i.e., capacitors, batteries, supercapacitors, and link between energy and power requirements), (ii) supercapacitor principles (i.e., electrochemical double layer capacitance, pseudo-capacitance, hybrids and device taxonomy), (iii) fabrications (i.e., positive electrode, negative electrode, electrolyte and assembly selection), and (iv) characterizations (i.e., setup configuration, cyclic voltammetry, charge-discharge, electrochemical impedance spectroscopy and procedure to evaluate device performance). The stated focus is planned to be delivered during lectures; which emphasize on the recent advancement on supercapacitors technology (including symmetric supercapacitor, asymmetric supercapacitor, solid state supercapacitor, advancement on electrode materials and applications). Industry visit to supercapacitor-related companies is scheduled; to ensure sufficient exposure of device assembly in industry to the students. A hands-on based assignment (mini project) is designed to encourage students to incorporate managerial and leadership skills (e.g., group activities, data handling and evaluation, work coordination and vocal presentation). A mid-term, four quizzes and final semester examination is designed to assess student's understanding of the course. Students should be able to (i) solve problems in supercapacitor fabrications, and characterizations in industry and research domains, and (ii) identify energy-power density requirement in certain device/application and (iii) the practice and cultivate managerial skills during mini project/presentation; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve related problems in supercapacitor technology using the appropriate principles
CO2: Analyze the appropriate concepts learned about supercapacitor technology comprehensively
CO3: Develop new ideas and identify alternative approaches for problem solving appropriate to supercapacitor technology
CO4: Identify the ability to incorporate managerial skills in assigned task
CO5: Demonstrate leadership characteristics in assigned task

BSP3543
Thin Film Technology
Credit: 3
Pre-requisite: None

Synopsis:

This course exposes students to overview the Thin Film Technology in various industries. This course covers methods of deposition, deposition growth, and thin film properties such as optical, electrical, magnetic and mechanical properties. The reactions and several techniques for thin film characterization are also discussed in details in the second half semester. Industrial visit is planned to introduce students in depth understanding for thin film applications. Students will be assigned to discuss a topic of thin film application and deliver a presentation to encourage them to practice technopreneurial skills. Written test such as quizzes (both offline and online), mid-term test and final test will be given to evaluate the students learning output. Upon completion of the course, the students are able to solve the basic problem of thin film applications as well the capability in analysing and providing the alternative solution for problem solving regarding the thin film technology and their applications.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve the basic problems associated with preparation of thin film using the appropriate principles.
CO2: Analyze the appropriate concepts learned to solve a given situations in thin film technology comprehensively.

CO3: Develop new ideas and identify alternative approaches for problem solving appropriate to thin film technology
CO4: Identify the ability to incorporate entrepreneur skills in assigned task

BSP4523
Recycle Technology
Credit: 3
Pre-requisite: None

Synopsis:

Material resources to support our industrial age have become increasingly scarce. On the other hand, garbage or trashes or solid wastes resulted from our economic system that urges disposable lifestyles have become difficult problem to solve for those responsible for their management. Much of these discarded materials which could not be otherwise reused, sold, or salvaged may contain valuable amount of materials and or energy if appropriate technology and management are applied to convert these wastes to wealth. This course deals with materials recycling and recovery. The course content includes four parts, i.e. (1) Principles of Solid Waste Management, (2) Materials Recycling, (3) Hazardous Waste Recovery, and (4) Future Strategies for Waste Management.

A problem-based assignment is designed to encourage the learners to incorporate technopreneurial skills (e.g., identifying materials to be recycled, proposing a business plan and recycling methods). Learners need to sit for mid-term, final semester examinations, and four quizzes (i.e., two offline quizzes during class, and two online-based quizzes); to ensure sufficient theoretical and fundamental knowledge.

Learners should be able to (i) hypothesize alternative approaches to solve problems related to recycle technology, and (ii) practice and cultivate entrepreneurial skills during presentation of idea; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve related problems in recycle technology using the appropriate principles
CO2: Analyze the appropriate concepts learned about recycle technology comprehensively
CO3: Develop new ideas and identify alternative approaches for problem solving appropriate to recycle technology
CO4: Identify the ability to incorporate managerial skills in assigned task
CO5: Demonstrate leadership characteristics in assigned task

BSP4533
Molecular Modelling
Credit: 3
Pre-requisite: None

Synopsis:

The course emphasized on validation of realistic cluster model using state of the art modelling tool i.e., Ab Initio Density Functional Theory calculations. The calculations and modelling procedure are planned to be carried out using Gaussian 09W, and Gaussview 5.0 respectively. Five important analysis of materials are included in the syllabus i.e., structure, opto-electronic, reduction–oxidation energy level, adsorption– desorption mechanisms, and electron dynamics in opto-electronic devices. A combination of lecture and hands-on activities is designed to ensure sufficient experience, and efficient delivery. Additionally, two visits are planned i.e., (i) Advanced Analysis and Modelling (ADAM), and Advanced Computing facilities at MIMOS Berhad, and (ii) DFT simulation facility at Universiti Malaysia Terengganu; to expose the learners to available career in the respective field. Learners are expected to accomplish a problem-based assignment; which needs combination of realistic cluster modelling, and technopreneurial skills. Learners are required to sit for a test, four quizzes (i.e., two offline quizzes during class, and two online-based quizzes) to ensure sufficient theoretical and fundamental knowledge. Upon completion of the course, the learners should be able to (i) hypothesize alternative approaches to solve problems in respective field using realistic cluster modelling procedure, and (ii) practice entrepreneurial skills during presentation of idea.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve problems related to realistic modelling using appropriate principles
CO2: Analyze the appropriate concepts learned about density functional theory calculations comprehensively
CO3: Construct realistic cluster model using

correct procedure to accomplish given problem
CO4: Identify the ability to incorporate managerial skills in assigned task
CO5: Demonstrate leadership characteristics in assigned task

BSP4543
Semiconductor Devices
Credit: 3
Pre-requisite: None

Synopsis:

This course introduces the major application of solid state physics. This course covers the most basic semiconductor devices as a p-n junction, JFET, MOSFET, MESFET as well as the fabrication techniques of the devices on silicon wafer. The application of the devices for diode, LED, photodetector and solar cell are also introduced. Industrial visit is planned to introduce students in depth understanding for semiconductor devices fabrication. Students will be assigned to have a topic of semiconductor devices application and give a presentation to incorporate with technopreneurial skills. Written tests such as quizzes (both offline and online), mid-term test and final test will be given to evaluate the students learning. Upon completion of the course, the students are able to solve the basic problem of semiconductor devices applications as well the capability in analyzing and providing the alternative solution of problem regarding the semiconductor devices fabrication and their applications.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve the basics problems associated with semiconductor devices
CO2: Analyze the appropriate concepts learned about semiconductor devices.
CO3: Plan a solution for the existing technology and discuss the method involved to solve
CO4: Identify the ability to incorporate entrepreneur skills assigned work
CO5: Demonstrate leadership characteristics in assigned work

BSP4553
Computational Physics
Credit: 3
Pre-requisite: None

Synopsis:

This course will introduce techniques and applications in computational Physics. This course focuses specifically on methods for solving Physics/Mathematics problems using modern computational tools such as MATLAB, MAPLE or MATHEMATICA or etc. The emphasis of the course will be on using computational methods to solve physics problems that cannot be solved analytically. Student will be taught about theory in lecture room and hands on practice in laboratory. At the end of semester, student should be able to plan a solution to solve Physics problem. Furthermore, student should be able to incorporate managerial and express their leadership skills.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve physics problems using appropriate tools and technique
CO2: Analyze problems using appropriate methods
CO3: Plan a solution for a given problem and discuss the method involved comprehensively
CO4: Identify the ability to incorporate managerial skills in assigned task
CO5: Express leadership characteristics in assigned task

BSP4563
Nanomaterial Technology
Credit: 3
Pre-requisite: None

Synopsis:

Learning activities are focused on (i) basic theory, (ii) classification of nanomaterials (i.e., 0-D, 1-D, 2-D and 3-D), (iii) synthesis of nanomaterials (i.e., inert-gas inspection, sol-gel deposition, molecular self-assembly, physical vapor deposition and milling mechanical alloying), (iv) characterization techniques (i.e., scanning tunnelling microscope, atomic force microscope, energy dispersive spectroscopy and Raman spectroscopy technique), and (v) application of nanomaterials in science and technology. The stated focus is planned to be delivered during lectures; which cover the functions of nanomaterials (i.e., nano-sensors, carbon nanotubes, quantum dots nanoparticles) which acts as optical, chemical and biosensors in various applications (i.e., food and agriculture, medical, water treatment and automotive

industry). A project-based assignment is designed to enhance learner's cognitive and psychomotor skills (e.g., nanostructures in nature and nanomaterial in art and culture heritage). Learners need to sit for mid-term, final semester examinations, and four quizzes (i.e., two offline quizzes during class, and two online-based quizzes); to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) explain and solve related problems in nanotechnology based on the tools, methods and applications and (ii) develop new idea and create alternative approaches for problem solving by considering the concerns and challenges in nanotechnology; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve related problems of nanotechnology based on their tools, methods and applications.
CO2: Analyze the nanomaterial and nanostructures for future application
CO3: Develop new ideas and identify alternative approaches for problem solving appropriate to supercapacitor technology
CO4: Identify the ability to incorporate managerial skills in assigned task
CO5: Demonstrate leadership characteristics in assigned task

BSP3553
Advance Solid-State Physics
Credit: 3
Pre-requisite: None

Synopsis:

This course is designed to expose wave mechanics and wave propagation through crystals, fundamental and reciprocal lattice types, Brillouin zones, lattice vibrations, phonon, density of state, Debye and Einstein model of specific heats, Fermi free electron, Hall effect, energy band, Bloch functions, Kronig Penney model. There are seven (7) headlines in the course; introduction to quantum mechanics, Schrodinger equation, reciprocal lattice vectors, crystal vibrations, Fermi free electrons and energy bands. The stated focus is planned to be delivered during lectures. A problem-based assignment is designed to encourage the learners to incorporate the ethics and professional values. Learners need to sit for two tests, final semester examinations, and four quizzes to ensure sufficient theoretical and fundamental knowledge. Learners should be able to (i) develop new ideas and identify alternative approaches for problem solving related to solid state physics, and (ii) demonstrate the ethical values and professionalism character in completing a given task; upon completion of the course.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve related problems on industrially relevant crystals such as semiconductors, superconductors, dielectrics, and ferroelectrics
CO2: Use the learnt properties of crystalline solids to analyze related phenomena thereby solving related problems
CO3: Develop new ideas and identify alternative approaches for problem solving appropriate to electrical properties of crystalline solids.
CO4: Identify the ability to incorporate managerial skills in assigned task
CO5: Demonstrate leadership characteristics in assigned task

COURSE SYNOPSIS FOR BACHELOR OF OCCUPATIONAL SAFETY AND HEALTH WITH HONOURS

BUM2123
Applied Calculus
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces Polar Coordinates and Vector, Vector-Valued Functions, Partial Derivatives, and Multiple Integrals. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Analyse and apply appropriate calculus concepts to solve various science and engineering problems.
CO2: Use appropriate software and tool to solve the graphical and computational problems in calculus.
CO3: Analyse and think critically a wide range of problem and solve it using ideas and methods in calculus.
CO4: Relate and applied the concepts and methods studied into other courses.

BUM2413
Applied Statistics
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses on statistical problem-solving methodology and descriptive statistics; sampling distribution and confidence interval; hypothesis testing; analysis of variance (ANOVA); goodness-of-fit test and contingency tables; regression and correlation including simple and multiple linear regressions. Statistical packages such as Microsoft Excel, SPSS, R Language, S Plus, EViews and Minitab shall be used in this course.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain statistical terminologies and apply statistical concepts in solving problems using conventional method.
CO2: Apply statistical concepts in solving problems using statistical packages.
CO3: Work together in a group to accomplish the task given.

BTU1123
Industrial Psychology
Credit Hour: 3
Prerequisite: None

Synopsis

The Industrial Psychology course introduces students to the principles of behaviours as it exists at the workplace: attitudes of employees and employers, organizational behaviour, workplace environment and its effects. It focuses on three parts concerning personnel issues, organizational issues, and work environment issues investigated in industrial/organizational psychology. Specifically, the course explains the major applications of Industrial Psychology; describes the importance relationship of selecting, training, and evaluating employees; discusses the issues facing industrial psychology today and how these issues affect workers, organizations, and society; and illustrates how the principles of Industrial Psychology can be applied to day-to-day experiences as an organizational member, and to help you develop as an effective organizational member or manager.

Course Outcome

By the end of semester, students should be able to:
CO1: Know major applications of Industrial Psychology.
CO2: Describe the importance relationship of selecting, training and evaluating employees.
CO3: Relate the issues affecting workers, organizations, and society.
CO4: Illustrate how the principles of Industrial Psychology can be applied in organization.

BTU 2413
Management Information System
Credit Hour: 3
Prerequisite: None

Synopsis

This course aims to provide firm understanding on the significance role of information systems in today's organization in particular in managing organizational most valuable assets - its data and information. The discussion sessions shall cover four

major topics; Information Systems and its applicability in modern enterprise and organization including its strategic competitive advantage as well as ethical issues involved; Information technology infrastructure and security issues; Information system applicability for digital age; building and managing information systems for organizational use. Hands on activity on the usage of office automation system and designing relational database shall be cover in lab sessions.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe information systems roles in modern organization and its functions in obtaining organizational competitive advantage.

CO2: Describe information technology infrastructure and its requirement for digital firm and security threats involved.

CO3: Discuss various strategies and approaches in system development.

CO4: Demonstrate the usage of office automation system in performing operational tasks and managing information resources within organization.

BTU 2123
Quality Management System
Credit: 3 credits
Prerequisites: None

Synopsis

This course intends to provide an understanding of the fundamental of quality management. The topics covered the introduction to Quality Management, Quality`s Guru, Quality Tools and Concepts, Different Quality Approaches, Quality Tools and Statistical Process Control. Students will be exposed to various cases studies on Quality locally and internationally.

Course Outcome

By the end of semester, students should be able to:

CO1: Define and explain the fundamental concept and definition of total quality management.

CO2: Identify the basic knowledge on quality management and quality control in production and manufacturing.

CO3: Demonstrate and evaluate new concept of quality control for production and manufacturing, and quality practices in service sectors which integrate fundamental aspects of quality management.

CORE PROGRAME
BPS1313
OSH Fundamentals
Credit: 3 credits
Prerequisites: None

Synopsis

This course introduces the principles and basic concepts of occupational safety and health. Students will be exposed to the history of occupational safety and health (OSH) development, acts and legislations in relation to OSH, the responsibilities and qualification of safety and health practitioner and professional ethics. The human bodies and its psychological functions and its relationship to workplace productivity will also be discussed. Introduction to Occupational Hygiene is also discussed as a foundation for the next subjects. Some common safety and health hazards will be emphasized for better understanding.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply the occupational safety and health fundamentals theory to identify hazards, risk and exposure at the workplace to improve safety and health performance.

CO2: Analyse workplace hazards, risk and exposure that effect workers health and planning for the best solution to improve workplace safety and health management and performance.

CO3: Discuss occupational safety and health problems/challenges and demonstrate a scientific approach to resolves the issues.

CO4: Adhere team working skills for problem solving in completing task.

BPS 1323
Introduction to Engineering Science
Credit: 3 credits
Prerequisites: None

Synopsis

This course is designed to introduce students to the engineering and spatial science professions, to provide them with an

understanding of the fundamental concepts of engineering science and to develop the basic skills necessary to effectively study in an engineering or spatial science discipline. Students will learn how to apply these skills and knowledge, using an engineering systems approach, to a range of authentic multidisciplinary engineering and spatial science problems. Topics covered include the nature of engineering and spatial science; fundamentals of engineering science and their application; study skills and an exposure to a range of professional skills including technical communications, calculation and presentation tools and information literacy.

Course Outcome

By the end of semester, students should be able to:

CO1: Understanding fundamental scientific and applied mathematical principles in engineering applications.
CO2: Apply fundamental knowledge of engineering.
CO3: Formulate the method to solve introductory engineering problem.

BPS 1333
OSHE Legislation
Credit: 3 credits
Prerequisites: None

Synopsis

This course provides a foundation for understanding the related law on Occupational Safety and Health (OSH) including act, rules, regulations, orders, guidelines and code of practice in their organization. The focuses of studies are for the students to know about the related law and apply their knowledge as OSH personnel in their organization in order to minimize hazards and accident.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain occupational safety and health related laws including act, regulations and code of practice to be applied at the workplace.
CO2: Apply related laws on occupational safety and health including act, regulations and orders to solve OSH related problems at the workplace.
CO3: Assist the organization to reduce accident and incident in the workplace by applying the related law.

BPS 1343
Fire & Building Safety
Credit: 3 credits
Prerequisites: None

Synopsis

This subject is aimed to give an understanding on the basic concept of Fire Prevention and Protection especially its application in buildings. The course will cover topics such as Basic Principles of Fire and its category, the Components of Fire Safety, the Active and Passive Fire Safety Systems, the Life Cycles of a Building, Loss Impact and Means of Escape During Emergencies. Upon completion of this course, the students will be able to understand and practice major areas in fire hazard management and apply best practices in fire safety and fire management system as well as preparing for emergency cases. Students will also learn the theory of combustion and causes of fire and the way to fight fire, including the types and correct use of fire extinguishers. Students will experience with Live Fire Training Unit where they will learn how to use fire extinguishers correctly and safely.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify the basic principles of fire, fire sources and fuel classifications.
CO2: Distinguish between preventive and protective measures of fire safety in the buildings.
CO3: Analyse the loss impact of fire to individual, organization, society and the country.
CO4: Organize fire safety management system and establish the fire safety activity within the life cycle of a building.

BPS 1353
Hazard Recognition & Risk Management
Credit: 3 credits
Prerequisites: BPS1113 Occupational Safety and Health Fundamentals

Synopsis

This course is aimed to give an understanding on the basic steps in recognizing hazards at work place and managing risks to as low as reasonably practicable (ALARP). These include the introduction to type of hazards, hazard identification, risk evaluation, risk assessment, determining risk control, hierarchy of risk control and risk management principle.

Course Outcome

By the end of semester, students should be able to:

CO1: Conduct hazard identification and risk assessment in workplace.
CO2: Determine risk control and risk reduction measures based on hierarchy of control.
CO3: Adapt risk management principles in reducing risk level to as low as reasonably practicable (ALARP) and preventing workplace incidents.

BPS 1363
Industrial Toxicology
Credit: 3 credits
Prerequisites: BPS1113 Occupational Safety and Health Fundamentals

Synopsis

This course provides students with a basic understanding and appreciation of the principles of human body system and toxic effects of chemicals on the living organism, regulatory aspect, application of toxicology in industry and the effects of toxic substances on man and the environment. Topics include: disposition and metabolism of toxic substances, types of exposure and response, toxic responses of selected body systems, toxic mechanisms of drugs, industrial chemicals, food additives, pesticides, environmental pollutants, household products, toxicity testing and risk assessment.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the principles of human body system, dose-response relationship and the concept of threshold dose.
CO2: Explain how toxins enter the body and are transported to different organs and tissues.
CO3: List and discuss several types of toxic chemicals available in the occupational environment.
CO4: Describe organ toxicity and type of response occur which results from industrial chemical exposure.
CO5: Apply the principles of chemical safety management in the workplace.

BPS 2313
Industrial Hygiene
Credit: 3 credits
Prerequisites: BPS1113 OSH Fundamentals

Synopsis

This course generally will introduce the field of industrial hygiene, including the chemical, physical and biological agents, which affect the health and safety of employees, the application of control measures for the various agents and study of occupational exposure limit. Upon completion of this course, the student will have studied the major topic areas within the field of chemical, physical and biological hazards, principle of exposure monitoring, medical surveillance and personal protective equipment.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply basic terms, technical concepts, legal, professionals and ethical frameworks integral to the practice of industrial hygiene.
CO2: Conduct industrial hygiene assessment fieldwork using standard methodology, proper equipment and correct analysis.
CO3: Illustrate concept of anticipation, recognition and evaluation in designing hazard control to solve industrial problem.

BPS2323
Behaviour Based Safety
Credit: 3 credits
Prerequisites: NONE

Synopsis

Work always involves humans. Human are complex and their behaviour is the results of interaction between and within internal and external factors. This course will introduce usage of behaviour-based safety as a scientific tool for behaviour change. The course will review the relationship between behaviour, attitudes, culture, and systems and explain how behaviour-based fits into the hierarchy of control. Underlying concepts related to performance management and a powerful tool (ABC analysis) is learned and applied to understanding behaviour and to developing a change plan. Overall, the course provides a clear understanding of how attitudes, cultures, and systems influence or affect behaviour, and focuses on understanding how successful behavioural change efforts really work. Effective leadership and involvement are seen as the cornerstone to success in promoting a positive safety culture. This course also will introduce current thinking on safety leadership and supervision models and strategies relevant to health and safety at work.

Course Outcome

By the end of semester, students should be able to:

CO1: Use the right technique in determining the best intervention strategy in promoting safety culture in a workplace.

CO2: Analyse the right concepts of behaviour-based safety approach in developing a Total Safety Culture in the workplace.

CO3: Demonstrate their ability to work in group either as a member or leader in completion of project related to behaviour-based safety.

BPS2333
Toxic and Hazardous Waste Management
Credit: 3 credits
Prerequisites: BPS13633 Industrial Toxicology

Synopsis

This course introduces the student to the physical, chemical and toxic properties of toxic and hazardous wastes which are the basis for their hazard classification, movement and distribution as well as their impacts on human health and the environment. The industries which generate toxic and hazardous waste will be discussed. The management of these wastes which include handling, storage and transportation based on the regulations stipulated in the Environmental Quality Act, 1974 as well as other international regulations will be discussed. Understanding on the treatment and disposal processes will be emphasized including pollution prevention and waste minimization strategies.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply the theories and principle of toxic and hazardous waste management, the impact and the risks towards human health and environment.

CO2: Use the legal requirements on toxic and hazardous waste management in the safety and health fields.

CO3: Communicate risk, hazard and safety factors in toxic and hazardous waste treatments.

BPS2343
Occupational Epidemiology and Disease
Credit: 3 credits
Prerequisites: BPS 1363 Industrial Toxicology, BUM 2413 Applied Statistics

Synopsis

This course will emphasize on aspects of disease transmission and causation, measuring occurrence of disease, determining the cause of disease and estimating risk. The major types of epidemiologic study (cohort, case referent and cross-sectional) will be described. Threats to validity and issues in interpreting epidemiologic data such as bias, confounding factors, and random error will be discussed. Communicable and non-communicable diseases plus epidemiologic surveillance will be also discussed for preventing and controlling diseases. Students will also be exposed to the latest journals related to environmental and occupational epidemiology.

Course Outcome

By the end of semester, students should be able to:

CO1: Demonstrate knowledge of the principle of disease causation, and the epidemiological approach to defining and measuring the occurrence of health- related states

in populations.
CO2: Contrast the main types of study design in terms of characteristics, strengths, weaknesses and risk measurements.
CO3: Apply the epidemiology concepts and methods to broad area of environmental and occupational health.

BPS 2353
Emergency Response & Preparedness
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course will provide student with basic understanding of Emergency and Disaster Management based on its cycle. Managing a good emergency response is the most effective way to reduce the impact of a crisis on vulnerable populations. Student also will be exposed to management processes which involve units created to prepare for, respond to and recover from any emergency events. This is important to ensure the business continuity is achieved after facing certain type of disasters by manmade or natural cause. Specific topics on Business Continuity Management (BCM), Hazardous Materials (HAZMAT), Incident Command System (ICS) and *Arahan Nombor* 20 *Majlis Keselamatan Negara* (MKN) also will be discussed.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply the knowledge of emergency response preparedness for emergency and Disaster Management plan.
CO2: Evaluate vulnerability analysis in determining exposure of human, environment and property to various emergency threats.
CO3: Apply appropriate technical skills in conducting Emergency response and preparedness plan.

BPS 2363
Ergonomics
Credit: 3 credits
Prerequisites: BPS1113 OSH Fundamentals

Synopsis

This course provides a foundation for understanding the key concepts and principles related to ergonomics. The aim of ergonomics in industry is to increase productivity, and decrease accidents and illnesses by obtaining a good fit between the employer and the job. This course also examines the relationships between employer, work equipment and work environment. Case studies are also used to test student current knowledge and understanding of the way complex systems are designed and used.

Course Outcome

By the end of semester, students should be able to:
CO1: To apply scientific knowledge of ergonomics in order to identify ergonomics related problems.
CO2: To analyse and interpret the level ergonomics risk factors that may exists in the place of work.
CO3: To propose control measure to overcome ergonomics problems.

BPS 2374
Exposure Measurement Technique and Analysis
Credit: 3 credits
Prerequisites: BPS 2313 Industrial Hygiene

Synopsis

This course is for advanced in-depth study of the approaches to workplace and personnel exposure sampling. Emphasis is on statistical sampling methods, passive monitoring, colorimetric devices, breathing zone, area sampling strategies, monitoring and surveillance techniques. Course work will include laboratory exercises and field work. This course is also designed to assist student in understanding the various instruments that are utilized in industrial hygiene and environmental studies and give them the chance to fully understand the way these instruments are calibrated and applied.

Course Outcome

By the end of semester, students should be able to:
CO1: Prepare occupational and environmental stressor assessment report cases to comply with relevant legislations.
CO2: Differentiate appropriate sampling procedure and measuring technique for occupational and environmental

stressors.

CO3: Adapt data collection and analysis through surveys, calibration, sampling, monitoring by using the instantaneous or integrated instruments to assess the risk of occupational and environmental stressors.

BPS 2713
Environmental Management and Green Technology
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course will cover the fundamental of environmental management, the principles and concepts about ecology, ecosystems, weather and human impacts on the environment, and the concept of green technology. The natural renewable and non-renewable resources and its management, current issues related to the environment including economics, global view and ethics will also be discussed. Other issues related to environmental development, trade, green activities and roles that are played by the consumer, community, industry and government towards sustainable development also discovered. The students will be also introduced to the ISO 14000 series of Environmental Management Standards and environmental management tools which minimize and reduces the negative impact of human activities.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply theories and principles of environmental management and sustainable development in solving environmental issues.

CO2: Analyse current environmental problems and able to select international conventions, agreements and local legislations to come out with idea on how to solves the problems.

CO3: Recognize appropriate solution for current environmental issues by integrating environmental management tools and systems, and green technology applications towards sustainable development.

BTU2113
Research Method
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course aims to expose students with research methodology and its application in conducting research projects. Topics to be covered include identification of research problem, construct research objective, review the literature and propose appropriate methods. This course also allows students to prepare a proposal for conducting academic research in their field of study.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain several types of research methods in several aspects.

CO2: Discover appropriate research methods in developing research proposal.

CO3: Prepare a detail research proposal.

BPS 3313
Applied Mechanics for Safety
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course introduces a foundation in engineering science principles which will provide a systematic approach to problem solving in the field of occupational safety and health (OSH) problems such as accident and incident investigation, ergonomics, industrial safety, construction safety and etc. It goes beyond the core engineering science include all the material science, statics, dynamics, fluid mechanics, thermodynamics and heat transfer that can be included in course at this level. The emphasis on the integration of student`s understanding and the application aspects of all engineering science principles, supported with many examples, makes this course a very useful for practicing the OSH.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain a fundamental knowledge of engineering science principles such as theories, laws, equations and models.

CO2: Develop the equations in engineering science for OSH

applications.
CO3: Analyse the problems in OSH and apply a systematic approach of engineering science for problem solving.

BPS3323
Industrial Safety
Credit: 3 credits
Prerequisites: BPS1113 OSH Fundamentals

Synopsis

This course designed to give student understanding in industrial safety field and its application in the hazard's identification and risk management. Students will be exposed to machinery safety practices including design, safe operation, fencing and guarding. Student also will be introduced to mechanical handling safety which details out the design and safe operation of material handling equipment. Maintenance hazards are discussed in details including hazardous energy control and permit-to-work (PTW) system. Hazards of confined space and pressure vessel are also exposed to student. Basic electrical and radiation safety topics are discussed as part of industrial safety management.

Course Outcome

By the end of semester, students should be able to:
CO1: Conduct recognition of physical hazards in workplace.
CO2: Analyse any issue and incident on physical hazards to solve industrial safety problems.
CO3: Adapt industrial safety management best practices in workplace.

BPS3443
Human Factors in Safety Engineering
Credit: 3 credits
Prerequisite: BPS2363 Ergonomics

Synopsis

Human Factors is a science that focuses on how humans interact with the environment in their workplace. Human Factors in Safety Engineering is concerned with ways of designing jobs, machines, operations, and work environments so they are compatible with human capacities and limitations.

Course Outcome

By the end of semester, students should be able to:
CO1: Analyse the principles of human factors in safety engineering to identify workplace problems.
CO2: Evaluate the problems arise in human factors in safety engineering to propose the practicable solutions.
CO3: Communicate ideas professionally in relation to human factors in safety engineering.

BPS3343
Accident and Incident Investigation and Analysis
Credit: 3 credits
Prerequisites: BPS1113 OSH Fundamentals

Synopsis

This subject is aimed to introduce and give an understanding on the methodology for incident investigation and analysis. Topics include data collection, investigation techniques, interviewing techniques, notification and reporting to authority, corrective and preventive actions to prevent recurrences. Root cause analysis techniques commonly used in the industry will be also introduced.

Course Outcome

By the end of semester, students should be able to:
CO1: Conduct incident investigation at workplace.
CO2: Carry out root cause analysis (RCA) to determine incident causal factors.
CO3: Initiate incident notification and reporting to authorities based on legislations, track and close out correction and preventive actions.

BPS3713
Business Continuity Plan
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course is an extension with details regarding to emergency preparedness and response where it provides a foundation and guide to coordinated organizational emergency recovery during and after a disruptive occurrence. The best practices for planning and maintaining Business Continuity Management (BCM) programs is

introduced to students where knowledge of these practices is essential to managers and planners of small companies, large corporations and public agencies in order to keep their organizations running after major disruptive events. The recovery time and recovery point objectives (RTO and RPO) also covered.

Course Outcome

By the end of semester, students should be able to:

CO1: Conduct Business Continuity Management programme and exercise at workplace based on applicable standards.
CO2: Carry out Risk Analysis and Business Impact Analysis to determine business continuity strategies.
CO3: Adapt industrial best practices of the Business Continuity Management as part of disaster risk reduction.

BPS3512
Final Year Project 1
Credit: 2 credits
Prerequisites: All the first and second year subjects

Synopsis

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final Year Project 1 are: (i) problem background, (ii) problem statement, (iii) research objectives, (iv) research questions, (v) research framework, (vi) literature reviews, and (vii) research methods.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify problems/issues/incidences, research objectives/ questions, appropriate literature and research methods.
CO2: Relate problems/issues/incidences with research objectives, research questions and literatures.
CO3: Prepare research proposal comprising research problem, Ros, RQs, literature review and research methods.

BPS3723
Air Pollution Control Technology
Credit: 3 credits
Prerequisites: None

Synopsis

The topics in this course discuss several important aspects of air pollution that include classification and sources of air pollutants, their effects on human, vegetation and material. Sampling methods, pollution control and air quality management system will be discussed.

Course Outcome

By the end of semester, students should be able to:

CO1: Understand the terminologies, theories and principle of air pollution control technology.
CO2: Understand the impacts and the risks of air pollution towards human health and environment.
CO3: Understand the meteorological concept ant its application in air pollution studies.
CO4: Identify the specific air pollutants and its control technology.
CO5: Apply proper air pollutants sampling methods for air quality monitoring.

BPS4514 Final Year Project II
Credit: 3 credits
Prerequisites: BPS3512 Final Year Project I

Synopsis

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final Year Project II are: (i) development of research instruments for data collection, (ii) carrying out data collection, (iii) analysing data collected, (iv) interpreting data, (v) writing reports.

Course Outcome

By the end of semester, students should be able to:
CO1: Develop research instruments.
CO2: Analyse collected data using research instruments that has been developed.
CO3: Prepare Final Year Project report comprising research problem, Ros, RQs, literature review, research methods, data analysis and conclusions.

BPS 4313
Process Safety and Loss Prevention
Credit: 3 credits
Prerequisites: BPS 1353 Hazard Recognition and Risk Management

Synopsis

This course presents the principles and methodology for Process Safety Management (PSM) in chemical and process-based industries. In particular, it emphasizes on Process Hazard Analysis (PHA). The implementation of PSM also will be explained to students. Loss prevention systems such as relief system, emergency shutdown system, toxic release suppression, explosion prevention and safety instrumented system will also be discussed. Students also will be trained on major hazard management based on major accident case studies.

Course Outcome

By the end of semester, students should be able to:
CO1: Conduct Process Hazard Analysis (PHA) to determine process hazards.
CO2: Apply process loss prevention systems to reduce process risks.
CO3: Adapt Process Safety Management (PSM) and major hazard management as part of industrial disaster risk reduction.

BPS4323
OSH Management System
Credit: 3 credits
Prerequisites: BPS1313 OSH Fundamentals

Synopsis

This course will expose the candidates to the latest and existing Occupational Safety and Health Management System (OSH-MS), the evolution and the elements in the systems that cater current requirement in OSH. The course also introduces the concepts, relationships and principles of managing the OSH function and the development of training procedures and practices to integrate that function into the organization.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply the PDCA cycle and OSH-MS models based on recognized standards.
CO2: Analyse all phase in OSHMS; policy, hazard and risk analysis, compliance of legal and other requirements, objectives and programmes.
CO3: Communicate ideas professionally in relation to Occupational Safety and Health Management System.

BPS 4713
Construction Safety
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course is designed for persons who work in the construction industry. This course will provide all members with greater safety in construction field particularly referred to construction safety awareness. It is also designed to increase their confidence in the action to take in case of any emergencies. The stages of construction and most of the building process within the life cycle of a building will be elaborated. All the relevant document and acts particularly

relating to Malaysia scenario are among the important references that will be discussed along with the sequence of building construction. Building materials Students are expected to venture into a general safe working practices at construction site and able to supervise the total environment as a free accident area.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify the hazardous materials, substances and unsafe practices at construction industry.

CO2: Assess the level of risk and safety of work places compliance to the national safety regulation.

CO3: Outline a proposal to enhance and increases a safer work practices in construction industries.

BPS 2623
Solid Waste Management
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course introduces the students to elements of solid waste management systems, which include generation, on-site handling, collection, transportation, treatment and disposal. Aspects to be discussed include methods of waste classification, categorization and listing, handling of waste at source, collection and transportation of waste, waste treatment technologies including waste minimization and recycling, and final disposal technologies. Current and legal issues on solid waste management both from local and international perspectives will also be discussed.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain elements in solid waste management and characteristics of solid waste.

CO2: Propose suitable technology of managing the solid waste that are available within the national and international practices.

CO3: Demonstrate their ability to work in team either as leader or ordinary member.

BPS 2633
Marine & Offshore Safety
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course introduces student to Health, Safety and Environment (HSE) principles and practices in marine and offshore operations particularly in oil and gas industry. Marine and offshore safety covers upstream operations which include exploration, drilling, completion, production and transportation. The lifecycle of this industry will be covered from engineering, procurement, construction, hook-up, installation, commissioning, operation, maintenance and decommissioning. Topics include legal requirements, type of hazards, accident cases, safety management and technical aspects. Discussion personnel safety and process safety issues will be emphasized. Safety Analysis tool such as Hazard Identification (HAZID) Analysis and Bow Tie Analysis will be introduced. Applicable international standards and codes such as International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), Safety International Convention for the Safety of Life at Sea (SOLAS), 1974 and International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM) and International Ship and Port Facility Security Code (ISPS) will be exposed to students.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain concept of hazard, risk and safety applied in marine and offshore operations.

CO2: Analyse marine and offshore hazards using modern tools and data analysis methods.

CO3: Adapt best practices in implementing safety management systems for marine and offshore industrial sector.

BPS 2643
Road and Transportation Safety
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course introduces student to Health, Safety and Environment (HSE) principles and practices in land transportation and

aviation sectors. Land transportation sectors cover road and railway while for aviation cover flight and ground airside safety. Topics include regulatory requirements, type of hazards, accident cases, technical aspects and Safety Management System (SMS). The discussion on personnel and technical safety issues will be emphasized. Safety Analysis tool such as Fault Tree Analysis (FTA) and Failure Mode and Effect (FMEA) Analysis will be introduced. Applicable international standards from such as Federal Railway Administration (FRA), National Transportation Safety Board (NTSB) and International Civil Aviation Organization (ICAO) will be exposed to students.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain concept of hazard, risk and safety applied in land transportation and aviation operations.

CO2: Analyse land transportations and aviation hazards using modern tools and data analysis methods.

CO3: Adapt best practices in implementing safety management systems for land transportation and aviation sector.

BPS 2653
Radiation and Nuclear Safety
Credit: 3 credits
Prerequisites: NONE

Synopsis

This introductory course in the fundamentals of radiation and nuclear safety intended to meet the requirements required of all employees who receive, or might receive, a health care related occupational exposure while working in or near a controlled / restricted area. The course focuses on the need for every employee, both radiological workers and non- radiological workers, to play an active role in maintaining exposures to radiation and radioactive materials within regulatory limits and in compliance with regulatory control such as The International Basic Safety Standards for Protection Against Ionizing Radiation and for Safety of Radiation (BS), IAEA Safety Series no 115 (1996), Atomic Energy Licensing Act 1984 (Act 304). Topics include Fundamentals of Radiation and Radioactivity, Radiation Biology, Radiation Dose Limits and ALARA, Personnel Monitoring and others

Course Outcome

By the end of semester, students should be able to:

CO1: Interpret the fundamental of radiation and nuclear safety in the workplace

CO2: Classify risks associated with radiation, radioactivity and radiation exposure among workers exposed to radiation.

CO3: Adapt the best practices to meet desired safety and health for workers exposed to radiation within the considerable of economic, social, political and sustainability.

BPS 2663
Wastewater Treatment Technology
Credit: 3 credits
Prerequisites: NONE

Synopsis

This course gives the students exposure to the physical, biological and chemical processes that are used in the treatment of wastewater. Examples of the use of these processes in the manufacturing sector and agriculture including low waste zero discharged technology will be discussed. The environmental laboratory is introduced to students the important of scientific analysis of the wastewater as part of environmental impact assessment. This is to curb the damaged done to the purity of water and to be able to reduce the level of pollution into the surrounding living space particularly involving the quality of river.

Course Outcome

By the end of semester, students should be able to:

CO1: To apply scientific knowledge of the wastewater treatment technology in order to control level of pollution in the environmental.

CO2: To analyse and interpret the level of pollution that exists within the specify sample of wastewater analytically.

CO3: To communicate the importance of wastewater treatment technology theoretically and analytically with the safety, health and environmental issue.

BPS 4538
Industrial Training
Credit: 8 credits

Prerequisites: All subjects

Synopsis

This course aims to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make a regular entry describing the work they are undertaking. Student are supervised by industrial and university supervisors to guide and ensure they can do their work as good as possible and achieve the objective for this course.

Course Outcome

By the end of semester, students should be able to:

CO1: Adapt working culture and regulation as occupational safety and health practitioner in related industry.
CO2: Demonstrate skills by applying the theory learned for real problem solving in organization.
CO3: Support others in organization performing the task given.
CO4: Express interpersonal skills and professional ethics in organization.
CO5: Perform assigned task proficiently as required by industrial training supervisor.

BPS 4534
Industrial Training Report
Credit: 8 credits
Prerequisites: BPS 4538 Industrial Training

Synopsis

During the placement, students are expected to keep a log book, in which they make regular entries describing the work they are undertaking. Then Students need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to hand in to the university supervisor for evaluation. Students need to do presentation as well at the end of their placement for assessment.

Course Outcome

By the end of semester, students should be able to:

CO1: Organize systematically the industrial training knowledge, experience and skill in the preparation of the industrial training report.
CO2: Demonstrate technical writing skill in preparing the industrial training report.
CO3: Present the details of industrial training experience to both university and industrial supervisor.

COURSE SYNOPSIS FOR DIPLOMA IN OCCUPATIONAL SAFETY AND HEALTH

DTS1313
Principles and Practices of OSH
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the principles and basic concepts of occupational safety and health. Students will be exposed to the history of occupational safety and health (OSH) development, acts and legislations in relation to OSH, the responsibilities and qualification of safety and health practitioner and professional ethics. The human bodies and its psychological functions and its relationship to workplace productivity will also be discussed. Introduction to Occupational Hygiene is also discussed as a foundation for the next subjects. Some common safety and health hazards will be emphasized for better understanding.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify the hazard, risk and exposure at the workplace to improve safety and health performance
CO2: Explain the workplace hazards, risk and exposure that effect workers' health and planning for the best solution to improve workplace safety and health management and performance
CO3: Discuss the occupational safety and health problems/challenges and demonstrate a scientific approach to resolves the issues

DTS1322
OSH Legislations
Credit Hour: 2
Prerequisite: None

Synopsis

This course provides a foundation for understanding the related law on Occupational Safety and Health (OSH) including act, rules, regulations, orders, guidelines and code of practice in their organization. The focuses of studies are for the students to know about the related law and apply their knowledge as OSH personnel in their organization in order to minimize hazards and accident.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain occupational safety and health related laws including act, regulations and code of practice to be applied at the workplace
CO2: Apply related laws on occupational safety and health including act, regulations and orders to solve OSH related problems at the workplace
CO3: Assist the organization to reduce accident and incident in the workplace by applying the related law

DTS1332
Introduction to Human Anatomy and Physiology
Credit Hour: 2
Prerequisite: None

Synopsis

This course aim is to provide an understanding of the structure (anatomy) and function (physiology) of the human body. Students will be introduced to the sciences of anatomy and physiology, anatomical organization and terminology and the hierarchical level of human body starting from cells, tissues, organs and systems.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain the fundamentals and basic unit of human body and physiology
CO2: Recognize the anatomical structures and explain the physiological functions of body systems
CO3: Analyze the principle of homeostasis and the use of feedback loops to control physiological systems in the human body

DUM2413
Statistics and Probability
Credit Hour: 3
Prerequisite: None

Synopsis

In this course, students are exposed to basic statistics and analyze statistically. The topics covered are introduction to statistics, descriptive statistics, probability, discrete probability distributions, continuous probability distributions, and correlation and simple linear

regression.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of statistics
CO2: Perform statistical analysis by using appropriate statistical theory and methodology
CO3: Analyse real life data to solve related problems in various disciplines

DTS1343
Principles of Toxicology
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides students with a basic understanding and appreciation of the principles of human body system and toxic effects of chemicals on the living organism, application of toxicology in human health and the effects of toxic substances on man and the environment. Topics include: disposition and metabolism of toxic substances, types of exposure and response, toxic responses of selected body systems, toxic mechanisms of drugs, industrial chemicals, food additives, pesticides, environmental pollutants, household products and toxicity testing.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply the principles of human body system, dose-response relationship and the concept of threshold dose in relation to toxicants
CO2: Analyse organ and system toxicity associates to human health
CO3: Discuss the principles of chemical safety management in the workplace

DTS1353
OSH Risk Management
Credit Hour: 3
Prerequisite: None

Synopsis

This course is aimed to give an understanding on the basic steps in recognizing hazards at work place and managing risks to as low as reasonably practicable (ALARP). These include the introduction to type of hazards, hazard identification, risk evaluation, risk assessment, determining risk control, hierarchy of risk control and risk management principle.

Course Outcome

By the end of semester, students should be able to:
CO1: Understand the concept of identifying hazard and managing risk at workplace
CO2: Conduct hazard identification and risk assessment at workplace
CO3: Apply risk management principles in reducing risk level to As Low as Reasonably Practicable (ALARP)

DTS2313
Fundamentals of Industrial Hygiene
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the field of industrial hygiene with emphasis on the theory and practical skills towards anticipation, recognition, evaluation and control of health hazards at workplaces. Types of health hazard, occupational exposure limits, principle of exposure monitoring and medical surveillance using standard methods for evaluating the exposure level and health risk will be introduced. This course also covers laboratory works to calibrate and use selected instruments for measuring exposure level towards the health hazards. Various approaches for control measures to minimize those hazards will be discussed. Upon completion of this course, students will be able to choose appropriate methods to identify various health hazards at the workplace and evaluate the exposure level before recommending appropriate control measures.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply basic terms, technical concepts, legal, professionals and ethical frameworks integral to the practice of industrial hygiene
CO2: Conduct industrial hygiene assessment, fieldwork using standard methodology, proper equipment and correct analysis
CO3: Illustrate concept of anticipation, recognition and evaluation in designing hazard control to solve

industrial problem

DTS2322
OSH Information and Data Management Systems
Credit Hour: 2
Prerequisite: None

Synopsis

This course aims to provide understanding on the significance role of information systems in today's organization particularly in managing organizational data and information. Students will be shared about the current practice on managing occupational safety and industrial health (OSH) information. Class discussion also will be conducted pertaining of various sources and formats of OSH information which is available. On the practical part, students will be given opportunity to explore techniques and skills on the usage of office automation system and preparing relational organizational requirement such as report and slides presentation.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse information systems roles in modern organization and its functions in obtaining organizational competitive advantage
CO2: Respond to various strategies and approaches in system development
CO3: Demonstrate the usage of office automation system in performing operational

DTS2332
Behaviour Based Safety
Credit Hour: 2
Prerequisite: None

Synopsis

This course aims to give an understanding on the basic knowledge of behavioural based safety to be implemented in workplace setting. The course also provides a clear understanding of how attitudes, cultures, and systems influence or affect behaviour, and focuses on understanding how successful behavioural change efforts really work. The students also will be exposed to the techniques of reducing the occurrence of at-risk behaviour by modifying such behaviours through observation, feedback, and positive interventions.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply the right concepts of behaviour-based safety approach to identify the critical behaviour and barriers to safety
CO2: Propose the right technique in determining the best intervention strategy in promoting safety culture in a workplace
CO3: Demonstrate the ability to work in group either as a member or leader in completion of project related to behaviour-based safety

DTS2343
Fire Safety
Credit Hour: 3
Prerequisite: None

Synopsis

This course aims to expose students on the physical and chemical properties of fire that will lead to a better understanding on fire hazard and selecting the most appropriate control measures. This course also highlights the safety and health best practices to be applied in the industry. The course also provides students with leadership and technical skills through their hands-on experience with the organization.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply basic principle of fire prevention, fire protection and control system in a building
CO2: Assist the organization to implement the best control measure in fire prevention and protection
CO3: Adapt appropriate method for controlling Industrial Major Accident Hazards

DTS2353
Introduction to Ergonomics
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides a foundation for understanding the key concepts and principles related to ergonomics. The aim of ergonomics in industry is to increase

productivity, and decrease accidents and illnesses by obtaining a good fit between the employer and the job. Examines relationships between employer, work equipment and work environment.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply the fundamentals knowledge on ergonomics to predict the impact of various personal attributes (anatomical, physiological and psychological) for safe working practice

CO2: Provide solution based on ergonomic design problem, design of work areas and equipment to a range of occupational settings

CO3: Conduct ergonomic risk assessment using ergonomics risk assessment tools

DTS2363
Industrial Safety
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides students basic knowledge in industrial safety and its application in the hazards identification and risk management. Students will be exposed to all physical hazards such as machinery, pressure vessel, material handling equipment, welding, confined space and electrical. Introduction to process safety and construction safety also will be introduced to students.

Course Outcome

By the end of semester, students should be able to:

CO1: Categorize physical hazards in the industries

CO2: Apply industrial safety related legislations in the industries

CO3: Analyze any issue or incident on physical hazards to solve industrial safety problems

DTS2372
Introduction to Epidemiology and Diseases
Credit Hour: 2
Prerequisite: None

Synopsis

This course gives an overview of occupational health and health related problem with emphasis on the study of disease occurrence among working population. The basic concept of disease transmission and causation, measuring occurrence of disease, determining the cause of disease and estimating risk will be discussed. The major types of epidemiologic study design used to investigate the disease occurrence will be introduced. Other topics to be highlighted include threats to validity and issues in interpreting epidemiologic data such as bias, confounding factors, and random error. This course also covers the prevention of communicable and non-communicable diseases at the workplace. Upon completion of this course, students will be able to illustrate the epidemiologic concepts and methods to environmental and occupational health issues.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the principle of disease causation, and the epidemiologic approach to defining and measuring the occurrence of health-related states in populations.

CO2: Contrast the main types of study design in term of characteristics, strengths, weaknesses and risk measurements

CO3: Illustrate the epidemiologic concepts and methods to environmental and occupational health issues

DTS2613
Quality Management
Credit Hour: 3
Prerequisite: None

Synopsis

The course provides a comprehensive understanding in the fields of quality management and process improvement. The quality management principles, performance management, and quality improvement alongside relevant tools, techniques, models and frameworks will be learnt.

Course Outcome

By the end of semester, students should be able to:
CO1: Demonstrate a working knowledge of the principles and practices of quality management
CO2: Display quality tools and techniques for continuous quality improvement
CO3: Describe the quality implementation plans for the strategic issues in quality management

DTS3314
Workplace Assessment Project
Credit Hour: 4
Prerequisite: None

Synopsis

This course will expose students to research activities using the established methods in accordance to the teaching subjects offered in the program. Each student will apply their technical skills to carry out measurements, monitoring and analyses during field work and laboratory analysis as proposed in the project proposal. The project will be conducted individually with the consultation by the respective lecturer who assigned as supervisor of project.

Course Outcome

By the end of semester, students should be able to:
CO1: Perform the technical skill for executing research activities
CO2: Organize a report of the research conducted in a scholarly manner using scientific approach
CO3: Defend findings of the research conducted

DTS3323
Accident Investigation
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides student with knowledge for accident investigation and analysis. Topics cover data collection, investigation and interviewing techniques, notification and reporting to authority, corrective and preventive actions to prevent recurrences. Root cause analysis techniques commonly used in the industry will also be introduced to students

Course Outcome

By the end of semester, students should be able to:
CO1: Analyze accident root cause by using root cause analysis techniques
CO2: Conduct accident investigation at workplace
CO3: Initiate accident notification and reporting to authority based on legislation

DTS3333
Emergency Response Plan
Credit Hour: 3
Prerequisite: DTS2343 Fire Safety

Synopsis

This course provides student with introduction to emergency response planning. Types of emergency hazards will be discussed including its specific response including first aid. Student also will be exposed to communication during emergency, Incident Command System (ICS) and Arahan Majlis Keselamatan Negara 20. The student will be trained to conduct emergency drill including table top exercise.

Course Outcome
By the end of semester, students should be able to:
CO1: Conduct emergency response exercise at workplace.
CO2: Apply knowledge on emergency response planning at workplace
CO3: Demonstrate interpersonal skills in handling emergency response matters

DTS3342
OSH Management System
Credit Hour: 2
Prerequisite: None

Synopsis

This course will expose the candidates to the latest and existing Occupational Safety and Health Management System (OSH-MS), the evolution and the elements in the systems that cater current requirement in OSH. The course also introduces the concepts, relationships and principles of managing the OSH function and the development of training procedures and practices to integrate that function into the organization.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply the PDCA cycle and OSH-MS models based on recognized standards

CO2: Analyze all phase in OSHMS; policy, hazard and risk analysis, compliance of legal and other requirements, objectives and programs

CO3: Communicate ideas professionally in relation to Occupational Safety and Health Management System

DTS3613
Waste Management
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses about the basic concept on waste, types and sources of waste and its management application. It includes the physical, chemical and biological properties of wastes which are the basis for their hazard classification, movement and distribution as well as their impacts on human health and the environment. The management of these wastes which include handling, storage and transportation based on the regulations stipulated in the Environmental Quality Act, 1974, Solid Waste and Public Cleansing Management Act, 2007, as well as other international regulations will be discussed. Understanding on the treatment and disposal processes will be emphasized including pollution prevention and waste minimization strategies.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply the theories and principle of waste management to prevent risks towards human health and environment

CO2: Apply knowledge and skills to ensure occupational safety and health in workplaces and the community

CO3: Relate the legal requirements on waste management with safety and health aspects

DTS3623
Environmental Technology and Management
Credit Hour: 3
Prerequisite: None

Synopsis

This subject will provide exposure on current environmental issues as well as applicable legislations in the country. The discussion will focus on sources of pollution, fundamental sciences, monitoring methods and control technology available in the market. Environmental management tools such as Environmental Impact Assessment (EIA) and Environmental Management System (EMS) also discussed.

Course Outcome

By the end of semester, students should be able to:

CO1: Determine the source of pollutions, impact of specific pollutants and best available technology to control and mitigate

CO2: Express responsibilities towards the community, culture, religion and environment

CO3: Adopt the current environmental management and technology issues with environmental legislations

DTS3912
Industrial Training
Credit Hour: 12
Prerequisite: All faculty and program courses

Synopsis

This course aims to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make a regular entry describing the work they are undertaking. Student are supervised by industrial and university supervisors to guide and ensure they can do their work as good as possible and achieve the objective for this course.

Course Outcome

By the end of semester, students should be able to:

CO1: Demonstrate skills by applying the theory learned for real problem solving in organization

CO2: Demonstrate skills by applying the theory learned for real problem

solving in organization

CO3: Support others in organization performing the task given

CO4: Express team working skills and professional ethics in organization

CO5: Perform assigned task proficiently as required by industrial training supervisor.

COURSE SYNOPSIS FOR DIPLOMA IN INDUSTRIAL SCIENCES

DUM1113
Basic Mathematics
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Students will be exposed to number system, equations, inequalities and absolute value, polynomials, sequences and series, matrices and system of linear equations, functions and graphs, and trigonometric functions. This course also integrates symbolic tools, graphical concepts, and numerical calculations.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire the fundamental principles of basic mathematics.
CO2: Apply appropriate method studied to solve mathematical problems.

DUM1123
Calculus
Credit Hour: 3
Prerequisite: None

Synopsis

Calculus is the mathematics of change, of calculating problems that are continually evolving; by breaking such problems into infinitesimal steps, solving each of those steps, and adding all the results. Calculus allows these computations to be done simultaneously. There are two primary branches of calculus i.e., differential calculus (differentiation) and integral calculus (integration). Therefore, students will be exposed to limits and continuity, differentiation, application of differentiation, integration, and application of integration. This course integrates symbolic tools, graphical concepts and numerical calculations.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire and apply the fundamental principles of calculus.
CO2: Apply the appropriate method studied to solve mathematical problems.
CO3: Provide solution to solve mathematical problem arise from real life

DSI1113
Industrial and Laboratory Safety
Credit Hour: 3
Prerequisite: None

Synopsis

This course exposes students to basic concepts of industrial and laboratory safety. Topics inclusive of quality systems for laboratory management, occupational health & safety and acts, and related regulations. Students will be introduced to laboratory and industrial safety, laboratory and industrial accident, safety policy and procedure, emergency response plan, introduction to basic toxicology, and first aid.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain the basic concept of industrial and laboratory safety.
CO2: Possess the knowledge and information related to quality system, policies, procedures and safety manuals.
CO3: Present and contribute to the needs of groupwork related to laboratory and industrial safety in assigned test.

DSI1123
Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course emphasizes basic understanding of chemistry. Students will be introduced to theories and basic concepts of chemistry. The course explains the basic concepts of matter, unit conversion, atomic structure, the periodic table of elements, chemical bonding, state of matter, thermochemistry and equilibrium. In this section also, there are calculations of basic concepts in chemistry such as mole, concentration and balance equation. At the end of this course, students will master the theory, concepts and understandings of basic chemistry that can be apply for related courses.

Course Outcome

By the end of semester, students should be

able to:
CO1: Explain theories learned to solve problems of chemistry.
CO2: Solve related problems in chemistry using the appropriate principles.
CO3: Demonstrate a good ethics in completing the given task.

DSI1402
Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This course offers a rigorous, foundational treatment of atoms and molecules. The students will study the nature of chemical bonding and how bonding gives rise to the three-dimensional structure of matter. We explore how the macroscopic properties of substances can be interpreted in terms of atomic and molecular structure. We also learn mathematical and conceptual tools for quantifying chemical equilibrium.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve related problems in material science and technology using the appropriate principles.
CO2: Follow the guided experiments using the correct guideline and procedures.
CO3: Work in teamwork, communicate effectively orally and in writing the information.

DSI1133
Computer Interfacing and Control
Credit Hour: 3
Prerequisite: None

Synopsis

Internet of Things (IoT) consists of smart devices that communicate with each other. The IoT starts with measurement and being able to collect data from devices anywhere in the world, linked up via the Internet to 'big data' information systems and provides the foundation for control and optimization. Due to the importance of IoT, this course introduces basic concepts and techniques of computer interfacing with external devices for data collection and process control. This will include transferring and converting analog variables into the digital form needed for processing. The contents emphasis not only on the theoretical knowledge of interfacing but also the practical implementation in real-life situation. Students will learn basic structure of computer interfacing and exposed to method for basic hardware-software interfacing. It is aimed that students will be interested in data acquisition and real-time control systems and data logging system incorporating input/output to and from external devices.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories of interfacing concept, data acquisition and their practical applications.
CO2: Solve related problems to troubleshoot analog and digital interfacing circuits using the appropriate technique.
CO3: Apply digital skills to solve problems.

DUM1413
Statistics & Probability
Credit Hour: 3
Prerequisite: None

Synopsis

In this course, students will be exposed to basic statistics and analyze statistically. The topics covered are introduction to statistics, descriptive statistics, probability, discrete probability distributions, continuous probability distributions, and correlation and simple linear regression.

Course Outcome
By the end of semester, students should be able to:
CO1: Acquire fundamental principle of statistics.
CO2: Perform statistical analysis by using appropriate statistical theory and methodology.
CO3: Analyze real life data to solve related problems in various disciplines.

DSI1143
Organic Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

In this course, fundamental principles of organic chemistry will be introduced. Chemical structures, physical properties and chemical bonding of organic molecules and basic organic reaction to prepare common functional groups will be studied.

Course Outcome

By the end of semester, students should be able to:
CO1: Understand the principle of chemical bonding and nomenclature which followed the IUPAC system.
CO2: Describe characteristics and physical properties of certain organic molecules.
CO3: Recognize the main functional groups in organic chemistry and predict their reactions.

DSI1412
Organic Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

Practical activities which comprise several laboratory experiments related to organic chemistry; will be carried out by the students. In organic chemistry experiments, students are exposed to melting point determination, extraction, distillation, isolation, crystallization, chromatography, titration and identification of an organic functional groups.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply the knowledge of organic chemistry to solve the problem.
CO2: Report and discuss the data and information of the experiment.
CO3: Communication by explain the questions given based on experiments.

DSI1153
Laboratory Quality Management & Validation
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces the Good Laboratory Practice (GLP) with many aspects of laboratory quality management and the way to achieve recognition and certification. In addition, different perspectives and theories of method validation including issues in validating, testing, research method and measurement of uncertainty will be addressed.

Course Outcome
By the end of semester, students should be able to:
CO1: Explain concepts of laboratory quality management and its validation process.
CO2: Solve related problems to laboratory quality management and its validation process.
CO3: Present and contribute to the needs of groupwork related to laboratory quality management.

DUM2512
Introduction to Data Science
Credit Hour: 2
Prerequisite: None

Synopsis

Data science is the emerging interdisciplinary field which requires the tools for extraction of meaningful insights from the big data stored in the data sets. This course includes the overview of data science, big data, the process of data science, infrastructure and computational requirements for data science. This course is aimed to produce graduates who are knowledgeable, and skilled in the field of mathematics, statistics, computer science, and storing, analyzing and managing the big data.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain the terminologies used in data science.
CO2: Distinguish the foundation of data science, process, infrastructure and required computing tools
CO3: Communicate effectively in written and oral form by completing the task given.

D3912**
Principles of Operations Management
Credit Hour: 2
Prerequisite: None

Synopsis

The course provides a range of academic knowledge, operations understanding, operational management techniques. It will focus on the main decision areas of operations management and the role of the operations manager for productivity improvement.

Course Outcome

By the end of semester, students should be able to:
CO1: Apply the fundamental concept and the main areas of operation management.
CO2: Demonstrate operation decisions in solving operational problems.
CO3: Justify operations management requirements.

DSI2113
Physics
Credit Hour: 3
Prerequisite: None

Synopsis

This course is intended to expose the central ideas and principles of physics to students requiring a general background in physics. It covers unit and measurements, kinematics, forces and Newton's law of motion, statics equilibrium, work, energy and power, fluid mechanics, electricity and magnetism.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve problems of physics.
CO2: Solve related problems in physics using the appropriate principles.
CO3: Respond and contribute to the need of group work in assigned task.

DSI2402
Physics Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

Throughout this course, student will conduct and doing experiments which reflects to theoretical learned and actual practice in industry such as moments, Hooke's law, free fall, thermal expansion of solid and liquid etc. As such, it will provide an excellent foundation to fulfill the requirements of other material courses.

Course Outcome
By the end of semester, students should be able to:
CO1: Solve related problems in material science and technology using the appropriate principles.
CO2: Follow the guided experiments using the correct procedures.
CO3: Organize and complete with confidence the experiments using the correct procedures.

DSI2123
Analytical Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course will provide students with a basic understanding of analytical chemistry and major aspects of quantitative chemical analysis. The course will concentrate upon descriptive analytical chemistry and analytical methods based on chemical equilibrium.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve problems of quantitative analysis.
CO2: Solve related problems in analytical chemistry using the appropriate principles.
CO3: Demonstrate teamwork skills in solving the assigned tasks.

DSI2412
Analytical Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

Throughout this course, student will conduct experiments which reflects to theoretical learned and actual practice in industry such as titration, instrumentation analysis etc. As such, it will provide an excellent foundation to fulfill the requirements of industrial chemistry course.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve related problems in analytical chemistry using the appropriate principles.
CO2: Follow the guided experiments using the correct procedures.
CO3: Demonstrate teamwork skills in solving the assigned tasks.

DSI2132
Instrumental Analysis
Credit Hour: 2
Prerequisite: None

Synopsis

This course is intended to expose the central ideas and principles of instrumental to students requiring a general background in chemistry. It covers the initial basics of data analysis, principles of mass, UV-Vis, infrared, atomic spectrometry and chromatography.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve analytical problems in chemistry.
CO2: Solve related problems in analytical chemistry using the appropriate instrumental principles.
CO3: Demonstrate teamwork skills in solving the assigned tasks.

DSI2143
Biochemistry
Credit Hour: 3
Prerequisite: None

Synopsis

Biochemistry is a field of study which related to macromolecules, and exploration of their physical and biochemical characteristics. Consequently, important pathways for the biosynthesis and degradation of the macromolecules will be explained. The coverage on metabolism also included energy production from most importantly of carbohydrate and lipid macromolecules. Besides that, the principle of cellular signalling in living organisms also will be described in this course. Overall fundamental biochemistry knowledge to be imparted for preparedness for higher cognitive courses of biotechnology.

Course Outcome

By the end of semester, students should be able to:
CO1: Defining the structure, properties and biochemical roles of macromolecules and their respective monomers.
CO2: Explain macromolecules biosynthesis and monomers degradation for energy production in metabolism.
CO3: Presenting the function and integration of various metabolic pathways in organism.

DSI2422
Biochemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This course provides hands-on training of laboratory apparatus and equipment such as pH-meter, magnetic stirrer, and spectrophotometer as well as the basic preparation of common reagents in the laboratory such as buffer preparation. The course will introduce students with the basic calculations and techniques that are commonly used in a biochemical lab. Several quantitative and qualitative tests on important biomolecules will also be covered.

Course Outcome

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments.
CO2: Demonstrate skills in handling basic biochemistry-related equipment and performing biochemistry experiments.
CO3: Analyze, Interpret and relate experimental data with the fundamental theories.

DSI2153
Cell & Molecular Biology
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses fundamental concepts of cell biology, structure and function of cellular organelles and their biomolecules. Emphasis will be given on compositions, structures and functions of cell membrane and concepts of cell division. The course also includes discussions on applications of cell biology such as cancer, antibodies and stem cells. Concepts of molecular biology, gene expressions and its control are also discussed. Brief introductions on techniques of molecular biology such as DNA/RNA extraction, polymerase chain reaction (PCR), and gene cloning also explained in this course.

Course Outcome

By the end of semester, students should be able to:
CO1: Understand and describe the principle of cell and molecular biology.
CO2: Analyze cell structures, biological mechanisms and their related

investigation techniques.
CO3: Relate cell and molecular biology knowledge with current and ethical issues.

DSI2432
Cell & Molecular Biology Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

In this course, students will be introduced and practice modern biotechnology laboratory techniques and theories. The subjects that will be covered are basic laboratory equipments' handling and techniques such as nucleic acid isolation and purification, deoxyribonucleic acid (DNA) cloning, polymerase chain reaction (PCR) and gel electrophoresis analysis. In addition, students will be exposed to basic bioinformatic tools for analysis of genes.

Course Outcome

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments.
CO2: Demonstrate skills in performing cell and molecular biology experiments.
CO3: Analyze, Interpret and relate experimental data with the fundamental theories.

DSI2162
Food Biotechnology
Credit Hour: 2
Prerequisite: None

Synopsis

This course is aimed to produce graduates who are knowledgeable, skilled and able to integrate the knowledge of biological science, biotechnology and food technology related to considering ethical and legal aspects.

Course Outcome
By the end of semester, students should be able to:
CO1: Explain the principles of food biotechnology.
CO2: Analyze the food biotechnology-based concept in order to develop problem-solving strategies and solutions.
CO3: Understand and be aware of ethical, legal and socio-cultural impacts on the application of food biotechnology in the industry.

DSI2173
Material Science
Credit Hour: 2
Prerequisite: None

Synopsis

This course is designed to expose the concept of structure and scaling. There are seven (7) headlines in the course; atomic structure, bonds and crystal structure, defect structure and strengthening mechanisms, failure, diffusion, material properties (mechanical, electrical, magnetic & optic), economic, and environmental issues. Student will be taught in lecture room; and the assessments which include quiz, test, assignment and final exam will be carried out throughout the semester. At the end of semester, students are expected should be able to explain, solve, analyze and develop new ideas during problem solving; related to material science. Furthermore, students also should be able to demonstrate good ethics and professional skills.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve problems of Material Science in related task given.
CO2: Solve related problems in material science using the appropriate principles.
CO3: Demonstrate a good ethic and entrepreneurial skills in completing the given task.

DSI2442
Material Science Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces students to fundamentals of experiment in material science which includes mechanical, electrical and optical measurements. Students will experience hands on learning using related experimental set ups and methods, quantitative and qualitative characterization of materials, and composition of scientific report.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve related problems in material science and technology using the

appropriate principles.
CO2: Follow the guided experiments using the correct procedures.
CO3: Organize and complete with confidence the experiments using the correct procedures.

DSI2183
Metals & Alloys
Credit Hour: 3
Prerequisite: None

Synopsis

Metals & alloys course will provide understanding of fundamental knowledge of sciences; which involves investigation of chemical and physical properties of metallic elements, compounds and alloys. The course will cover metal-related technologies, iron-carbon phase diagram, metalworking processes such as casting and forging.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve problems of metal & alloy in related task given.
CO2: Solve related problems in metal and alloy using the appropriate principles.
CO3: Demonstrate a good ethic and entrepreneurial skills in completing the given task.

DSI2212
Current Issues in Science
Credit Hour: 2
Prerequisite: None

Synopsis

Metals & alloys course will provide understanding of fundamental knowledge of sciences; which involves investigation of chemical and physical properties of metallic elements, compounds and alloys. The course will cover metal-related technologies, iron-carbon phase diagram, metalworking processes such as casting and forging.

Course Outcome

By the end of semester, students should be able to:
CO1: Demonstrate an understanding of the relevant issues in broad field of sciences.
CO2: Analyze and discuss current topics in sciences including physics, chemistry and biology.
CO3: Communicate effectively in written and oral forms by completing the task given.

DSI2222
Industry Quality Management
Credit Hour: 2
Prerequisite: None

Synopsis

This course focuses on the management of quality for manufacturing, service and public sectors to achieve global competitiveness. Emphasis is placed on new techniques for managing quality. This course is divided by two parts. Part one introduces quality assurance principles, including (i) Good Manufacturing Practices (GMP), (ii) ISO 9000 family and (iii) various continuous improvement techniques such as six sigma, lean manufacturing, 5S and total quality management and (iv) audit process. Part two focuses on the quality control system, which is concerned with (i) quality control tools used in industries, (ii) acceptance sampling, (iii) statistical data analysis, (iv) reliability and maintainability, and (v) cost of quality.

Course Outcome

By the end of semester, students should be able to:
CO1: Describe the basic concept of quality assurance (QA) and quality control (QC) in industries.
CO2: Analyze suitable approach to solve problems related to industrial quality management.
CO3: Gather information from multiple sources related to quality assurance and quality control in industries.

DSI2233
Physical Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses on the fundamental principles of physical chemistry, which all matter can exist in one of the three states: solid, liquid and gas. Besides, dimensional analysis is learnt in chemical calculations where scientific notation is a convenient way to show a number with significant figures.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned in chemistry.
CO2: Solve relevant problems in chemistry by using the appropriate principles and skills.
CO3: Respond and contribute to the need of group work in assigned task.

DSI2452
Physical Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

In this course, students will conduct various experiments related to physical chemistry course.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve related problems in chemistry using the appropriate principles.
CO2: Conduct the experiments with the correct procedures.
CO3: Demonstrate teamwork skills in solving the assigned tasks.

DSI2243
Inorganic Chemistry
Credit Hour: 3
Prerequisite: None

Synopsis

This course is intended to expose the key concepts in inorganic chemistry. It covers crystal field theory, common structural types, bonding as well as the physical and chemical properties of inorganic compounds.

Course Outcome
By the end of semester, students should be able to:
CO1: Explain certain key introductory concepts in inorganic chemistry (e.g. crystal field theory, common structural types, bonding) as well as the physical and chemical properties of inorganic compounds.
CO2: Use these concepts in problem solving, describe the chemistry of main group elements and transition metals.
CO3: Respond and contribute to the need of group work in assigned task.

DSI2462
Inorganic Chemistry Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

Throughout this course, student will conduct experiments related to reactivity of elements in different groups from 1A to VII A in the periodic table.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain the chemical reactions of the main group elements.
CO2: Follow the guided experiments using the correct procedures.
CO3: Demonstrate teamwork skills in solving the assigned tasks.

DSI2252
Environmental & Water Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course is intended to expose the central ideas and principles of environmental analysis and water treatment. It covers the prospect of analysis and water treatment in environmental chemistry.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve problems of environmental and water analysis.
CO2: Solve related problems in environmental and water analysis using the appropriate principles.
CO3: Teamwork during water sampling.

DSI2263
Microbiology
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides introduction to diversity and classification of microorganisms (bacteria, fungi, protists and viruses) and relate the microorganisms to their structures, functions and lifecycle. Students will be introduced to the

culturing techniques, microbial nutrition, growth and control. The accreditation of microbial testing laboratory in food, medical and industrial industries will be discussed.

Course Outcome

By the end of semester, students should be able to:
CO1: Identify the type of microorganisms (bacteria, fungi, protists and viruses) with their structure, functions and lifecycle.
CO2: Outline the microbial growth and control.
CO3: Organize accreditation of microbiological testing in microbiology laboratory.

DSI2472
Microbiology Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

This course covers practical in experiments and analyses in microbiology laboratory. Emphasis on basic techniques in handling microorganisms, including aseptic technique, media preparation, inoculation and isolation of pure culture. Analysis and control of microbial growth, and biochemical and morphological characterization, will also be carried out.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain different related microbial methods and technology using the appropriate principles.
CO2: Follow the guided experiments using the correct procedures.
CO3: Relate the fundamental theories with laboratory experiments.

DSI2473
Bioprocess Technology
Credit Hour: 3
Prerequisite: None

Synopsis

The course discusses on the basic operational in bioprocess technology, unit, dimension, mass transfer at the equilibrium phase, stoichiometry of microbial growth and product formation. This course explicates the connection between microbial growth, product formation, mass transfer and environment. Likewise, this course gives an overview of the bioprocess from raw material to product. Upstream and downstream processing will be discussed. This course explains the processes and techniques used for extraction and purification of a product from culture medium. Also, bioprocess consideration in using animal and plant cell cultures will discuss using different techniques.

Course Outcome

By the end of semester, students should be able to:
CO1: Describe the principle, applications and fundamental calculation in bioprocessing.
CO2: Apply the different aspects of bioprocess application.
CO3: Discuss the important aspects in bioprocess technology for commercialization purpose of biotechnology products.

DSI2482
Bioprocess Technology Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

The course discusses on the basic operational in bioprocess technology, unit, dimension, mass transfer at the equilibrium phase, stoichiometry of microbial growth and product formation as well. This course explicates the connection between microbial growth, product formation, mass transfer and environment. Likewise, this course gives an overview of the bioprocess from raw material to product. Upstream and downstream processing will be discussed. This course explains the processes and techniques used for extraction and purification of a product from culture medium. Also, bioprocess consideration in using animal and plant cell cultures will discuss using different techniques.

Course Outcome

By the end of semester, students should be able to:
CO1: Relate the fundamental theories with laboratory experiments.
CO2: Demonstrate skills in performing bioprocess experiments.
CO3: Manage experiment in laboratory following rules and regulations.

DSI2282
Bioinformatics
Credit Hour: 2
Prerequisite: None

Synopsis

Bioinformatics is the science of storing, extracting, organizing, analyzing, interpreting, and utilizing biological information. Bioinformatics use biological information to solve biological problems. This course will deliver descriptions of this rapidly evolving field and facilitate user access to and manipulation of the biological data. Topics will include an introduction to bioinformatics, biological databases and relevant tools available to retrieve and analyze the information within these. Descriptions of various techniques, such as evolutionary analysis, data mining, protein structure/function.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain the principle and theoretical basis of the bioinformatics tools.
CO2: Identify the bioinformatics tools for data analysis.
CO3: Recommend suitable approach to solve biological problems.

DSI2293
Polymers
Credit Hour: 3
Prerequisite: None

Synopsis

Polymers course highlighted the fundamental principles of polymer chemistry and technology. This course also will cover industrial polymers and technology, including engineering and specialty polymers, composites, biopolymers, industrial polymerization technique and polymer processing. Applications of polymer technology in industrial such as polymer manufacturing including plastic, rubber, textile, etc.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain theories learned to solve problems of polymers.
CO2: Solve related problems in polymers using the appropriate principles.
CO3: Demonstrate a good ethic and entrepreneurial skills in completing the given task.

DSI2313
Composites
Credit Hour: 3
Prerequisite: None

Synopsis

This course is intended to expose the central ideas and technical aspect of composite to students requiring a general background in the materials. It covers fundamental, classification, processing and their application towards development of composite materials. Students will be exposed on composite material, the major constituents and various classification of composite. Students also will be teaching on the roles of the reinforcement phase and the matrix phase in composite, their manufacturing process and the properties and application of the composite.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain processing and theory learned to solve problems of composite.
CO2: Solve related problems in composite using the appropriate processing.
CO3: Demonstrate a good ethic and entrepreneurial skills in completing the given task.

DSI2492
Polymers & Composites Laboratory
Credit Hour: 2
Prerequisite: None

Synopsis

Throughout this course, student will conduct experiments which reflects to theoretical learned and actual practice in industry. As such, it will provide an excellent foundation to fulfill the requirements of other material courses. This course consists of two related field of study which are polymer and

composite. Learners are introduced to practical and hands-on activities; inclusive of (i) manipulation of instruments to perform synthesis of materials, quantitative and qualitative characterization of materials, and (ii) composition of scientific report. Learners need to synthesis the materials by using resin transfer molding, press laminating and extruder. Experiment demonstration and safety talk is scheduled to be delivered by senior academician and trained technical staff during the second week of academic semester. Laboratory manual is given to each learner; which consists of theory, background of experiment, series of instructions, objectives, problem statement, and references.

Course Outcome

By the end of semester, students should be able to:

CO1: Solve related problems in material science and technology generally and polymer and composite specifically using the appropriate principles.
CO2: Follow the guided experiments using the correct procedures.
CO3: Organize and complete with confidence the experiments using the correct procedures.

DSI2323
Ceramics
Credit Hour: 3
Prerequisite: None

Synopsis

This course is intended to expose the central ideas and principles of ceramics technology to students which requires a general background in material science. Learning activities cover several main aspects of ceramics: i.e. (i) The crystal structure of ceramics, (ii) microstructure of ceramics, (iii) oxide and non-oxide ceramics, (iv) defects in ceramics and (v) physical properties of ceramics.

Lectures will be conducted two hours per week; with two assignments throughout the semester. Learners are required to sit for two tests, and series of quizzes to ensure enough fundamental knowledge. Upon completion of the course, the learners should be able to hypothesize alternative approaches to solve problems related to ceramics using fundamental knowledge.

Course Outcome

By the end of semester, students should be able to:

CO1: Explain theories and fundamental learned to solve problems in ceramics.
CO2: Solve related problems in ceramic using the appropriate principles.
CO3: Demonstrate a good ethic and entrepreneurial skills in completing the given task.

DSI4812
Industrial Training
Credit Hour: 12
Prerequisite: All faculty and program courses

Synopsis

This course provides a platform for the students to practice and apply their knowledge and skills that they have gained during their study. During the industrial training placement, students are expected to keep a log book, in which they make a regular entry describing the work they are undertaking. Then, students need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to be submitted to the university's supervisor. Students need present their work, which will be assessed by an appointed supervisor during a visit. Students will be supervised by the industry and university supervisors to ensure achievement of the objectives for this course.

Course Outcome

By the end of semester, students should be able to:

CO1: Adapt working culture in project, consultant, construction and related industry.
CO2: Organize the industrial training knowledge, experience and skill in the preparation of the industrial training report.
CO3: Build effective communication skills in written and oral presentation

FACULTY OF MANUFACTURING AND MECHATRONIC ENGINEERING TECHNOLOGY

FACULTY OF MANUFACTURING & MECHATRONICS ENGINEERING TECHNOLOGY

INTRODUCTION

The Faculty of Manufacturing & Mechatronics Engineering Technology, Universiti Malaysia Pahang is situated in the royal town of Pekan in the State of Pahang. The state is located on the waterfront facing the South China Sea, approximately 270km to the east of the capital city of Malaysia, Kuala Lumpur. The university was established more than a decade ago and since then has been making significant contributions as a research and learning institution, equipped with high-end facilities and driven by capable faculties. Apart from undergraduate programmes manufacturing and mechatronics engineering, the faculty offers postgraduate degrees in a wide range of research fields including:

- Advanced Manufacturing Processes & Design
- Innovative Materials
- Mechatronics System & Design
- Manufacturing System & Optimisation

The faculty has strong links with various strategic partners in the automotive, manufacturing and mechatronics industries especially in the East Coast Region of Malaysia. Our undergraduate students are trained and developed through various structured soft-skill programmes and industrial schemes thus gaining vital professional competencies and enhancing their employment prospects.

The Faculty of Technology Engineering Manufacturing & Mechatronics as known as Faculty of Manufacturing Engineering was established in 2008 with the target to produce competent professionals for the manufacturing industry. Being an industry-driven faculty, the faculty offers several academic programs which are significant in preparing students with essential engineers attributes such as solid scientific foundation, psychomotor skills, critical thinking skills, communication skills, and entrepreneurship.

The faculty is actively engaged with research and development activities in the areas manufacturing, computer simulation, product design and development, and material engineering to generate technologies relevant to the needs of the industry. With the aim to become a world-class competency-based manufacturing engineering faculty, we strive to produce competent engineering graduates by providing excellent manufacturing engineering program for industries particularly in the East Coast Region of Malaysia.

The latest updated information regarding our faculty is available at: http://ftkpm.ump.edu.my/

The information provided by Faculty of Manufacturing & Mechatronics Engineering Technology are based on University's Regulation and endorsement until 15 March 2019

PROGRAMMES OFFERED

At the undergraduate level, FTKPM offers five degree programmes are offered by the faculty for the 2019/2020 academic session, as follows:

- B. Eng (Hons.) Manufacturing Engineering
- B. Eng (Hons.) Mechatronics Engineering
- B. Eng (Hons.) Mechatronics Engineering - (Collaboration programme with HsKA, Germany)
- Bachelor of Engineering Technology (Manufacturing) with Honours
- Bachelor of Technology in Industrial Machining with Honours

CAREER OPPORTUNITIES

Manufacturing engineering is a discipline highly sought after by almost all working fields spanning from heavy industrial to agricultural including medical and financial sectors. The discipline with high analytical and innovative skillset possessed by manufacturing and mechatronic engineers let them to assume main roles in providing technologies to serve the community and ease their everyday life. Examples of such technologies are; satellites, space ships, airplanes, ships, commercial vehicles, home utilities and healthcare products.

Career Opportunities :

- Project Engineer
- Design Engineer
- Operation Engineer
- Mechatronic Engineer
- Manufacturing Engineer
- Robotic Engineer
- Research & Development Engineer
- Energy Engineer
- Process Plant Engineer
- Sales Engineer
- QA Engineer
- Production Engineer
- Material Engineer
- Consultant
- Instrumentation & Control Engineer
- CAD/CAM Engineer
- Technopreneur
- Lecturer

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FACULTY OF MANUFACTURING & MECHATRONIC ENGINEERING TECHNOLOGY
PROGRAMME CURRICULUM
B. ENG (HONS.) MANUFACTURING ENGINEERING (BFF)

YEAR	FIRST	SECOND	THIRD		FOURTH
SEMESTER	FIRST & SECOND	FIRST & SECOND	FIRST & SECOND		FIRST & SECOND
MANUFACTURING ENGINEERING CORE COURSES	BFF1103 STATICS	BFF2801 ELECTRICAL/ELECTRONICS LAB	BFF3103 VIBRATIONS	BFF3906 INDUSTRIAL TRAINING (LI) 12 WEEKS	BFF4902 FINAL YEAR PROJECT 1
	BFF1801 MACHINING 1	BFF1123 DYNAMICS	BFF3622 COMPUTER AIDED MANUFACTURING		BFF4**3A MANUFACTURING ELECTIVE 3
	BFF2003 COMPUTER PROGRAMMING	BFF1133 MECHANICS OF MATERIALS	BFF3242 HEAT TRANSFER		BFF4914 FINAL YEAR PROJECT 2
	BFF1113 ENGINEERING MATERIALS	BFF2612 COMPUTER AIDED ENGINEERING DESIGN	BFF3632 DESIGN OF JIGS & FIXTURES		BFF4**3B MANUFACTURING ELECTIVE 4
	BFF1602 TECHNICAL DRAWING	BFF2423 MANUFACTURING PROCESSES	BFF3**3A MANUFACTURING ELECTIVE 1		BFF3123 MACHINE DESIGN
	BFF1811 MACHINING 2	BFF2223 FLUID MECHANICS	BFF2821 MECHANICS LAB		BFF4103 CONTROL SYSTEM ENGINEERING
	BFF1502 PROJECT MANAGEMENT	BFF2233 THERMODYNAMICS	BFF2433 ADVANCED MANUFACTURING PROCESSES		BFF4911 ENVIRONMENT SAFETY & HEALTH
	BFF1343 FUNDAMENTAL OF ELECTRICAL ENGINEERING	BFF2523 QUALITY ENGINEERING	BFF3**3B MANUFACTURING ELECTIVE 2		BFF4533 MANUFACTURING AUTOMATION
	BFF1353 FUNDAMENTAL OF ELECTRONICS ENGINEERING	BFF2513 MANUFACTURING SYSTEM	BFF3313 SENSOR AND INSTRUMENTATION SYSTEMS		BFF3523 PRODUCTION PLANNING AND CONTROL
	BFF1932 ENGINEERS IN SOCIETY	BFF1922 ENGINEERING ECONOMY	BFF3801 THERMAL-FLUID ENGINEERING LAB		
			BFF3573 PRODUCT DESIGN AND DEVELOPMENT		
			BFF4653 INTEGRATED DESIGN PROJECT		
109	23	26	29	6	25
29	**University Required Courses** : Applied Calculus, Applied Statistics, Ordinary Differential Equations, English For Academic Communication, English for Technical Communication, Fundamental of English Language, English for Professional Communication, Falsafah dan Isu Semasa, Penghayatan Etika dan Peradaban, Foreign Languages Level 1, Foreign Languages Level 2, Soft Skills 1, Soft Skill 2, Co-Curriculum I, Co-Curriculum II, Technopreneurship, Elective Courses PBMSK				
138	**Total Credit For Graduation**				

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COURSE SYNOPSIS FOR DEGREE PROGRAMME 2020/2021

COURSE SYNOPSIS FOR MANUFACTURING PROGRAMME (BFF)

BFF1103
Statics
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the concepts of force vector algebra and free-body diagrams to solve problems on equilibrium of forces. The course covers six major chapters in engineering mechanics of statics as follows: 1. equilibrium of forces on a particle, 2. equilibrium of forces on single rigid body, 3. equilibrium of forces on simple trusses, frames and machine structures (multi-rigid bodies), 4. quilibrium of forces in dry friction, 5. centre of gravity and centroid and 6. moments of inertia.
By the end of semester, students should be able to:

CO1: Solve problems on equilibrium of forces for particles and rigid bodies using the equation of equilibrium
CO2: Analyse problems on equilibrium of forces for trusses, frames and machines
CO3: Analyse problems on equilibrium of rigid bodies subjected to dry frictional forces
CO4: Determines the centre of gravity, centroid and moment of inertia for a body of arbitrary shape
CO5: Design solutions for complex engineering problems for a simple structure in equilibrium

BFF1113
Engineering Materials
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the fundamental concepts of engineering materials which includes the structure of materials, mechanical and physical properties of materials, binary phase diagrams, isothermal diagram, heat treatment, applications and current developments of metal, polymer, ceramic, composite and advanced materials. Also, basic understanding on the environmental degradation of engineering materials.

CO1: Identify the atomic bonding and the crystal structures as well as the mechanical and physical properties of engineering materials.
CO2: Analyse various types of engineering materials based on their microstructures, properties and failure behaviours.
CO3: Illustrate structure-property correlations of materials based on phase diagram, heat treatment and strengthening mechanism.
CO4: Recommend a suitable material for engineering applications based on product design requirements.
CO5: Identify the importance of environmental considerations and sustainability in engineering materials.
CO6: Communicate effectively regarding materials-related project in oral presentation.

BFF1123
Dynamics
Credit Hours Hours: 3
Prerequisite: BFF1103

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Synopsis
This course covers rigid body kinematics and kinetics of 2D planar motions. At the of the course, the students should be able to analyse the position, velocity and acceleration of a 2D planar mechanism. Furthermore, by applying either the principle of force-acceleration, work-energy, and/or impulse-momentum, the students should be able to solve the kinetics problems of 2D planar motion. This course also requires the students to design a 2D planar mechanism that performs a specific function.

CO1: Analyse the linear velocity and acceleration of a point, or angular velocity and angular acceleration of remaining links including the Coriolis acceleration if applicable.
CO2: Apply the Newton's Second Law of Motion to determine the acceleration and angular acceleration of a body.
CO3: Apply the Principle of Work and Energy to determine the velocity and angular velocity of a body.
CO4: Apply the Principle of Impulse and Momentum to determine the velocity and angular velocity of a body.
CO5: Design a 2D planar mechanism that performs a specific function and to prepare report that demonstrates the knowledge of velocity and acceleration.

BFF1133
Mechanics of Materials
Credit Hours Hours: 3
Prerequisite: BFF1103; BFF1113

Synopsis
This course introduces the concept of stress, strain and mechanical properties of materials under axial, torsion, bending, transverse, shear and combined loadings in elastic structural members. Plane stress transformation is also included.

CO1: Identify the concept of stress, strain and different mechanical properties of materials.
CO2: Analyse the stress and strain in structural members subjected to the axial loads and torsional loads.
CO3: Analyse the stress and strain in structural members subjected to the bending loads and shear loads.
CO4: Analyse the stress and strain in structural members subjected to the combined load and analyse the stress transformation to solve the mechanics of materials problems.
CO5: Design solutions for complex engineering problem related to mechanics of materials

BFF1343
Fundamental of Electrical Engineering
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces DC circuit and AC circuit analyses. It covers the fundamental laws and theorems, circuit techniques, transient analysis, sinusoidal steady-state analysis and three-phase systems.

CO1: Apply fundamental laws, circuit theorems and method of analysis to solve electrical circuit
CO2: Analyse transient response and steady-state response of circuit applications

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CO3: Analyse balanced and unbalanced three-phase systems
CO4: Analyse electrical circuit using simulation software

BFF1353
Fundamental of Electronics Engineering
Credit Hours Hours: 3
Prerequisite: BFF1343

Synopsis
This course covers the fundamental and applications topics of analog and digital electronics including devices, circuitry, system, and analysis techniques. For analog electronics, it also covers diode, bipolar junction transistor (BJT), field effect transistor (FET), and operational amplifier (Op-Amp). For digital electronics, it also covers different number systems, Boolean Algebra theorems, and combinatorial logic circuits.

CO1: Explain the principle operation and characteristics of diode, bipolar junction transistor (BJT), and field effect transistor (FET) devices and analyse its operation
CO2: Explain and analyse the operation of various type of operational amplifier circuits and applications
CO3: Use different number system to represent data and binary codes for representing numeric and alphanumeric data and apply the Boolean Algebra theorems for simplification of complex logic expression
CO4: Analyse and design of combinatorial logic

BFF1502
Project Management
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course embraces a broad basic overview and principles of project management which has become central to operations in manufacturing enterprises throughout five stages of managing project; initialization, planning, execution, control and closing.

CO1: Develop a project charter which describes a preliminary framework of project's goal, scopes and high level deliverables.
CO2: Develop a project planning using management tools
CO3: Propose task scheduling using an ordered sequence of activities with time allotted
CO4: Evaluate actual performance at any of project duration

BFF1602
Technical Drawing
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces fundamental knowledge and skill of technical drawing for engineers. Both hand sketching and CAD approach will be used in this course. Student will be exposed with Fundamental of Engineering Graphic Language; Layout and Lettering; Technical Sketching; Geometric Constructions; Basic and Advanced Dimensioning; Orthographic Drawing; Section and Auxiliary Views; Geometric Dimensioning and Tolerance (GD&T); and 2D Parametric Drawing Construction. This course also preparing the student to create and interpret working technical drawing according to ISO standards

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CO1: Apply standard procedures in sketching and technical drawing.
CO2: Manipulates CAD for 2D drawing based on orthographic projections and section views.
CO3: Analyze the geometric dimensioning and tolerance (GD&T) to explicitly describe geometry, variation and accuracy in engineering drawing
CO4: Develop standard drawing package consists of 2D assembly drawing, parts list and details part drawing.
CO5: Show the ability to be an effective team player based on the completion of tasks and involvement in group activities.

BFF1801
Machining 1
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course introduces the students to the fundamental knowledge and principle of metal removing process. In this course, student will applied the theoretical knowledge to perform the actual material removal operation using appropriate tools and technique according to required dimensions, tolerance, specification and safety regulations.

CO1: Apply the role of safety and regulatory compliance of hand tools and lathe machine
CO2: Analyse various types of drawings, material removal processes and machining parameters
CO3: Perform basic material removal processes using hand tools and lathe machine with correct sequence of machining operation

BFF1811
Machining 2
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course introduces student on safety rules, metrology, milling process and surface grinding and machining process.

CO1: Apply the safety and health procedures during machining
CO2: Apply skill in part inspection during machining
CO3: Apply technical skill in milling process
CO4: Apply technical skill in surface grinding process
CO5: Practice right standard operation procedure and ethics for machining work

BFF1932
Engineer in Society
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces the engineering profession, local industries sector, issues in local industries, ethics and public responsibility, engineer and law, and contract law.

CO1: Discuss the engineering practices in local manufacturing industries.
CO2: Adheres the practice and laws which govern engineering population for environmental and sustainable development.
CO3: Apply responsibility for ones working ethics and public

responsibility in engineering practices.

BFF1922
Engineering Economy
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces concept of life cycle cost, interest and equivalent. Formula and factors for single and multiple cast flow. Method for investments assessment and alternative comparison and project evaluation using cost worth ratio, inflation and cash flow method.

CO1: Analyse the cost concept, cost structure and estimation
CO2: Analyse the money-time relationship with/without taxes consideration
CO3: Justify the best economical alternative in private and public engineering projects

BFF2003
Computer Programming
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the basics of C programming language. The contents of this course includes coding input and output, variables, constants, arithmetic operations, mathematical functions, user-defined functions, loops, selection making decision and repetitive construct, array, and also data structure. The programming language used for the course is C/C++ language.

CO1: Solve a mathematical problem using variables, constants, arithmetic operations, mathematic functions and user-defined functions with the correct rules.
CO2: Organizes the flow of a program that uses decision making, repetition and loop statements without any errors.
CO3: Write an organised and readable C program code without producing compile and output result errors.
CO4: Develop a program code that is related to manufacturing applications that follows a design specification.
CO5 :Analyse the handling of arrays in a program to ensure correct calculated output is produced.

BFF2223
Fluid Mechanics
Credit Hours Hours: 3
Prerequisite: BFF1103

Synopsis
This course is a fundamental course for engineering students which presents unlimited practical applications from daily life to related industrial fields. Students taking this course are expected to have adequate background of calculus, physics and engineering mechanics. Lesson will be covering the fundamental concepts of fluids, fluid properties, problem analysis for fluids at static and in motion, fluid flow in pipeline and dimensional homogeneity concept. Students will be also exposed to the application of complex engineering problem such as the utilization of Computational Fluid Dynamics (CFD) to enhance their problem solving skills and competency.

CO1: Analyse forces applied by fluids at rest.
CO2: Analyse mass, Bernoulli and energy equations

associated with fluids in motion.

CO3: Analyse minor and major losses, pressure drop and pumping power requirement of laminar and turbulent flow in pipes.

CO4: Analyse dimensional homogeneity of equations, method of repeating variables to obtain non-dimensional parameters and similarity principle for experimental modelling.

CO5: Develop solution for complex engineering problem to solve flow characteristics in pipes.

CO6: Produce a comprehensive report to demonstrate implemented project.

BFF2233
Thermodynamics
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course focuses on the application of the thermodynamics knowledge in various engineering systems. The subject covers the review and analysis of energy, concepts of thermodynamics laws and entropy, heat engines, refrigerators and heat pumps cycles.

CO1: Analyze thermodynamics fundamental concepts which includes energy, state, temperature, pressure, process and cycle.

CO2: Analyze the properties of pure, simple compressible substances and ideal gases.

CO3: Analyze the concept of 1st law of thermodynamics in closed and open systems.

CO4: Analyze entropy change in 2nd law of thermodynamics.

CO5: Design engineering project on thermodynamics.

CO6: Communicate effectively regarding principles of thermodynamics aspects of engineering design.

BFF2423
Manufacturing Processes
Credit Hours Hours: 3
Prerequisite: BFF1113

Synopsis
This course introduces various challenges and issues in modern manufacturing process and operations, ranging from traditional topics such as casting, forming, machining and joining process.

CO1: Ability to describe manufacturing process of metal casting, forming and shaping, joining and surface technology

CO2: Analyse the mechanics and processing parameters of metal casting, forming, joining and surface technology

CO3: Propose a design of manufacturing process system that can be used in production that can contribute to public health and safety, cultural, societal, environmental and sustainability

CO4: Recommend an optimized process parameters of a manufacturing process using research methods

BFF2433
Advanced Manufacturing Processes
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course covers the processing of ceramics, glasses, superconductors, plastics, and composite materials. This

course also covers, rapid-prototyping processes and operations, advanced machining processes and equipment, fabrication of microelectronic devices, and fabrication of microelectromechanical devices and systems and nanoscale manufacturing.

CO1: Comprehend knowledge in advanced manufacturing processes.
CO2: Analyze engineering problem related with advanced manufacturing processes.
CO3: Apply investigation in related topic advanced manufacturing processes.
CO4: Follow ethical during exercises covering advanced manufacturing processes.
CO5: Perform life long learning in the subject of advanced manufacturing processes.

BFF2513
Manufacturing System
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course provides in-depth understanding of manufacturing system components, Manufacturing Operations, Models and Metrics useful to evaluate them, Material Transport and storage systems, analysis of Single cell, Cellular Manufacturing and Flexible Manufacturing systems. Deals with the analysis of manual and automated assembly systems.

CO1: Understand the concepts of manufacturing systems and Analyse the performance of these systems using different metrics.
CO2: Analyse the material handling and storage systems in different manufacturing environments
CO3: Quantify the performance of single cells, cellular manufacturing systems, flexible manufacturing systems and assembly lines
CO4: Evaluate the suitability of modern manufacturing philosophies to improve the performance of manufacturing systems.

BFF2523
Quality Engineering
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course is the application of statistical, mathematical and management methods for improving the quality and reliability of industrial products, processes and systems. Thus, the concept of basic quality tools, fundamental of statistics, control chart for variables and attributes, fundamental of probability and acceptance sampling systems are the key success of this course.

CO1: Determine the measures of frequency distributions, central tendency, dispersion and normal curve when the data are systematically gathered
CO2: Analyze the variations that occur in the central tendency and mean of a set of observation
CO3: Analyze the quantitative data to improve process, develop a new product and establish a statistical control
CO4: Discover the application of optimization among society

BFF2612
Computer Aided Engineering Design

Credit Hours Hours: 2
Prerequisite: BFF1602

Synopsis
This course introduces 3D surface solid modelling which emphasized on the drawing, functioning and organizing the model. Further course content included part assembly, animation and basic FEA application. Students experience the practical learning through the CAD software.

CO1: Apply the knowledge of geometric modelling concepts used in commercial CAD/CAM software
CO2: Construct 3D parts, assembly models and drafting according to the engineering standards
CO3: Assess the part models with basic Finite Element Analysis (FEA) simulations
CO4: Communicate effectively on the topic of geometric modelling

BFF2801
Electrical/Electronics Lab
Credit Hours Hours: 1
Prerequisite: BFF1353

Synopsis
This course introduces practical electrical circuits. Students should analyse, synthesis and build circuits using passive/active components

CO1: Apply electrical fundamental technique to solve circuit using modern tools
CO2: Implement fundamental electrical and electronic principle and devices to solve circuit problem
CO3: Develop an integration of electrical system for an application in a group

BFF2821
Mechanics Lab
Credit Hours Hours: 1
Prerequisite: BFF1123

Synopsis
This lab introduces principles of engineering and solid mechanics through practical experiments. The covered areas are for principles of statics, dynamic and mechanics of materials.

CO1: Analyze engineering mechanics problems for a rigid body at rest and in motion
CO2: Demonstrate understanding about mechanical properties of engineering structures.
CO3: Demonstrate ethical principles and commitments of professional ethics on lab practices

BFF3103
Vibrations
Credit Hours Hours: 3
Prerequisite: BFF1123

Synopsis
This course introduces the fundamental of vibration, free vibration (Single Degree of Freedom -SDOF System), harmonically excited vibration (SDOF System), general excited vibration (SDOF System), two degree of freedom (TDOF System), and vibration control.

CO1: Analyze the single degree of freedom system vibration and harmonically excited vibration
CO2: Analyze the two degree of freedom system vibration and control vibration method
CO3: Demonstrate the vibration solution for engineering problem
CO4: Apply the modern tools for solving vibration problem

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BFF3123
Machine Design
Credit Hours Hours: 3
Prerequisite: BFF1133, BFF1123

Synopsis
This course focuses on the fundamentals of component design - free body diagrams, force flow, concepts, failure theories, and fatigue design, with application to fasteners, springs, bearings, gears, shafts, clutches, and brakes. It explains the basics of mechanics, strength of materials, and materials properties on how to apply these fundamentals to specific machine components design.

CO1: Analyze the concept of machine design, Design considerations for the machine elements, Load and stress analysis, design of compression members
CO2: Analyze the failure of machine components due to static and variable loadings, Design of shafts
CO3: Design of power screws and mechanical springs
CO4: Design of bearings, gears, clutches and flexible mechanical elements
CO5: Design solution for engineering problems related to the course content

BFF3242
Heat Transfer
Credit Hours Hours: 2
Prerequisite: BFF2233

Synopsis
The course covers the modes of heat transfer (through conduction, convection and radiation) in a model of heat transfer system.

CO1: Analyse manufacturing and mechatronics engineering problems as either conduction, convection or radiation problems and model them as a heat transfer system
CO2: Apply specific knowledge of thermofluids principles and heat transfer mechanisms (conduction, convection or radiation) to the heat transfer system
CO3: Design solutions for engineering problems based on course content
CO4: Propose the impact of heat transfer engineering for the environment

BFF3313
Sensor & Instrumentation Systems
Credit Hours Hours: 3
Prerequisite: BFF2801

Synopsis
This course covers instrumentations system including instrument principles, measurement techniques and data analysis for a particular sensor and measurement situation.

CO1: Determine general treatment of instruments and their characteristics
CO2: Analyse transducer elements, intermediate elements and data acquisition systems (DAQ)
CO3: Determine principles of the work and derive mathematical model of sensors for measuring motion and vibration, dimensional metrology, force, torque and power, pressure, temperature, flow and acoustics.
CO4: Develop team-oriented project for interfacing data acquisition system with applications.

BFF3403

Elective: Advanced Machining
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course will introduce the knowledge and technologies in precision machining, technique of making tool and die and engineering measurement using industrial standard equipment

CO1: Evaluate advanced machining process input parameter toward machining quality and failure surface quality and failure
CO2: Conduct machining of a complex product using optimized tool path and machine parameters.
CO3: Communicate effectively in presenting project outcomes
CO4: Function effectively in a teamwork

BFF3603
Elective: Plastics Product Design
Credit Hours Hours: 3
Prerequisite: None

Synopsis
In this course students will introduced with plastic product design including plastic materials selection, design for strength, features for assembly and design for injection moldings process.

CO1: Apply knowledge in designing engineering plastic product including material selections, general design practice, design for strength and design for assembly
CO2: Design an engineering plastic product using CAD software.
CO3: Analysed the plastic product using Finite element software and suggest improvement
CO4: Communicate effectively in presenting the project outcomes

BFF4603
Elective: Mold 1
Credit Hours Hours: 3
Prerequisite: None

Synopsis
In this course student will introduced with the knowledge and technologies in plastic injection mould constructions as well as designing a mould for plastic injection moulding process

CO1: Identify plastic mould construction and component
CO2: Define the plastic mould types
CO3: Define the plastic mould auxiliary system
CO4: Design the plastic injection mould

BFF4613
Elective: Die 1
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course enhances student's competencies in various die design applied in the sheet
metal stamping industry. Student's project will be emphasized on technical aspects in
progressive die design and process planning for die fabrication.

CO1: Analyse various die construction commonly used in sheet metal stamping industries
CO2: Analyse the principal and methodological in progressive die design.

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CO3: Design strip layout of a progressive die according to product specification
CO4: Design a progressive die and prepare detail process planning for die fabrication.

BFF4623
Elective: Mold 2
Credit Hours Hours: 3
Prerequisite: None

Synopsis
In this course students will fabricate the components of the mould according to the detail drawing and process planning, assemble the mould components, inject the product as well as analyze the quality of the final plastic product

CO1: Analyse the advance plastic injection mould design
CO2: Examine the machining process and plan sequences for the plastic mould fabrication
CO3: Conduct the machining operation and construct the mould according to the dimension and specification
CO4: Communicate effectively in a project work
CO5: Function effectively in a teamwork

BFF4633
Elective: Die 2
Credit Hours Hours: 3
Prerequisite: None

Synopsis
In this course students will fabricate the components of the die according to the detail drawing and process planning, assemble the die components, conduct stamping trial and analyse the quality of final sheet metal product.

CO1: Develop process planning on die fabrication
CO2: Construct and assemble die components
CO3: Demonstrate stamping trial and troubleshoot the die system
CO4: Evaluate the quality of stamped parts

BFF4503
Elective: Factory Management
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course is designed to provide students with an understanding of Factory Management (FM) concepts, issues, strategies, management approaches and tools commonly used in factory. The main topics which are covered are Operations and Supply Chain Management, Quality Management, Product Design, Processes and Technology; Capacity and Facilities Design, Human Resources, Supply Chain Management Strategy and Design; Global Supply Chain Procurement and Distribution; Resource Planning and Lean Systems.

CO1: Apply the concepts, systems and strategies relevant to factory operation management
CO2: Analyse the problems associated with factory planning and control of the production of goods and services.
CO3: Act as facilitating manager to deploy task and execution the decision made in management meeting.

BFF3563
Elective: Process Auditing Techniques
Credit Hours Hours: 3

Prerequisite: None

Synopsis
This course introduces the concept of basic internal auditing program i.e. step by step to be an effective auditor; establish audit program; implement audit execution; analyse audit findings and prepare audit report for Quality Management Systems (QMS); Environmental Management System (EMS) and relevant management systems.

CO1: Apply effective internal audit program for any organisations
CO2: Prepare audit report based on analysis of audit findings
CO3: Conduct internal audit program in a manufacturing company

BFF4513
Elective: Lean Production System
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the role of lean production system in a manufacturing environment. The concept of value adding and waste elimination through implementing lean production system. Using the basic principle of Pull system to promote waste elimination, various Lean tools would be introduced which include value stream mapping, Pull System & Kanban, Heijunka, and Cellular manufacturing.

CO1: Analyse principles of lean production to a manufacturing environment by identifying the different type of wasteful activities, value added and non-value added activities
CO2: Propose process improvement through implementation of pull system in the process by planning pull mechanism such as Kanban system and heijunka technique
CO3: Perform a value stream mapping (VSM) study for a manufacturing process from the incoming material until product delivery and propose a future value stream map to minimize the non-value added activities

BFF4643
Elective: Production Line Management
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the basic approach to effectively managing production line from receiving the manufacturing order to producing the required quantity, meeting the quality requirements, delivering on-time and realizing the product with optimal cost.

CO1: Identify and Analyze the fundamental steps required to be performed to ensure each manufacturing order met the objectives
CO2: Implement and Analyze the utilization of limited resources – manpower, time, money, space, equipment. – at optimum level.
CO3: Analyze the production line Productivity and Quality achievement to plan & implement process improvement activities

BFF3583
Elective : Industrial Ergonomics
Credit Hours Hours: 3
Prerequisite: None

Synopsis
CO1 : Define the philosophy of ergonomics in industry based on human structure, function and behaviour to perform work
CO2 : Design the good workspace based on best ergonomics practice.
CO3 : Improve the current workspace considering the environments / surrounding factors
CO4 : Analyse the human-machine and human components of modern work systems.

BFF4573 Elective: Six Sigma
Credit Hours Hours: 3
Prerequisite: None

Synopsis
In this program, students will be able to use all tools, technics and concepts learned in the Introduction program to solve a problem in a Six Sigma. Students will be doing a Six Sigma project and will experience Six Sigma deployment from Define phase until Control phase.
CO1 : Analyze the collection of quantitative data pertaining to any subject or group when the data systematically gathered and collated.
CO2 : Analyze the quality improvement by using control chart.
CO3 : Analyze the various sampling systems in terms of lot by lot, continuous production, attributes and variables.
CO4 : Develop a mathematical model as the solution for the problem.

BFF4663 Elective: Maintainance and Reliability
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the concept and techniques used for planning and controlling all aspects of manufacturing.
CO1 : Investigate the reliability estimation of a system and the components.
CO2 : Build the likelihood function and adapt its use in the estimating of parameters of the failure time distributions.
CO3: Perform the preventive and scheduled maintenance as well as warranty policies according to reliability objectives.

BFF3523 Production Planning and Control
Credit Hours Hours: 3
Prerequisite: None

Synopsis
The course covers the topics of ERP, demand management, forecasting techniques, sales and operation planning, MPS, MRP, Capacity requirement planning, production activity control and scheduling techniques

CO1: Apply forecasting models to develop forecasts for product demand, profits, sales, material requirements for a competitive advantage
CO2: Evaluate and analyze capacity planning, MPS and a resultant MRP for a complete production facility
CO3: Analyze production and inventory planning & control systems, and scheduling problems by using appropriate analytical skills and tools for a complete production facility

BFF3622
Computer Aided Manufacturing
Credit Hours Hours: 2
Prerequisite: BFF2612

Synopsis
This course introduces to develop students a degree of competencies in the CAM principle, application, and integration that applied in the modern manufacturing system. Emphasizes will

be given on the manual programming fundamentals and the application of various prismatic (2-axis) and surface (3-axis) machining strategies, through the selected computer assisted simulation software interface (CATIA).

CO1: Demonstrate the principal, application and integration of CAM system in the manufacturing.
CO2: Apply the fundamentals of manual part programming.
CO3: Analyze the machining parameters (machining strategy, geometry tools, feeds and speeds) using appropriate CAM software.
CO4: Demonstrate actual machining for various mechanical parts on the CNC machine in a teamwork.
CO5: Developing a group project as for effective and functional component output

BFF3632
Design of Jigs & Fixtures
Credit Hours Hours: 2
Prerequisite: BFF2612

Synopsis
This course covers the important of jigs and fixture in industrial application. Several type of jigs and fixture are introduces where emphasis given to the function of locating, supporting, clamping and positioning as requirement for all applications before design of efficient and ergonomic jigs and fixture is develop to improve productivity.

CO1: Evaluate the importance of jigs and fixture in industrial application for the improvement of production and quality.
CO2: Analyze variety of jigs and fixture and its applications considering the engineering factors.
CO3: Design jigs and fixture using appropriate tools to improve productivity, efficiency and ergonomics.

BFF3801
Thermal-Fluid Engineering Lab
Credit Hours Hours: 1
Prerequisite: BFF2233, BFF2223

Synopsis
This course introduces the thermodynamics concepts and experimental approaches to verify approximate solutions of thermofluids problems at conceptual design stage. The course covers three major chapters in thermofluid engineering as follows: 1. Experimental measurements and analysis 2. Experimental techniques for engineering thermodynamics 3. Experimental technique for engineering fluid mechanics

CO1: Determine the accuracy of themofluids measurement using uncertainty analysis
CO2: Analyze the experimental and analytical results for verification of thermofluid principles in a controlled experimental settings
CO3: Assess thermodynamic concepts in a varying experimental conditions
CO4: Characterize a thermofluid concept by initiating complex engineering problem.

BFF3906
Industrial Training
Credit Hours Hours: 6
Prerequisite: Third year student and achieved “Kedudukan Baik (KB)” status on current evaluation.

Synopsis

Students are required to undergo a minimum 10 weeks practical training in an industry or research area under industrial supervision. During this period, students will apply the knowledge and skills that they have learned. The hands-on experience will expose them to the real engineering practice and prepare them to work in the manufacturing or related field in various industries upon graduation.

CO1: Suggest solutions to problems for related industry
CO2: Obey the rules and etiquettes in industry
CO3: Communicate effectively on industry experience
CO4: Function effectively as a member to supports the efforts of others
CO5: Search information in the broadest context of industrial experience

BFF3573
Product Design and Development
Credit Hours Hours: 3
Prerequisite: None

Synopsis
The course blends the perspective of marketing, design and manufacturing into a single approach to product development. It provides students of all kinds with an appreciation for the realities of industrial practice and for the complex and essential roles played by the various members of product development teams. The method provides a concrete approach to solve a product development problem.

CO1: Identify customer needs and product specifications by interpreting customer statement and developing needs-metrics matrix
CO2: Analyze concept generation, concept selection and concept testing to verify the customer needs have been adequately met by the product concept
CO3: Apply design for assemble and manufacturing (DFMA) to reduce manufacturing time and cost during the system-level and detail-design phases of the process
CO4: Communicate effectively to propose a product design and development project

BFF4653
Integrated Design Project
Credit Hours Hours: 3
Prerequisite: BFF3573

Synopsis
This course requires the students to design and develop a computer-controlled manufacturing machine as a product. It integrates the knowledge of software programming; manufacturing processes planning and design; mechanical and electronic design. Students are required to design and developed a machine in a group as well as performing individual engineering roles in a multidisciplinary setting. The design and development are for providing a solution for complex engineering problems with consideration of health and safety, economy, productivity, quality, environmental and sustainability

CO1: Construct product design requirement and produce relevant concept-to-final design specifications
CO2: Produce concept design sketching, detail drawings with GDT & BOM, circuit drawings and programming flowchart
CO3: Justify engineering design parameters and properties through engineering design

calculation, finite element analysis and circuit analysis

CO4: Develop detail manufacturing process planning including materials selection, tooling and process parameters

CO5: Produce the product according to the proposed plan which is includes the procurement, manufacturing, programming, assembly and testing

CO6: Recommend potential improvement of the product design and manufacturing processes to reduce impact on environment and sustainability

CO7: Exhibit effective engineering communication by producing design book and conduct an oral presentation of the product

CO8: Display an active contribution as a member and leader of multidisciplinary team

CO9: Manage the project using project management tools with consideration of financial and man-hour aspect of product development

BFF4533
Manufacturing Automation
Credit Hours Hours: 3
Prerequisite: BFF3313

Synopsis
This course introduces fundamental knowledge and skill of hydraulic and pneumatic system for engineers. Both design and development approach will be used in this course. Student will be exposed with Fundamental of Fluid Power; Pneumatic system; Hydraulic system and Programmable Logic Controller. Laboratory management and 5S implementation is essential for the lab session

CO1: Analyse Pneumatic and Hydraulic system and its components

CO2: Develop PLC program for automation system

CO3: Design hydraulic / pneumatic system for mechatronics applications

BFF4103
Control System Engineering
Credit Hours Hours: 3
Prerequisite: BFF3103

Synopsis
This subject will cover the analysis of the system's stability and performance of the control system by using the time domain and frequency domain approaches. Conventional controller such as PID controller will be used to improve the transient and steady state performances in the time domain approach. In the frequency domain approach, the bode plot method will be utilised. The lead, lag and led-lag compensators are introduced in improving the performance of the control system using the frequency approach.

CO1: Analyze the transient response, system stability and state response for first and second order systems

CO2: Design the PD, PI, PID, Lag, Lead and Lag-Lead compensator using root locus technique and frequency response technique.

CO3: Design a PID control system project

CO4: Communicate about the project effectively

BFF4902
Final Year Project 1
Credit Hours Hours: 2
Please refer to PSM handbook (Has passed more than 90 Credit Hours Hourss)

Synopsis
This course focuses on the investigative research oriented approach to engineering studies. Students are expected to develop techniques in literature review, perform individual analysis and judgement and show capability of being assessed independently. The application of project management element as a medium for conducting and integration all expertise areas during the course is highly encouraged. Upon completion of this course student will proceed to Final Year Project 2 (FYP2) to fulfill the overall Final Year Project requirement.

CO1: Formulate problem statement
CO2: Review literature critically
CO3: Propose research methodology
CO4: Communicate on research work through report and presentation
CO5: Demonstrate ethical principles based on norms of engineering practise
CO6: Demonstrate project management principles according to engineering practise
CO7: Conduct preliminary investigation based on the proposed research methodology.

BFF4911
Environment Safety & Health
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course covers the topics on industrial safety and health regulations, accident causation phenomenon, accident investigation, accident analysis, industrial hazard, industrial hygiene and managing safety and health.

CO1: Explain the importance of environmental safety and health and OSHA regulations in workplace
CO2: Analyse the practices in work places of employment contributing to serious possible damage to life, health and property.
CO3: Develop a solution to ESH problem in a given case study.

BFF4914
Final Year Project 2
Credit Hours Hours: 4
Prerequisite: BFF4902 Please refer to PSM handbook (Has passed more than 90 Credit Hours Hourss)

Synopsis
This course is a continuation of the research work from FYP1. Student needs to conduct investigation based on the proposed research methodology. Students have to complete the course by submitting the thesis with formal presentation and a written report. Students will be assessed on the ability to work independently.

CO1: Demonstrate understanding of fundamental and technical knowledge.
CO2: Assess problems on relevant topics and develop its solution.
CO3: Ability to engage in independent and life-long learning in the broadest context of literature review.

CO4: Design and propose research methodology based on the given title.
CO5: Conduct investigation based on the proposed research methodology.
CO6: Communicate on project work through report and presentation.
CO7: Apply ethical principles and commit responsibility in thesis writing.
CO8: Produce and demonstrate project management according to engineering practice.
CO9: Suggest recommendations for sustainable development.

COURSE SYNOPSIS FOR MECHATRONICS PROGRAMME (BFM)

BFF1103
Statics
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the concepts of force vector algebra and free-body diagrams to solve problems on equilibrium of forces. The course covers six major chapters in engineering mechanics of statics as follows: 1. equilibrium of forces on a particle, 2. equilibrium of forces on single rigid body, 3. equilibrium of forces on simple trusses, frames and machine structures (multi-rigid bodies), 4. Equilibrium of forces in dry friction, 5. centre of gravity and centroid and 6. moments of inertia.

CO1: Solve problems on equilibrium of forces for particles and rigid bodies using the equation of equilibrium.
CO2: Analyze problems on equilibrium of forces for trusses, frames and machines.
CO3: Analyze problems on equilibrium of rigid bodies subjected to dry frictional forces.
CO4: Determines the centre of gravity, centroid and moment of inertia for a body of arbitrary shape.
CO5: Design solutions for complex engineering problems for a simple structure in equilibrium.

BFF1502
Project Management
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course embraces a broad basic overview and principles of project management which has become central to operations in manufacturing enterprises throughout five stages of managing project; initialization, planning, execution, control and closing.

CO1: Develop a project charter which describes a preliminary framework of project's goal, scopes and high level deliverables.
CO2: Develop a project planning using management tools
CO3: Propose task scheduling using an ordered sequence of activities with time allotted
CO4: Evaluate actual performance at any of project duration

BFF1113
Engineering Materials
Credit Hours Hours: 3
Prerequisite: None

Synopsis

This course introduces the fundamental concepts of engineering materials which includes the structure of materials, mechanical and physical properties of materials, binary phase diagrams, isothermal diagram, heat treatment, applications and current developments of metal, polymer, ceramic, composite and advanced materials. Also, basic understanding on the environmental degradation of engineering materials.

CO1: Identify the atomic bondings and the crystal structures as well as the mechanical and physical properties of engineering materials.
CO2: Analyse various types of engineering materials based on their microstructures, properties and failure behaviours.
CO3: Illustrate structure-property correlations of materials based on phase diagram, heat treatment and strengthening mechanism.
CO4: Recommend a suitable material for engineering applications based on product design requirements.
CO5: Identify the importance of environmental considerations and sustainability in engineering materials.
CO6: Communicate effectively regarding materials-related project in oral presentation.

BFF1123
Dynamics
Credit Hours Hours: 3
Prerequisite: BFF1103

Synopsis
This course covers rigid body kinematics and kinetics of 2D planar motions. At the of the course, the students should be able to analyze the position, velocity and acceleration of a 2D planar mechanism. Furthermore, by applying either the principle of force-acceleration, work-energy, and/or impulse-momentum, the students should be able to solve the kinetics problems of 2D planar motion. This course also requires the students to design a 2D planar mechanism that performs a specific function.

CO1: Analyse the linear velocity and acceleration of a point, or angular velocity and angular acceleration of remaining links including the Coriolis acceleration if applicable.
CO2: Apply the Newton's Second Law of Motion to determine the acceleration and angular acceleration of a body.
CO3: Apply the Principle of Work and Energy to determine the velocity and angular velocity of a body.
CO4: Apply the Principle of Impulse and Momentum to determine the velocity and angular velocity of a body.
CO5: Design a 2D planar mechanism that performs a specific function and to prepare report that demonstrates the knowledge of velocity and acceleration.

BFF1343
Fundamental of Electrical Engineering
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces DC circuit and AC circuit analyses. It covers the fundamental laws and theorems, circuit techniques, transient analysis, sinusoidal steady-state analysis and three-phase systems.

CO1: Apply fundamental laws, circuit theorems and method of analysis to solve electrical circuit
CO2: Analyse transient response and steady-state response of circuit applications
CO3: Analyse balanced and unbalanced three-phase systems
CO4: Analyse electrical circuit using simulation software

BFM2831
Fundamental of Electrical Engineering Lab
Credit Hours Hours: 1
Prerequisite: BFF1343

Synopsis
This course introduces practical electrical circuits. Students should analyze, synthesis, and build circuits using passive or active components.

CO1: Apply electrical fundamental techniques to solve circuit using modern tools.
CO2: Implement fundamental electrical and electronics principle devices to solve circuit problems.
CO3: Develop an integration of electrical system fo an application in a group.

BFF4911
Environment Safety and Health
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course covers the topics on industrial safety and health regulations, accident causation phenomenon, accident investigation, accident analysis, industrial hazard, industrial hygiene and managing safety and health.

CO1: Explain the importance of environmental safety and health and OSHA regulations in workplace
CO2: Analyse the practices in work places of employment contributing to serious possible damage to life, health and property.
CO3: Develop a solution to ESH problem in a given case study.

BFF1602
Technical Drawing
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces fundamental knowledge and skill of technical drawing for engineers. Both hand sketching and CAD approach will be used in this course. Student will be exposed with Fundamental of Engineering Graphic Language; Layout and Lettering; Technical Sketching; Geometric Constructions; Basic and Advanced Dimensioning; Orthographic Drawing; Section and Auxiliary Views; Geometric Dimensioning and Tolerance (GD&T); and 2D Parametric Drawing Construction. This course also preparing the student to create and interpret working technical drawing according to ISO standards.

CO1: Apply standard procedures in sketching and technical drawing.
CO2: Manipulates CAD for 2D drawing based on orthographic projections and section views.
CO3: Analyze the geometric dimensioning and tolerance (GD&T) to explicitly describe geometry, variation and accuracy in engineering drawing.

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CO4: Develop standard drawing package consists of 2D assembly drawing, parts list and details part drawing.
CO5: Show the ability to be an effective team player based on the completion of tasks and involvement in group activities.

BFM2013
Programming or Engineers
Credit Hours Hours: 3 Credit Hourss
Prerequisite: BHM2003

Synopsis
This course introduces the parallel/serial interfacing techniques between PC and external circuit built with the components such as LEDs, motors (DC/stepper), thermometer etc. using C/C++ programming language. In addition, the intermediate level of programming techniques such as pointers, dynamic memory allocation, data structures, and graphical user interface are also introduced to fit the purpose. By the end of semester, the students apply the interfacing techniques in a mechatronics-based project.

CO1: Apply concepts of pointers, data structures and logical bitwise.
CO2: Develop graphical user interface.
CO3: Construct an integration software with electrical devices/components and mechanical system.
CO4: Orally present and collaborate effectively in a group on a mechatronics-based project.

BFF2612
Computer Aided Engineering Design
Credit Hours Hours: 2
Prerequisite: BFF1602

Synopsis
This course introduces 3D surface solid modelling which emphasized on the drawing, functioning and organizing the model. Further course content included part assembly, animation and basic FEA application. Students experience the practical learning through the CAD software.

CO1: Apply the knowledge of geometric modeling concepts used in commercial CAD/CAM software
CO2: Construct 3D parts, assembly models and drafting according to the engineering standards
CO3: Assess the part models with basic Finite Element Analysis (FEA) simulations
CO4: Communicate effectively on the topic of geometric modelling

BFF1801
Machining 1
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course introduces the students to the fundamental knowledge and principle of metal removing process. In this course, student will applied the theoretical knowledge to perform the actual material removal operation using appropriate tools and technique according to required dimensions, tolerance, specification and safety regulations.
This course introduces the basic technique to perform manual production techniques by selecting and using appropriate hand tools and perform basic turning processes and operations according to the given dimensions, specifications and tolerances.

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CO1: Apply the role of safety and regulatory compliance of hand tools and lathe machine
CO2: Analyse various types of drawings, material removal processes and machining parameters
CO3: Perform basic material removal processes using hand tools and lathe machine with correct sequence of machining operation

BFF1811
Machining 2
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course introduces student on safety rules, metrology, milling process and surface grinding and machining process.

Course Outcomes
CO1: Apply the safety and health procedures during machining
CO2: Apply skill in part inspection during machining
CO3: Apply technical skill in milling process
CO4: Apply technical skill in surface grinding process
CO5: Practice right standard operation procedure and ethics for machining work

BFF2003
Computer Programming
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the basics of C programming language. The contents of this course includes coding input and output, variables, constants, arithmetic operations, mathematical functions, user-defined functions, loops, selection making decision and repetitive construct, array, and also data structure. The programming language used for the course is C/C++ language.

CO1: Solve a mathematical problem using variables, constants, arithmetic operations, mathematic functions and user-defined functions with the correct rules.
CO2: Organizes the flow of a program that uses decision making, repetition and loop statements without any errors.
CO3: Write an organized and readable C program code without producing compile and output result errors.
CO4: Develop a program code that is related to manufacturing applications that follows a design specification.
CO5: Analyse the handling of arrays in a program to ensure correct calculated output is produced.

BFF2423
Manufacturing Processes
Credit Hours Hours: 3
Prerequisite: BFF1113

Synopsis
This course introduces various challenges and issues in modern manufacturing process and operations, ranging from traditional topics such as casting, forming, machining and joining process.

CO1: Ability to describe manufacturing process of metal casting, forming and shaping, joining and surface technology

CO2: Analyse the mechanics and processing parameters of metal casting, forming, joining and surface technology
CO3: Propose a design of manufacturing process system that can be used in production that can contribute to public health and safety, cultural, societal, environmental and sustainability
CO4: Recommend an optimized process parameters of a manufacturing process using research methods

BFF3622
Computer Aided Manufacturing
Credit Hours Hours: 2
Prerequisite: BFF2612

Synopsis
This course introduces to develop students a degree of competencies in the CAM principle, application, and integration that applied in the modern manufacturing system. Emphasizes will be given on the manual programming fundamentals and the application of various prismatic (2-axis) and surface (3-axis) machining strategies, through the selected computer assisted simulation software interface (CATIA).

CO1: Demonstrate the principal, application and integration of CAM system in the manufacturing.
CO2: Apply the fundamentals of manual part programming.
CO3: Analyze the machining parameters (machining strategy, geometry tools, feeds and speeds) using appropriate CAM software.
CO4: Demonstrate actual machining for various mechanical parts on the CNC machine in a teamwork.
CO5: Developing a group project as for effective and functional component output

BFF2821
Mechanics Lab
Credit Hours Hours: 1
Prerequisite: BFF1133, BFF1123

Synopsis
This lab introduces principles of engineering and solid mechanics through practical experiments. The covered areas are for principles of statics, dynamic and mechanics of materials.

CO1: Analyze engineering mechanics problems for a rigid body at rest and in motion
CO2: Demonstrate understanding about mechanical properties of engineering structures.
CO3: Demonstrate ethical principles and commitments of professional ethics on lab practices

BFF2223
Fluid Mechanics
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course is a fundamental subject for engineering students which presents unlimited practical applications from daily life to related industrial fields. Students taking this course are expected to have adequate background of calculus, physics and engineering mechanics. Lesson will be covering the fundamental concepts of fluids, fluid properties, problem analysis for fluids at static and in motion, fluid flow in pipeline and dimensional homogeneity concept.

Students will be also exposed to the application of complex engineering problem such as the utilization of Computational Fluid Dynamics (CFD) to enhance their problem solving skills and competency.

CO1: Analyze forces applied by fluids at rest.
CO2: Analyze mass, Bernoulli and energy equations associated with fluids in motion.
CO3: Analyze minor and major losses, pressure drop and pumping power requirement of laminar and turbulent flow in pipes.
CO4: Analyze dimensional homogeneity of equations, method of repeating variables to obtain no dimensional parameters and similarity principle for experimental modelling.
CO5: Develop solution for complex engineering problem to solve flow characteristics in pipes.
CO6: Produce a comprehensive report to demonstrate implemented project.

BFF2233
Thermodynamics
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course focuses on the application of the thermodynamics knowledge in various engineering systems. The subject covers the review and analysis of energy, concepts of thermodynamics laws and entropy, heat engines, refrigerators and heat pumps cycles.

CO1: Analyze thermodynamics fundamental concepts which includes energy, state, temperature, pressure, process and cycle.
CO2: Analyze the properties of pure, simple compressible substances and ideal gases.
CO3: Analyze the concept of 1st law of thermodynamics in closed and open systems.
CO4: Analyze entropy change in 2nd law of thermodynamics.
CO5: Design engineering project on thermodynamics.
CO6: Communicate effectively regarding principles of thermodynamics aspects of engineering design.

BFF3242
Heat Transfer
Credit Hours Hours: 2 Credit Hourss
Prerequisite: BFF2233 Thermodynamics

Synopsis
The course covers the modes of heat transfer (through conduction, convection and radiation) in a model of heat transfer system.

CO1: Analyse manufacturing and mechatronics engineering problems as either conduction, convection or radiation problems and model them as a heat transfer system
CO2: Apply specific knowledge of thermofluids principles and heat transfer mechanisms (conduction, convection or radiation) to the heat transfer system
CO3: Design solutions for engineering problems based on course content
CO4: Propose the impact of heat transfer engineering for the environment

BFF1133
Mechanics of Materials
Credit Hours Hours: 3 Credit Hourss

Prerequisite: BFF1102, BFF1113

Synopsis
This course introduces the concept of stress, strain and mechanical properties of materials under axial, torsion, bending, transverse, shear and combined loadings in elastic structural members. Plane stress transformation is also included.

CO1: Identify the concept of stress, strain and different mechanical properties of materials.
CO2: Analyze the stress and strain in structural members subjected to the axial loads and torsional loads.
CO3: Analyze the stress and strain in structural members subjected to the bending loads and shear loads.
CO4: Analyze the stress and strain in structural members subjected to the combined load and analze the stress transformation to solve the mechanics of materials problems.
CO5: Design solutions for complex engineering problem related to mechanics of materials

BFF3103
Vibrations
Credit Hours Hours: 3
Prerequisite: BFF1123

Synopsis
This course introduces the fundamental of vibration, free vibration (Single Degree of Freedom-SDOF System), harmonically excited vibration (SDOF System), general excited vibration (SDOF System), two degree of freedom (TDOF System), and vibration control.

CO1: Analyze the single degree of freedom system vibration and harmonically excited vibration
CO2: Analyze the two degree of freedom system vibration and control vibration method
CO3: Demonstrate the vibration solution for engineering problem
CO4: Apply the modern tools for solving vibration problem

BFF3123
Machine Design
Credit Hours Hours: 3
Prerequisite: BFF1133, BFF1123

Synopsis
This course focuses on the fundamentals of component design - free body diagrams, force flow, concepts, failure theories, and fatigue design, with application to fasteners, springs, bearings, gears, shafts, clutches, and brakes. It explains the basics of mechanics, strength of materials, and materials properties on how to apply these fundamentals to specific machine components design.

CO1: Analyze the concept of machine design, Design considerations for the machine elements, Load and stress analysis, design of compression members
CO2: Analyze the failure of machine components due to static and variable loadings, Design of shafts
CO3: Design of power screws and mechanical springs
CO4: Design of bearings, gears, clutches and flexible mechanical elements
CO5: Design solution for engineering problems related to the course content.

BFF3213
Sensor and Instrumentations

Credit Hours Hours: 3
Prerequisite: BFF2801

Synopsis
This course covers instrumentations system including instrument principles, measurement techniques and data analysis for a particular sensor and measurement situation.

CO1: Determine general treatment of instruments and their characteristics
CO2: Analyse transducer elements, intermediate elements and data acquisition systems (DAQ)
CO3: Determine principles of the work and derive mathematical model of sensors for measuring motion and vibration, dimensional metrology, force, torque and power, pressure, temperature, flow and acoustics.
CO4: Develop team-oriented project for interfacing data acquisition system with applications.

BFF1922
Engineering Economy
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces concept of life cycle cost, interest and equivalent. Formula and factors for single and multiple cast flow. Method for investments assessment and alternative comparison and project evaluation using cost worth ratio, inflation and cash flow method.

CO1: Analyze the cost concept, cost structure and estimation
CO2: Analyze the money-time relationship with/without taxes consideration
CO3: Justify the best economical alternative in private and public engineering projects

BFF3801
Thermal-Fluid Engineering Lab
Credit Hours Hour: 1
Prerequisite: BFF2233, BFF2223

Synopsis
This course introduces the thermodynamics concepts and experimental approaches to verify approximate solutions of thermofluids problems at conceptual design stage. The course covers three major chapters in thermofluid engineering as follows: 1. Experimental measurements and analysis 2. Experimental techniques for engineering thermodynamics 3. Experimental technique for engineering fluid mechanics.

CO1: Determine the accuracy of themofluids measurement using uncertainty analysis
CO2: Analyze the experimental and analytical results for verification of thermofluid principles in a controlled experimental settings
CO3: Assess thermodynamic concepts in a varying experimental conditions
CO4: Characterize a thermofluid concept by initiating complex engineering problem.

BFF1932
Engineers in Society
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces the engineering profession, local industries sector,

issues in local industries, ethics and public responsibility, engineer and law, and contract law.

CO1: Discuss the engineering practices in local manufacturing industries.
CO2: Adheres the practice and laws which govern engineering population for environmental and sustainable development.
CO3: Apply responsibility for ones working ethics and public responsibility in engineering practices.

BFF3906
Industrial Training
Credit Hours Hours: 6
Prerequisite: Third year student and achieved "Kedudukan Baik (KB)" status on current evaluation

Synopsis
Students are required to undergo a minimum 10 weeks practical training in an industry or research area under industrial supervision. During this period, students will apply the knowledge and skills that they have learned. The hands-on experience will expose them to the real engineering practice and prepare them to work in the manufacturing or related field in various industries upon graduation.

CO1: Suggest solutions to problems for related industry
CO2: Obey the rules and etiquettes in industry
CO3: Communicate effectively on industry experience
CO4: Function effectively as a member to supports the efforts of others
CO5: Search information in the broadest context of industrial experience

BFF4103
Control System Engineering
Credit Hours Hours: 3
Prerequisit: BFF3103

Synopsis
This subject will cover the analysis of the system's stability and performance of the control system by using the time domain and frequency domain approaches. Conventional controller such as PID controller will be used to improve the transient and steady state performances in the time domain approach. In the frequency domain approach, the bode plot method will be utilized. The lead, lag and led-lag compensators are introduced in improving the performance of the control system using the frequency approach.

CO1: Analyze the transient response, system stability and state response for first and second order systems
CO2: Design the PD, PI, PID, Lag, Lead and Lag-Lead compensator using root locus technique and frequency response technique.
CO3: Design a PID control system project
CO4: Communicate about the project effectively

BFM2313
Digital Electronics
Credit Hours Hours: 3
Prerequisite: BFF1343

Synopsis
This course is designed to introduce the basic principle of digital systems and digital circuit design with analysis. Lecture and practical will cover the following: Algebra Boolean, Numbering system, Basic Logic Gate, Combinational Logic Circuit Design, Bi-stable Memory Devices and Sequential Circuits Design.

CO1: Apply numbering system, digital codes and digital component in digital electronics
CO2: Analyze combinational logic circuits in digital system
CO3: Analyze sequential logic circuits in digital system
CO4: Construct digital schematic using computer aided design tools

BFM2303
Analog Electronics
Credit Hours Hours: 3
Prerequisite: BFF1343

Synopsis
In this course students will learn about discrete electronic circuits; that is, circuits containing discrete resistors, capacitors, diodes and transistors. The analysis of these fundamental circuits provides a key understanding of circuit operation and characteristics. Throughout this course, students will also develop, analyze, and design more complex analog electronic circuits by combining and expanding the basic circuits considered, to form more complex circuits. Lastly, students will learn how to analyze and design discrete circuits, these circuits are usually fabricated as integrated circuits called operational amplifiers.

CO1: Explain the Principle Operation of Active Device Characteristics (e.g Diode, Bipolar Junction Transistor (BJT), Field Effect Transistor (FET), and Metal Oxide Semiconductor Field Effect
CO2: Explain and Analyse Various Type of Transistor Circuits (e.g., biasing circuits and small signal model circuits)
CO3: Explain and Analyse Different Type Operational-Amplifier Circuits
CO4: Design and Analyze Operational Amplifier Applications

BFM3002
Computer Simulation
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces simulation software MATLAB (simple operations, matrices and vectors, functions, plot, programming and symbolic calculation) and Simulink (functional principle of Simulink, designing a block diagram, solving differential equation, starting simulink systems from matlab and importing plots to word and power points)

CO1: Solve mathematical equations/operations in
CO2: Construct functional programs using scripts
CO3: Design block diagrams using Simulink toolboxes
CO4: Develop simulation solution/project for dynamic Mechatronics systems in Simulink/MATLAB

BFM3333
Microcontroller System
Credit Hours Hours: 3
Prerequisite: BFF1343

Synopsis
This course is an introduction to microcontroller system and embedded devices. Students are exposed to microcontroller architecture, peripherals, and subsystems. These include processing unit, registers, memory, internal data flow, I/O, timer, PWM, Analog Digital Converter, interrupt, serial communication, Master-Slave configuration.

CO1: Demonstrate microcontroller's internal working and its architecture: Processing Unit, Registers, Memory, and their data flow.
CO2: Analyze microcontroller peripherals: Digital and Analog I/O, Timer, PWM, ADC
CO3: Analyze microcontroller subsystem: interrupt, serial communication, Master-Slave.
CO4: Develop a solution for engineering problems using microcontroller.
CO5: Communicate effectively in group works, presentations, and reports.

BFM3403
Fluid Drive System
Credit Hours Hours: 3
Prerequisite: BFF1343

Synopsis
This course introduces fundamental knowledge and skill of hydraulic and pneumatic system for engineers. Both design and development approach will be used in this course. Student will be exposed with Fundamental of Fluid Power; Pneumatic system; Hydraulic system and Programmable Logic Controller. Laboratory management and 5S implementation is essential for the lab session.

CO1: Apply Pneumatic and Hydraulic system and its components
CO2: Analyse PLC program for automation system
CO3: Design hydraulic/pneumatic system for mechatronics applications
CO4: Demonstrate the understanding of Engineering principles in managing the project

BFF3573
Product Design and Development
Credit Hours Hours: 3
Prerequisite: None

Synopsis
The course blends the perspective of marketing, design and manufacturing into a single approach to product development. It provides students of all kinds with an appreciation for the realities of industrial practice and for the complex and essential roles played by the various members of product development teams. The method provides a concrete approach to solve a product development problem.

CO1: Identify customer needs and product specifications by interpreting customer statement and developing needs-metrics matrix
CO2: Analyze concept generation, concept selection and concept testing to verify the customer needs have been adequately met by the product concept
CO3: Apply design for assemble and manufacturing (DFMA) to reduce manufacturing time and cost during the system-level and detail-design phases of the process
CO4: Communicate effectively to propose a product design and development project

BFM3303
Electrical Drive System
Credit Hours Hours: 3
Prerequisite: BFF1343

Synopsis
This course begins by introducing the basic electrical drive system components. The modelling and equivalent system of the dc motor and induction motor will be derived. This will

lead to the design of the drive system using flux controlled, voltage controlled, controlled rectifier, chopper controlled, scalar control.

CO1: Demonstrate knowledge and principle of motor modelling and equivalent system.
CO2: Analyse DC motor equations and evaluate DC motor drive system for different operating conditions, regenerative braking conditions, quadrant operations.
CO3: Analyse induction motor equivalent system and its characteristic, speed control.

BFM4503
Robotics for Engineers
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course provides an overview of robot mechanisms, kinematics, motion kinematic, dynamics, and planning control. Topics include robotic system overview, rotational matrices, translational matrices, homogeneous and composite matrices, D-H algorithm representation, Lagrange-Euler formulation, and robot planning. At the end of the course, students shall design the robot, together with the complete mathematical modelling to implement the theories that have been learnt.

CO1: Derive the robot kinematics using spatial movement.
CO2: Develop robot dynamic using Lagrange-Euler formulation and robot trajectory planning
CO3: Develop the robot's control system using PID Controller
CO4: Design a robotics system project in simulation and experiment
CO5: Communicate about the project effectively

BFM4653
Integrated Design Project (IDP)
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course requires the students to design and develop a computer-controlled manufacturing machine as a product. It integrates the knowledge of software programming; manufacturing processes planning and design; mechanical and electronic design. Students are required to design and developed a machine in a group as well as performing individual engineering roles in a multidisciplinary setting. The design and development are for providing a solution for complex engineering problems with consideration of health and safety, economy, productivity, quality, environmental and sustainability

CO1: Construct product design requirement and produce relevant concept-to-final design specifications
CO2: Produce concept design sketching, detail drawings with GDT & BOM, circuit drawings and programming flowchart.
CO3: Justify engineering design parameters and properties through engineering design calculation, finite element analysis and circuit analysis
CO4: Develop detail manufacturing process planning including materials selection, tooling and process parameters.
CO5: Produce the product according to the proposed plan which is includes the procurement, manufacturing,

programming, assembly and testing

CO6: Recommend potential improvement of the product design and manufacturing processes to reduce impact on environment and sustainability.

CO7: Exhibit effective engineering communication by producing design book and conduct an oral presentation of the product.

CO8: Display an active contribution as a member and leader of multidisciplinary team

CO9: Manage the project using project management tools with consideration of financial and man-hour aspect of product development

BFM4902
Final Year Project 1
Credit Hours Hours: 2
Prerequisite: Please refer to PSM handbook (Has passed more than 90 Credit Hours Hourss)

Synopsis
This course focuses on the investigative research oriented approach to engineering studies. Students are expected to develop techniques in literature review, perform individual analysis and judgement and show capability of being assessed independently. The application of project management element as a medium for conducting and integration all expertise areas during the course is highly encouraged. Upon completion of this course student will proceed to Final Year Project 2 (FYP2) to fulfill the overall Final Year Project requirement.

CO1: Formulate problem statement

CO2: Review literature critically

CO3: Propose research methodology

CO4: Communicate on research work through report and presentation

CO5: Demonstrate ethical principles based on norms of engineering practice

CO6: Demonstrate project management principles according to engineering practice

CO7: Conduct preliminary investigation based on the proposed research methodology.

BFM4914
Final Year Project 2
Credit Hours Hours: 4
Prerequisite: BFM4902 Please refer to PSM handbook (Has passed more than 90 Credit Hours Hourss)

Synopsis
This course is a continuation of the research work from FYP1. Student needs to conduct investigation based on the proposed research methodology. Students have to complete the course by submitting the thesis with formal presentation and a written report. Students will be assessed on the ability to work independently.

CO1: Demonstrate understanding of fundamental and technical knowledge.

CO2: Assess problems on relevant topics and develop its solution.

CO3: Ability to engage in independent and life-long learning in the broadest context of literature review.

CO4: Design and propose research methodology based on the given title.

CO5: Conduct investigation based on the proposed research methodology.

CO6: Communicate on project work through report and presentation.
CO7: Apply ethical principles and commit responsibility in thesis writing.
CO8: Produce and demonstrate project management according to engineering practice.
CO9: Suggest recommendations for sustainable development.

BFM4513
Automation System
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the students various control systems for operating equipment such as machinery, processes in factories, boilers and heat treating ovens, switching on telephone networks, steering and stabilization of ships, aircraft and other applications and vehicles with minimal or reduced human intervention. Automation has been achieved by various means including mechanical, hydraulic, pneumatic, electrical, electronic devices and computers, usually in combination After completing this course, students should be able to apply the theory of automation in mechatronics systems.

CO1: Demonstrate understanding of specific application and function related to automation
CO2: Analyse automation of the mechatronics systems in the industrial applications
CO3: Design an integration of automation devices and computerization of the mechatronics support systems
CO4: Develop a solution for an automation problem

BFM4513
Autonomous Robotic System
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the students to the foundation of autonomous robotic system. The course will start with the introduction of the common robotic system (mobile robot and robotic arm). The core of this course will address the problem of perception, localization, planning and control and robot motion and navigation. The course will be accompanied by a large practical part in which students have the opportunity to implement the fundamental theories that they learnt in lecture. After completing this course, students should be able to apply the theory into the real autonomous systems.

CO1: Demonstrate understanding of the overall robotic system (close loop system, hardware software integration)
CO2: Analyse the motion kinematic of holonomic and non-holonomic system
CO3: Analyse path planning Methodology using A* algorithm
CO4: Develop trajectory tracking control system algorithm for an autonomous system

BFM4543
Robotic Prototype Design
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course will expose the student to the engineering design of mechanism and control of prototype biomimetic robotic systems, which takes inspiration from nature to solve engineering problems. Students will learn the fundamentals of biomimetic

mechanisms such as legged locomotion, bird flight, swimming, and also biomimetic artificial muscles. For biomimetic control, students will learn about dynamics and control of bipedal walking, aerial flight and biomimetic underwater propulsion. Students are required to design a prototype robotic system, compare their design strengths and weaknesses with their team mates, and then propose the best design for solving a set problem.

CO1: Analyse the solution requirements for a problem
CO2: Design a biomimetic mechanical system that fulfils a set specification
CO3: Evaluate the strength and weakness of a design from a cost, weight, durability and practicality standpoint
CO4: Propose an improvement design after discussion with team members

BFM4603
Control System 2
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course extends the contents of available Control System subject in Mechatronic Programme. It introduces the state space analysis: (Concepts of State, State variable and State space model) controllability and observability: (BIBO Stability – Determining the stability by -Liapunov's stability criterion), non-linear control: (Non-linear systems properties, common physical non-linearity's, dead zone, relay, saturation)

CO1: Study the basic of State space control method.
CO2: Analyze the controllability and observability of control system.
CO3: Analyze and control the nonlinear dynamics system
CO4: Develop a non-linear control system with state space control method.

BFM4613
Digital Signal Processing
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces Digital Signal Processing and its applications. Discrete time signals and systems. Z-transform. Modelling and implementation forms of DT systems. Time and Frequency domain analysis of digital processors. Design and analysis of finite impulse response filters (FIR). Analog filter approximations. Design and analysis of infinite impulse response (IIR) filters. Digital filter networks. Digital equalizers. The Digital Fourier Transformation and Fast Fourier Transformation algorithms. DSP algorithms and applications.

CO1: Demonstrate the basic knowledge of DSP systems.
CO2: Design of DSP system.
CO3: Analyze DSP system with FIR, IIR, DFT, FFT algorithms
CO4: Develop DSP applications using computer software.

BFM4623
Computer Network in Mechatronic System
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces Computer Network in mechatronics system, layers of Transport and dialogue sessions - examples of the presentation layer in applications of mechatronics system - network security and privacy – Text

compression - terminal protocol - File Transfer Protocol - the application layer - Distributed Computing-network systems and distributed operating in mechatronics system application.

CO1: Introduce the basics of computer networks.
CO2: Design a network layers with security and protocol implementation.
CO3: Develop a complete network system for mechatronics applications.

BFM4633
Database and Information System
Credit Hours Hours: 3
Prerequisite: None

Synopsis
Nowadays, a tremendous amount of data is being generated, gathered and collected throughout multiple sources around us. Big data term was born few years back to describe data sets that are so large or complex that traditional data processing application software is inadequate to deal with them. By having this massive data, many challenges will occur including capture, storage, analysis, data curation, search, sharing, transfer, visualization, querying, updating, and information privacy as well. This course will provide an introduction to big data management and analysis. In addition, the beginner level of database setup and handling as well as parallel computing techniques are also introduced to fit the purpose. By the end of semester, the students apply the knowledge to solve real world big data problems.

CO1: Apply and identify the concepts of architectural components and programming models used for scalable big data management and analysis as well as how big data is analyzed.
CO2: Properly construct and build cloud to be executed under high performance computing environment.
CO3: Analyze real world big data problems using specific architectural components and programming models.
CO4: Orally present and collaborate effectively in a group on the real world big data problems project.

BFM4713
Industrial Electronics
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces some industrial Electronics components that hasn't been covered in the previous electronics courses: sample and hold circuit, Digital to Analog Converter, Analog to Digital Converters, Circuit Breaker, Electrical Switches, Relays, Thyristors, Triac, Photo-cells, Voltage and current regulators, flip/ flop etc

CO1: Demonstrate the working principle of some industrial electronics parts.
CO2: Integrate the studied components with other electronics components.
CO3: Develop applications using these components.

BFM4723
Digital System in Mechatronics Design
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the students to the foundation of digital system. The course will start with the introduction of

the understanding of control unit (CU) and data path unit(DU) for a control system. The core of this course will address the development concept of controlling mechatronics system. The course will be accompanied by a practical part in which students have the opportunity to implement the fundamental theories that they learnt in lecture. After completing this course, students should be able to apply the theory into the real mechatronics systems.

CO1: Demonstrate understanding of the overall digital system (control unit (CU), data path unit (DU), CU-DU integration)
CO2: Design control unit using Finite State Machine
CO3: Design integration of control unit and data path resources using Register Transfer Level (RTL)
CO4: Develop digital system for a mechatronics system using FPGA.

BFM4713
Industrial Electronics
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces some industrial Electronics components that hasn't been covered in the previous electronics courses: sample and hold circuit, Digital to Analog Converter, Analog to Digital Converters, Circuit Breaker, Electrical Switches, Relays, Thyristors, Triac, Photo-cells, Voltage and current regulators, flip/ flop etc

CO1: Demonstrate the working principle of some industrial electronics parts.
CO2: Integrate the studied components with other electronics components.
CO3: Develop applications using these components.

COURSE SYNOPSIS FOR MECHATRONICS (UMP-HsKA) PROGRAMME (BHM)

BHM1103
Statics
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the concepts of force vector algebra and free-body diagrams to solve problems on equilibrium of forces. The course covers six major chapters in engineering mechanics of statics as follows: 1. Equilibrium of forces on a particle, 2. Equilibrium of forces on single rigid body, 3. Equilibrium of forces on simple trusses, frames and machine structures (multi-rigid bodies), 4. Equilibrium of forces in dry friction, 5. Centre of gravity and centroid and 6. Moments of inertia

CO1: Solve problems on equilibrium of forces for particles and rigid bodies using the equation of equilibrium.
CO2: Analyze problems on equilibrium of forces for trusses, frames and machines
CO3: Analyze problems on equilibrium of rigid bodies subjected to dry frictional forces
CO4: Determines the centre of gravity, centroid and moment of inertia for a body of arbitrary shape
CO5: Design solutions for complex engineering problems for a simple structure in equilibrium.

BHM1113
Engineering Materials
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the fundamental concepts of engineering materials which includes the structure of materials, mechanical and physical properties of materials, binary phase diagrams, isothermal diagram, heat treatment, applications and current developments of metal, polymer, ceramic, composite and advanced materials. Also, basic understanding on the environmental degradation of engineering materials.

CO1: Identify the atomic bonding and the crystal structures as well as the mechanical and physical properties of engineering materials
CO2: Analyse various types of engineering materials based on their microstructures, properties and failure behaviours.
CO3: Illustrate structure-property correlations of materials based on phase diagram, heat treatment and strengthening mechanism.
CO4: Recommend a suitable material for engineering applications based on product design requirements.
CO5: Identify the importance of environmental considerations and sustainability in engineering materials.
CO6: Communicate effectively regarding materials-related project in oral presentation.

BHM1602
Technical Drawing
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces fundamental knowledge and skill of technical drawing for engineers. Both hand sketching and CAD approach will be used in this course. Student will be exposed with Fundamental of Engineering Graphic Language; Layout and Lettering; Technical Sketching; Geometric Constructions; Basic and Advanced Dimensioning; Orthographic Drawing; Section and Auxiliary Views; Geometric Dimensioning and Tolerance (GD&T); and 2D Parametric Drawing Construction. This course also preparing the student to create and interpret working technical drawing according to ISO standards.

CO1: Apply standard procedures in sketching and technical drawing.
CO2: Manipulates CAD for 2D drawing based on orthographic projections and section views.
CO3: Analyze the geometric dimensioning and tolerance (GD&T) to explicitly describe geometry, variation and accuracy in engineering drawing.
CO4: Develop standard drawing package consists of 2D assembly drawing, parts list and details part drawing.
CO5: Show the ability to be an effective team player based on the completion of tasks and involvement in group activities.

BHM1801
Machining 1
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This is an introductory course to the fundamental knowledge and principles in material removal processes. In this

course, the students apply the fundamentals and principles of material removal processes by selecting and using appropriate hand tools and perform basic turning processes and operations.

CO1: Demonstrate the role of safety and regulatory compliance of hand tools and lathe machine.
CO2: Analyse various types of drawings and machining parameters
CO3: Perform basic material removal processes using hand tools and lathe machine with correct sequence of machining operations

BHM1123
Mechanics of Materials
Credit Hours Hours: 3
Prerequisite: BHM1103, BHM1113

Synopsis
This course covers the concept of stress and strain, stress and strain under axial, torsion, bending, transverse-shear and combined loadings in elastic structural members. This course also covers the plane stress transformation.

CO1: Apply the concept of stress and strain in mechanics of materials.
CO2: Apply the stress and strain calculations in structural members subjected to axial loads and torsional loads.
CO3: Apply the stress and strain calculations in structural members subjected to the bending and shear loads.
CO4: Analyze the stress and strain in structural members subjected to the combined load and analyze the stress transformation to solve problems in mechanics of materials.
CO5: Design solution of complex engineering problem related to mechanics of materials.

BHM1313
Electronics Engineering 1
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces circuit theory analysis which includes ohm laws, KCL, KVL, thevenin, mesh, superposition and transient analysis of RC and RL network. The digital logic circuits cover analogue vs digital, number system, logic gates, SOP & POS and K-maps.

CO1: Apply fundamental laws, circuit theorems and method of analysis to solve electrical circuit
CO2: Analyze transient response and steady state response of circuit applications
CO3: Solve number systems and logic gates problem in digital system
CO4: Analyze electrical and digital circuit using simulation software

BHM1612
CAD Modeling
Credit Hours Hours: 2
Prerequisite: BFF1602

Synopsis
This course covers the fundamental of designing the 3D solid and surface model inclusive of drafting according to the industrial standard. Development of assembly model using parametric approach is also covered and also calculation of component displacements, strains, and stresses under internal and external loads using finite element analysis.

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CO1: Design 3D parts of solid and surface model and generate its technical drawing according to the manufacturing standards
CO2: Develop assembly model with animation and generate drawing complete with bill of material.
CO3: Perform and interpret the results of finite element analysis correctly.

BHM1811
Machining 2
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course introduces student on safety rules, metrology, milling process and surface grinding and machining process.

CO1: Apply the safety and health rules during machining
CO2: Apply skill in part inspection during machining
CO3: Apply technical skill in milling process
CO4: Apply technical skill in surface grinding process
CO5: Practice right standard operation procedure and ethics in machining work

BHM2103
Dynamics
Credit Hours Hours: 3
Prerequisite: BHM1103

Synopsis
This course introduces two major sections involving a motion of a rigid body; 1. Planar kinematics, and, 2. Planar kinetics. In planar kinematics, principles of rigid body motion in terms of translation and rotation will be discussed. For planar kinetics, principles of rigid body motion utilizing force and acceleration method, work and energy method and impulse and momentum method will be studied.

CO1: Analyze problems on planar kinematics of a rigid body for relative-motion analysis involving velocity and acceleration.
CO2: Analyze problems involving kinetics of a planar kinetics of a rigid body using force and acceleration method.
CO3: Solve problems involving kinetics of a planar kinetics of a rigid body using work and energy method.
CO4: Solve problems involving kinetics of a planar kinetics of a rigid body using impulse and momentum method.
CO5: Design solutions for complex engineering problems for a simple planar mechanism using kinematics principles.

BHM2003
Computer Programming
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the basics of C programming language. The contents of this course includes coding input and output, variables, constants, arithmetic operations, mathematical functions, user defined functions, loops, selection making decision and repetitive construct, array, and also data structure. The programming language used for the course is C/C++ language.

CO1: Solve a mathematical problem using variables, constants, arithmetic operations, mathematic functions and user-defined functions with the correct rules.

CO2: Organizes the flow of a program that uses decision making, repetition and loop statements without any errors.
CO3: Develop a program code that is related to mechatronics applications that follows a design specification.
CO4: Analyze the handling of arrays in a program to ensure correct calculated output is produced.
CO5: Write an organized and readable C program code without producing compile and output result errors.

BHM2342
Mechanical and Electrical Components
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course aims to introduce mechanical/electrical components in a mechatronic system, basic knowledge on costing and basic project management technique. The content of this course is divided into three parts namely, mechanical component (Part A), electrical components (Part B) and basic of costing (Part C). Part A covers mechanical measurement (fits and tolerance), components guides, springs, power transmission components and fasteners. Part B comprises basic of printed circuit board and electrical-drive-system. Whereas, Part C covers basic of costing including cost structure, manufacturing cost and break-even analysis. By learning this course the students will be able to select components based on analysed design requirement and finally assemble them into a functional mechatronic system.

CO1: Select mechanical components and their specification based on design requirements in a mechatronics systems
CO2: Select electrical components and their specification based on design requirements in a mechatronics systems
CO3: Examine a mechatronic system to perform basic costing analysis and recommend possible solution to justify cost and efficiency
CO4: Manage a mini projects that involve component selection, procurement and assembly of a mechatronic system using appropriate project management tools

BHM2403
Manufacturing Processes
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces various challenges and issues in modern manufacturing process and operations, ranging from traditional topics such as casting, forming, machining and joining process.

CO1: Identify the manufacturing process of metal casting, forming and shaping, joining and surface technology.
CO2: Analyse the mechanics and processing parameters of metal casting, forming, joining, and surface technology.
CO3: Propose a design manufacturing process system that can be used in the production that can contribute to public, health and safety, cultural society, environmental and sustainability.

CO4: Recommend an optimized process parameters of a manufacturing process using research methods.

BHM2203
Thermal-Fluid Engineering 1
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the thermodynamics concepts and analytical approaches to approximate the solutions of thermofluid problems at conceptual design stage. The course covers six major chapters in thermofluid engineering as follows: 1. Modelling of thermodynamics system 2. Thermodynamics concepts 3. Thermodynamics principles and governing equations 4. Thermodynamic processes and its performances 5. Heat engines and power plant 6. Heat pump and cooling system.

CO1: Model the physical situation and properties of a fluid in a thermodynamic device
CO2: Solve the idealised model of thermodynamics processes and cycles using the energy transport equation
CO3: Analyze the performances of idealised and actual thermodynamic devices
CO4: Evaluate conceptual design solutions for complex engineering problems using properties of an idealised thermalfluid model individually and in group

BHM2213
Thermal-Fluid Engineering 2
Credit Hours Hours: 3
Prerequisite: BHM2203

Synopsis
This course introduces the fluid dynamic concepts and analytical approaches to approximate the solutions of thermofluids problems at conceptual design stage. An introduction to mechanical engineering thermodynamics, dealing with the application of the first and second laws of thermodynamics to the thermodynamic performance analysis of typical thermo-mechanical plant components, using condensable vapors or gases as the working fluid. The course includes energy and entropy balance for closed and open systems. Basic fluid mechanics including: kinematics and dynamics of fluid flows; conservation laws applied to fluid flow; Euler, Bernoulli, Navier-Stokes equations; dimensional analysis; differential and integral flow analysis; flow visualization.

CO1: Model the physical situation and properties of a fluid in a thermofluid device
CO2: Solve the idealised model of fluid flow using the mass and momentum transport
CO3: Analyze the performances of idealised and actual thermodynamic device
CO4: Evaluate conceptual design solutions for complex engineering problems using properties of an idealised thermalfluid model individually and in group.

BHM3303
Sensor and Instrumentation Systems
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course covers sensor and instrumentation systems including the fundamental instrument principles, measurement techniques, data analysis, data processing, data

conversion, and working principle of sensors, and measurement theory.

CO1: Determine general treatment of instrument and sensors with their characteristic.
CO2: Analyse transducer elements, intermediate elements and data acquisition systems (DAQ)
CO3: Determine principles of the work and derive mathematical model of sensors for measuring physical characteristic (e.g. speed, pressure, temperature) by means of modern tool.
CO4: Develop team-oriented project for interfacing data acquisition system with sensor and instrument application.

BHM3102
Vibrations
Credit Hours Hours: 2
Prerequisite: BHM2103

Synopsis
This course introduces the fundamental of vibration, free vibration, harmonically excited vibration and vibration control.

CO1: Analyze the free vibration using equation of motion
CO2: Analyze the harmonically control excited vibration using equation of motion
CO3: Propose the solution for engineering problem based on literature review
CO4: Apply the modern tools for solving vibration problem

BHM4103
Control System Engineering
Credit Hours Hours: 3
Prerequisite: BHM3513

Synopsis
This subject will cover the analysis of the stability and performance of the control system by using the time domain and frequency domain approaches. PID controller will be used to improve the transient and steady state performances in the time domain approach. In the frequency domain approach, the bode plot method will be utilized. The lead, lag and led-lag compensators are introduced in improving the performance of the control system using the frequency approach.

CO1: Derive the mathematical model system in frequency domain and time domain.
CO2: Analyze the transient response, system stability and state response for first and second order systems.
CO3: Design the PD, PI, PID, Lag, Lead and Lag-Lead compensators using root locus technique and frequency response technique.
CO4: Discuss the systems performance between compensated and uncompensated based on transient and steady-state response.

BHM4911
Environment Safety and Health
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course covers the topics on industrial safety and health regulations, accident causation phenomenon, accident investigation, accident analysis, industrial hazard, industrial hygiene and managing environmental safety and health.

CO1: Explain the importance of environmental safety and

health and OSHA regulations in workplace

CO2: Analyse the practices in work places of employment contributing to serious possible damage to life, health and property.

CO3: Develop a solution to ESH problem in a given case study.

BHM2323
Electronics Engineering 2
Credit Hours Hours: 3
Prerequisite: BHM1313

Synopsis
In this course students will learn about discrete electronic circuits; that is, circuits containing discrete resistors, capacitors, diodes and transistors. The analysis of these fundamental circuits provides a key understanding of circuit operation and characteristics. Throughout this course, students will also develop, analyze, and design more complex analog electronic circuits by combining and expanding the basic circuits considered, to form more complex circuits. Lastly, students will learn how to analyze and design discrete circuits, these circuits are usually fabricated as integrated circuits called operational amplifiers.

CO1: Explain the Principle Operation of Active Device Characteristics (e.g Diode, Bipolar Junction Transistor (BJT), Field Effect Transistor (FET), and Metal Oxide Semiconductor Field Effect Transistor(MOSFET))

CO2: Explain and Analyse Various Type of Transistor Circuits (e.g., biasing circuits and small signal model circuits)

CO3: Explain and Analyse Different Type Operational-Amplifier Circuits

CO4: Design and Analyze Operational Amplifier Applications

BHM2333
Electronics Engineering 3
Credit Hours Hours: 3
Prerequisite: BHM1313, BHM2323

Synopsis
This course is designed to introduce the basic principle of digital systems and logic implementation with analysis. Lecture and practical will cover the following: Logic Implementation, data path unit elements, bi-stable memory devices and finite state machines.

CO1: Applying logic implementation in digital system.

CO2: Analyzing processing unit, storage and bussing circuits of a digital system.

CO3: Analyzing control unit of a digital system.

CO4: Construct digital schematics using computer aided design tools.

BHM2013
Programming for Engineers
Credit Hours Hours: 3
Prerequisite: BHM2003

Synopsis
This course introduces the parallel/serial interfacing techniques between PC and external circuit built with the components such as LEDs, motors (DC/stepper), thermometer etc. using C/C++ programming language. In addition, the intermediate level of programming techniques such as pointers, dynamic memory allocation, data structures, and graphical user interface are also introduced to fit the purpose. By the end of semester, the students apply the interfacing

techniques in a mechatronics-based project.

CO1: Apply concepts of pointers, data structures and logical bitwise.
CO2: Develop graphical user interface.
CO3: Construct an integration software with electrical devices/components and mechanical system.
CO4: Orally present and collaborate effectively in a group on a mechatronics-based project.

BHM3012
Numerical Programming
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces simulation software MATLAB (Simple operations, matrices and vectors, functions, plot, programming and symbolic calculation) and Simulink (functional principle of Simulink, designing a block diagram, solving differential equation, starting simulink systems from matlab and importing plots to word and power points).

CO1: Solve mathematical equations / operations in MATLAB
CO2: Construct functional programs in Scripts/m.file
CO3: Design blocks diagrams using the Simulink toolboxes
CO4: Develop simulation solution/project for dynamic Mechatronics systems in Simulink / MATLAB

BHM3702
Cleanroom Technology
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces the need of cleanrooms in different fields of application as micro-electronics, micro-optics, micro-mechanics in the semiconductor, pharmaceutical and food industry.

CO1: Design a cleanroom layout for a micro-mechatronic manufacturing process
CO2: Operate, test and monitor cleanroom condition to achieve standard required
CO3: Evaluate and eliminate the causes/sources of contamination in the cleanroom

BHM3712
Hybrid Integration
Credit Hours Hours: 2
Prerequisite: None

Synopsis
Basics of Micro-Mechatronics (MEMS and MOEMS) and different technologies for monolithic, hybrid and PCB-Systems fabrication, characteristics and application-oriented selection of ceramic materials for substrates (Al2O3). Different pastes used for the screen printing process. Different surface mounting technologies using unhoused semiconductors.

CO1: Build fundamental knowledge on technologies in Micro-Mechatronics
CO2: Develop a layout for a hybrid-integrated system by minimizing the dimensions (packaging density)
CO3: Employ the screen printing process with the best selection of the thixotropic pastes
CO4: Perform a correct thermal activating process

CO5: Demonstrate the surface mount technologies for bare dies (die-, wire- and fllip-chip-bonding)

BHM4942
Preparation of Bachelor Thesis
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces students to organize their bachelor thesis in terms of contents and time. It is based on the procedure and tool of scientific works. The task of the bachelor thesis becomes appropriate to the designed and related information of editing the Bachelor thesis are developed and structured.

CO1: Planning of the contents and structure of bachelor thesis.
CO2: Organize and complete the bachelor thesis in structured manner within allocated time.

BHM3722
SMD Technology
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This lecture gives an introduction into the PCB technology and the connections and interconnections of the board. The development and the production of single- and multi-layer PCBs are presented in detail. The mounting technologies are presented for the THD (Trough Hole Mounting Device) and for the SMD (Surface Mounting Device). Special designs such as multi-chip-modules and flip-chips are described as well as the assembly processes and the testing methods and tools. Soldering technologies, such as wave-soldering and reflow-soldering, are explained.

CO1: Explain the sustainable manufacturing of printed circuit boards and SMT devices
CO2: Distinguish the different printed circuit boards ,the respective mounting technologies and general SMD related problems in manufacturing
CO3: Role-play the functions of SMD Manufacturing production house with customer driven objectives aligned with companies mission and vision

BHM3922
Internship Preparation
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course provides the students the skills to prepare their mentality and documentations to apply a placement for their internship semester. The topics that will be covered are such as defining self-target and motivation in engineering profession, task understanding and delegation, priority and time management.

CO1: Complete excellent documentations to apply an internship placement.
CO2: Complete excellent documentations to apply an internship placement.
CO3: Complete excellent documentations to apply an internship placement.
CO4: Define the professional target for internship as well as after graduation.
CO5: Define the professional target for internship as well as after graduation.

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BHM3912
Internship
Credit Hours Hours: 12
Prerequisite: BHM3922

Synopsis
Students are required to undergo a minimum 6-months practical training in an industry or research area under industrial supervision. During this period, students will apply the knowledge and skills that they have learned. The hands-on experience will expose them to the real engineering practice and prepare them to work in the manufacturing or related field in various industries upon graduation. The students work in current projects of the firm in the design, development, production or distribution process. The projects deal with mechatronics or related fields and allow the practical application of university knowledge.

CO1: Demonstrate technical skills and knowledge to be applied in the industry
CO2: Suggest solutions to problems for related industry
CO3: Obey the rules and etiquettes in industry
CO4: Communicate effectively on industry experience
CO5: Function effectively as a member to supports the efforts of others
CO6: Search information in the broadest context of industrial experience

BHM3932
Internship Follow-Up
Credit Hours Hours: 2
Prerequisite: BHM3912

Synopsis
This course exposes the students to new tendencies in the mechatronics engineering/technologies from the talks by several representatives from the industries. The students will select a speaker after their speech to gather more information about the topics as well as get personal connection for future carrier benefits. In the end the students have to prepare a report and present about the topic.

CO1: Complete a report about new technologies / tendencies in the mechatronics engineering.
CO2: Complete a report about new technologies / tendencies in the mechatronics engineering.
CO3: Complete a report about new technologies / tendencies in the mechatronics engineering.
CO4: Present about new technologies/tendencies in the mechatronics engineering.
CO5: Present about new technologies/tendencies in the mechatronics engineering.

BHM4921
Engineers and Society
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course introduces the engineering profession in local industries sector, issues in local industries, ethics and public responsibility and sustainability practices in global economy

CO1: Explain the importance of engineering practices and its professionalism with stakeholders of businesses
CO2: Analyse the sustainability practices in engineering profession and impact to global society
CO3: Develop a solution with stakeholders engagement

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BHM3602
Quality Inspection
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course is the application of statistical, mathematical and management methods for improving the quality and reliability of industrial products, processes and systems. Thus, the concept of basic quality tools, fundamental of statistics, controal chart for variables and attributes, fundamental of probability and acceptance sampling systems are the key success of this course.

CO1: Determine the measures of frequency distributions, central tendency, dispersion and normal curve when the data are systematically gathered.
CO2: Analyze the variations that occur in the central tendency and mean of a set of observations.
CO3: Analyze the quantitative data to improve process, develop a new product and establish a statistical control.

BHM3313
Microcomputer Technology
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course introduces the microcomputer technology in which the students will learn about the periphery and structure of a microcontroller, assembler for the 8051 controller family, solving problems with assemblers, development of microcomputer hardware and overview on processor architecture.

CO1: Analyze the periphery and structure of microcontroller
CO2: Analyze the assembler for the 8051 controller family

BHM3323
Software Engineering
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course covers C++ for C programmer, object-oriented analysis and design, Unified Modelling Language and multi-layers software design. Students will design and develop software for a specific mechatronics system.

CO1: Convert C program into C++ program and develop an object-oriented C/C++ program.
CO2: Design software using the UML and multi-layer architecture.
CO3: Develop software for the specific mechatronics system.
CO4: Communicate effectively on the specific mechatronics system.

BHM3941
Engineering Communication
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course develops the students to write and present technical reports. They will learn about clear sentence, unified-paragraph and report writing. In addition, the students also prepare and practice oral presentations. This course requires the students to submit substantial technical report and perform effective presentation.

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CO1: Produce technical report with proper language and format.
CO2: Present technical information effectively.

BHM3512
Manufacturing Quality
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course familiarizes students with quality management method, quality control tools and techniques. Students expose to quality improvement process and quality management system in industry. The human factor in quality management and the requirements of ISO 9000 are also covered. Students are required to develop an effective quality management system in group as well performing individual engineering roles.

CO1: Construct the quality management method in manufacturing industry processes
CO2: Solve the quality problems by using statistical analysis tools and techniques for quality improvement.
CO3: Create the effective quality management system in a company

BHM4704
Industrial Automation
Credit Hours Hours: 4
Prerequisite: None

Synopsis
This course is continuation of course BHM3732 PLC System. In this course the students have to develop, document, and present industrial automation software for a manufacturing system using PLC

CO1: Understand specific applications and functions related to automation
CO2: Program and use the automation device of machine control systems with a PLC
CO3: Develop a solution for an industrial automation problem with PLCs

BHM4102
Finite Element Analysis
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces finite element methods for structural, thermal flow, electrostatic and electromagnetic problem analysis of micro electro-mechanical systems (MEMS).

CO1: Analyze Structural Problem using finite element methods.
CO2: Analyze Thermal Flow using finite element methods
CO3: Analyze Electrostatic and electromagnetic problem using finite element methods.
CO4: Analyze Complex Mechatronics problem using finite element methods.

BHM4904
Team Oriented Project Study
Credit Hours: 4 Credit Hourss
Prerequisite: None

Synopsis
This course trains student to conduct a group work engineering project to develop a product. After the students have analysed the main problem, they independently design and determine the specifications and requirements of the product. The documents are presented in form of a role play in which the

participants act as another character, e.g. manager or customer, to discuss and improve the relevant documents. These mid-term presentations emulate industrial project team meetings with a fixed agenda, protocol, leadership, voting procedures, kick-off etc. They are followed by the evaluation phase which includes a value analysis and cost and risk assessment. After the final kick-off meeting of the team session phase, the design and manufacturing process starts. This phase is critically accompanied by more reviews and laboratory presentations. At the end of the semester, the finished product is being publically presented.

CO1: Apply the product development process in the form of a team-oriented project work
CO2: Analyze and specify products
CO3: Provide technical documents of an engineering project
CO4: Apply technical communication and review skills.

BHM4931
Final Examination
Credit Hours Hours: 1
Prerequisite: None

Synopsis
This course is a project-based course which requires students to demonstrate technical skills and personal attributes at levels which correspond with professional engineering practice. It is preferrable for the project to be conducted in related industry. Nonetheless, students can also conduct the project in the university, should there is no available industry project. Each student will be supervised by 1 UMP lecturer, 1 HsKA lecturer and 1 engineering in industry (only applicable for industry project). This course evaluates the student's competency through oral presentation (viva) session.

CO1: Demonstrate understanding on fundamental and theoretical knowledge
CO2: Show understanding of the problem at hand and how the proposed solution can solve the problem
CO3: Explain the acquired knowledge
CO4: Present the executions of the project design
CO5: Use appropriate analysis approach to interpret the gathered data into sensible findings
CO6: Provide critical discussions from the analysis and conclude the findings
CO7: Deliver effective presentation on the project work
CO8: Prepare effective slides of the project work

BHM3612
Optoelectronics
Credit Hours Hours: 2
Prerequisite: None

Synopsis
This course introduces basic principles of various optics and optical components, optical fibers, optical emitters and detectors, radiometric and photometric quantities, optoelectronic systems for measuring distance geometry and surface finish.

CO1: Demonstrate the fundamental principles of optoelectronics and properties of wave nature of light
CO2: Differentiate the radiometry and photometry characteristics.
CO3: Differentiate the dielectric wave guides, its modes and the optical fiber parameters.

CO4: Distinguish the types and the principles of semiconductors used in optical devices including light emitting diode, laser and photodetector as well as other optoelectronic applications.
CO5: Enhanced communication skills in project.

BHM3623
Product Development and Design
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course covers the knowledge on product development and design to perform product development activities, process measurement and planning in order to manufacture product which meets the customer requirements at a competitive price. This covers development processes and organizations, product planning, opportunity identification, identifying customer needs and product specifications; concept generation, concept selection, concept testing and product architecture; industrial design, design for environment, design for manufacturing, prototyping and process measurement and planning.

CO1: Analyse problems in product development and design.
CO2: Develop solution related to product development and design.
CO3: Communicate effectively on issues in product development and design.

BHM4003
Information System
Credit Hours Hours: 3
Prerequisite: None

Synopsis
This course provides the basic information about information technology and the possibility of digital signal modification including Fourier Transformation. Students will undergo laboratory activities for development of an IT-supported system.

CO1: Describe transmission and processing of information in present-day communications technologies.
CO2: Determine and explain the principle of signal processing of HDTV material in IPTV.
CO3: Apply the fundamental and principle of signal processing in practical activities.

BHM4914
Bachelor Thesis
Credit Hours Hours: 4
Prerequisite: BHM4942

Synopsis
This course focuses on the real professional approach to engineering studies. Students will utilise their engineering knowledge and technical skills from the previous studies to solve an engineering problem.

CO1: Demonstrate understanding on fundamental and theoretical knowledge related to the project
CO2: Show clear understanding of the problem at hand and how the proposed solution can solve the problem
CO3: Apply with good explanation of the acquired knowledge.
CO4: Present the executions of the project design with valid result.
CO5: Use appropriate analysis approach to interpret the

gathered data into sensible findings.

CO6: Provide critical discussions from the analysis and clearly conclude the findings.

CO7: Suggest recommendations for implementation, further research and commercialization.

CO8: Communicate effectively on the project work through report and presentation.

BACHELOR OF ENGINEERING TECHNOLOGY (MANUFACTURING) WITH HONOURS

BTM1114
Basic Manufacturing Process
Credit Hours Hours: 4
Prerequisites: None

Synopsis
This course intended to introduce to materials, techniques, and equipment of industrial manufacturing. Emphasis on laboratory demonstration and simulation activities such as machining, welding, casting, and forming operations.

CO1: Explain the structure and properties of basic engineering materials and their relationship to manufacturing.

CO2: Describe the fundamental equipment and processes employed in common manufacturing operations.

CO3: Identify process parameters and how they affect the manufacturing processes.

BTM1614
Computer Aided Drafting
Credit Hours: 4
Prerequisites:None

Synopsis

This subject is designed to introduce to the students the principle of computer-aided design. Topics includes Drafting Overview, Drawing Set-up , Basic CAD ,Commands Geometric Construction , Orthographic Projection , Basic Drawing ,Tools, Pictorial Drawings, Sectional Views, Advance CAD Commands,Modifying CAD,Drawings, Dimensioning, Tolerances, Working Drawings, Threads and Fasteners

CO1: Analyze problem in technical drawing and understand drawing

CO2: Use basic geometric construction techniques to create objects in CAD

CO3: Project a 3 dimensional object in 2 dimensional space with the proper utilization of views in CAD

CO4: Read & create dimensioned drawings using conventional techniques in CAD.

CO5: Identify and understand the components of working drawings & the standards that apply.

BTM1124 Machine Production Processes
Credit Hours Hourss:4
Prerequisites: None

Synopsis
This course intends to provide detailed study of traditional and contemporary methods of metal machining. Laboratory experience includes the fundamentals of machine tool setup and operation, precision measurement techniques, and machine tool safety, care and maintenance.

CO1: Develop basic machine tool processing knowledge, abilities and skills.

CO2: Expand machine tool processing knowledge, abilities and skills through

experience with traditional process.

CO3: Complete assigned projects as directed within safety, planningand specifications consistent with items above.

CO4: Demonstrate understanding of function and application of processes through examination and discussion and operation.

CO5: Provide study and understanding of nontraditional processes in manufacturing.

BTE1112
Electrical Fundamentals Laboratory
Credit Hours: 2
Prerequisites: None

Synopsis
This course introduces students to the fundamentals laboratory of DC and AC circuits and basic network laws and theorems. The students will be handling the basic measurement equipment to measure and analyse the parameter of the electrical circuits.

CO1: Construct simple electrical and electronics and simulate the operation of the circuits using circuit simulation software (OrCAD).

CO2: Measure parameter of electrical circuits (resistance, voltage, current, etc)

CO3: Work ethically and effectively as an individual and in a group

BTE1113
Electrical Fundamentals
Credit Hours:3
Prerequisites: None

Synopsis
This module will introduce students to basic science of electricity, introduction to instrumentation and measurement, work and energy theorem, basic electrical circuits and introduction to magnetism.

CO1: Describe the basic concept of electricity, conductors, insulators, circuit, magnetism and other devices.

CO2: Apply basic electrical laws such as Ohm and Kirchhoff Law to solve circuit or electrical problems.

CO3: Shows the ability to communicate effectively.

BTM1313
Statics
Credit Hours:3
Prerequisites: BUM1113

Synopsis
This course introduces force vector algebra, equilibrium of forces on particle, equilibrium of forces on single rigid body and force analysis on simple frames and machine structures (multi-rigid bodies) and problems involving dry friction.

CO1: Perform force vector algebra – resultant of forces, cross product, dot product and mixed triple product of forces.

CO2: Solve equilibrium of forces on particle problems

CO3: Solve equilibrium of forces on single rigid body problems

CO4: Solve equilibrium of forces on simple frame and machine structure problems.

CO5: Solve problems involving dry friction.

BTM2223
Engineering Dynamics
Credit Hours:3

Prerequisites: BTM1313 Statics, BUM1113, BUM1223

Synopsis
This course intended to introduce the basic principles including friction and motion of a point in both one and two dimensions, as well as rigid body motion.

CO1: Ability to understand and apply properties of friction.
CO2: Ability to determine velocity and acceleration of a given particle in one and two dimensions.
CO3: Ability to determine rectilinear and curvilinear motion.
CO4: Ability to determine angular and linear velocity and acceleration.
CO5: Ability to apply acceleration and velocity concepts to rigid body motion.

BTM3234
Manufacturing Computer Application
Credit Hours:4
Prerequisites: None

Synopsis
Overview of computer hardware, software, and processing concepts related to the control of manufacturing tasks. Emphasis on use of integrated software packages in the solution of a variety of manufacturing problems. Laboratory assignments in automation control, real time data sampling, and creation of user interfaces.

CO1:Apply software development for technology problem solving.
CO2: Perform adaptive programming skills for more diverse application environment.

BTM3912 Engineering Ethics
Credit Hours:2
Prerequisites: None

Synopsis
This subject gives an overview of engineering, the profession and its requirement in Malaysia scenario. Topics that will be included ethics, management and contribution of engineering also generic skills and study skills. Moreover, this subject can enhance students knowledge about obligation of engineers/technologists to the clients, professionals and society, ethical codes, safety codes.
CO1: Explain Engineering ethics, management and contribution.
CO2: Analyze and comprehend the indispensable ethics, professionalism, responsibility, skills of teamwork and leadership
CO3: Justify systematic approach to the ethical issue in the industry and engineering field

BTV3433 Engineering Economy
Credit Hours:3
Prerequisites: None

Synopsis
This course introduces concept of life cycle cost, interest and equivalent. Formula and factors for single and multiple cash flow. Method for investment assessment and alternative comparison and project evaluation using cost worth ratio, inflation and cash flow method.
CO 1: Analyze the engineering cost concept.
CO 2: Analyze the return to capital
CO 3: Analyze the money-time relationship
CO 4: Analyze the depreciation of the asset
CO 5: Analyze the cost estimation and project evaluation

BTM2243 Fluid Power Technology
Credit Hours:3
Prerequisites: Thermofulid

Synopsis

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This subject is designed to introduce to the students the principle of fluid mechanic. Topics includes stress and strain rate descriptions, fluid statics, use of differential and finite control volume analysis with continuity, momentum, and energy equations, Bernoulli and Euler equations, vorticity, potential flow, incompressible viscous flow using Navier-Stokes equations, dimensional analysis, pipe flow, boundary layers, separation, introduction to turbulence.

CO1: Understand of fluid mechanics fundamentals, including concepts of mass and momentum conservation.
CO2: Apply the Bernoulli equation to solve problems in fluid mechanics.
CO3: Apply control volume analysis to problems in fluid mechanics.
CO4: Use potential flow theory to solve problems in fluid mechanics.
CO5: Perform dimensional analysis for problems in fluid mechanics

BTM1413 Properties of Materials
Prerequisites: None

Synopsis
This course intends to provide comprehensive introduction to the different classes of industrial materials, their structure, properties and industrial uses. The purpose of this course is to introduce the student to a wide range of engineering materials, which are important to industry. Such knowledge will be useful to make an intelligent selection of materials for a variety of commercial applications based on an understanding of properties, test methods and processes.

CO1: Knowledge of fundamental structure of materials.
CO2: Understanding of material properties.
CO3: Knowledge of material processing by casting and forging.
CO4: Solve the stress and strain in structural members subjected combined loads.

BTM2424 Strength of Materials
Credit Hours:4
Prerequisites: BTM1313 Statics, BUM1223

Synopsis
This course intends to provide mechanics of deformable bodies with emphasis on principles of stress and strain, shear and bending moment, torsion, buckling, failure criteria and design concepts.

CO 1 Determine axial and bending stress and strain as well as torsional stress and strain and Hookes law.
CO 2 Determine material properties and principal stresses both theoretically and experimentally
CO 3 Utilize mathematics and physics properties in solving complex stress / strain problems
CO 4 Utilize stress and strain information in designing tasks.

BTM2233 Thermofluids
Credit Hours:3
Prerequisites: None

Synopsis
This course is designed to give the student the ability to analyze many practical problems in which fluid is the working medium. Basics of Thermodynamics and heat transfer in its three different modes; conduction, convection and radiation, are also introduced. This is to enable the student to analyze simple thermal systems and cycles.

CO1: Apply fluid and thermal fundamental concepts and equations to analyse problems.
CO2: Construct experiment to understand the fundamental concept.
CO3: Demonstrate life-long learning skills during discussion or completing assignment.

BTM2133 Metrology
Credit Hours:3
Prerequisites: Basic Manufacturing Process

Synopsis

This course covers precision dimensional measurement techniques including laboratory
experience with optical, electronic, and mechanical comparators, light wave measuring
devices, use of precision gage blocks, and surface finish analysis.

CO1: Develop an understanding of measurement theory and systems
CO2: Use geometric or dimensional features of products or parts to be measured or inspected
CO3: Plan and perform measurements of products or parts and calibration of instruments at specified levels of accuracy
CO 4: Identify measurement acts and techniques.

BTV3413 Industrial Quality Control
Credit Hours:3
Prerequisites: None

Synopsis
Techniques of establishing and maintaining quality of product including statistical quality control applications.

CO 1 Analyze the productivity in an organization by using productivity concept and fundamentals.
CO 2 Select layout design based on layout design procedure location and basic layout design by taking into account the impact of sustainable environment
CO 3 Analyze production planning, control and inventory management activities based on given cases.
CO 4 Evaluate solutions for a given cases based on total quality management systems, quality control concept ISO 17001.

BTM4743
Advanced Manufacturing Process
Credit Hours:3
Prerequisites: BTM1114

Synopsis
This course is designed to provide students with an introduction to industrial manufacturing systems by having them engage in selected activities essential for modern manufacturing. Manufacturing systems, tools, and processes are studied as they are applied to producing products. Laboratory experiences cover manufacturing systems emphasizing tooling design, automated manufacturing, and control systems. Includes laboratory activities

CO 1 Discuss the importance and characteristics of manufacturing technology
CO 2 Conduct scholarly research that thoroughly presents and critically analyzes a manufacturing system or topic
CO 3 Apply sound principles of manufacturing engineering to solve problems related to manufacturing
CO 4 Develop programming to control a variety of

automated manufacturing equipment

CO 5 Fabricate products using advanced manufacturing and design equipment

BTM3134
Manufacturing Component Design
Credit Hours:3
Prerequisites: BTM2623

Synopsis
Design of motion components for the manufacturing industry. Includes CAD techniques to study solid modeling and manufacturing components such as gears, cams, and linkages, and their application.

CO 1 Design parts using solid modeling and identify downstream applications.
CO 2 Apply parametric solid modeling techniques in component design
CO 3 Perform design skills in the usage of Solid Works software
CO 4 Able to determine position, acceleration and velocity for a 4-bar mechanism
CO 4 Able to analyze a compound and epicycylic gear trains and design and analyze cams

BTM3353 Programmable Logic Controllers
Credit Hours:3
Prerequisites: None

Synopsis
This subject is designed to introduce to the students the principle of programmable logic controllers. This subject emphasize basic concepts and skills needed to program and apply programmable electronic controllers in industry. Man Machine Interface (MMI) and Supervisory Data Acquisition (SCADA) systems will be examined. Experiments in operation, programming, and industrial applications.

CO 1 Identify and define functions of hardware component of programmable logic controllers.
CO 2 Distinguish between different types and architectures of PLC's and their applications.
CO 3 Demonstrate proficiency in ladder logic by applying programming skills to implement industrial applications.
CO 4 Identify problems in industrial applications requiring PLC's by troubleshooting hardware and software.

BTM3334 CNC Machining
Credit Hours: 4
Prerequisites: BTM1124; BTM2623

Synopsis

This subject is designed to introduce to the students numerical control systems. Topics includesPrinciple of CNC part programming, tooling and work-holding devices,machine tool position and motion control systems,automatic tool changers and machining centres,kinematics and mechanics of milling operations,part programming using CAD/CAM systems.

CO 1 Write fundamental manual G-code programs, for various machining applications, including spindle speeds, and feed rates.
CO 2 Program absolute and incremental tool positions for machining canned cycle operations, linear and circular interpolation, looping and subroutine.

CO 3	Use a PC to prepare, edit and print a machine readable part program and use a CNC machine to verify and machine a basic part.
CO 4	Use 2D CAM software to create job operation files, 2D shape profiles, generate machine code, verify tool path using computer simulation, and machine basic parts on a CNC machine using computer generated code.

BTM3813 Engineering Technology Senior Design Project I
Credit Hours:3
Prerequisites: None

Synopsis
This course is designed to expose the students to a senior design project. They have to apply all the knowledge that they have learned in the programme to complete the senior design project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the senior design project I, the students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, expected result, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

CO 1	Propose background study, problem statement, objective and scopes of the research
CO 2	Practice positive attitude in research activities
CO 3	Present the research proposal and cited latest publications on the subject

BTM3514 Computer Integrated Manufacturing
Credit Hours:4
Prerequisites: None

Synopsis
Three basic themes will be stressed throughout the course. First, developing manufacturing strategy involves considering factors beyond the traditional boundaries of the manufacturing function. Such factors include the overall competitive position of the firm, the nature of market demand, competitor's actions, government regulations, and so on. Second, there is a strong linkage between a firm's competitive strategy and its manufacturing strategy. If this linkage is maintained, operations can become a formidable competitive weapon. If this linkage is neglected, even the best-designed strategies can fail. Finally, the course will consider manufacturing strategy issues in an integrative manner by developing the interrelationship between operations, finance, accounting, and marketing.

CO 1	List components of a computerized integrated manufacturing environment.
CO 2	Explain various automation techniques currently used in industry.
CO 3	Develop a systematic plan for manufacturing strategy implementation
CO 4	Develop a systematic plan for manufacturing strategy implementation required for a selected product.
CO 5	Model enterprise manufacturing and automation strategies that respond to national and global manufacturing demands.

BTM3134 Metal Fabrication Process
Credit Hours: 4
Prerequisites: BTM1614; BTM1114

Synopsis
This course introduces student about metal fabrication process from the materials, techniques and equipment of joining and welding process. Emphasis on laboratory demonstration and simulation activities focuses on different types of welding such as SMAW, GMAW, GTAW and others. It also includes quality management system in welding and defect detection.

CO 1 Discuss the various metal fabrication processes used in industry.
CO 2 Distinguish between types of metals and suitable joining processes and procedures for the various metals.
CO 3 Demonstrate common welding and other joining and cutting processes used in metal fabrication.
CO 4 Classify techniques utilized for testing the integrity of fabrications.

BTM3533 Production Planning
Credit Hours: 3
Prerequisites: None

Synopsis
Analysis, design, and management of production systems. Topics include productivity measurement, forecasting techniques, project planning, inventory systems, aggregate planning, master scheduling, operations scheduling, and operational research.

CO 1 Explain the principle of production control and planning.
CO 2 Describe the elements in production planning
CO 3 Design the scheduling in production
CO 4 Apply the techniques of Operational Research in Production

BTM3713 Lean Manufacturing System
Credit Hours: 3
Prerequisites: None

Synopsis
Introduction to modern issues in lean manufacturing systems and practice of lean tools. Topics include overview of lean manufacturing systems, quick changeover, total productive maintenance, pull/just-in-time/kanban, cellular manufacturing, kaizen, wastes identification, productivity measurement, plant layout, and line balance. At the end of the semester the students should be having a basic understanding of the design, operation and control of lean manufacturing systems and be able to use quantitative methods to model, analyze, and optimize such systems.

CO 1 Identify the seven types of waste in a manufacturing company.
CO 2 Evaluate lean production tools and techniques in Lean manufacturing system in a production line
CO 3 Perform the evaluation techniques to measure productivity in lean manufacturing activities.

BTM4826
Engineering Technology Senior Design Project II
Credit Hours: 6
Prerequisites: BTM3813

Synopsis
This subject is the continuation of the subject Engineering Technology Senior Design Project I. In this course, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of the semester, the students are required to produce a design project report and present it to faculty's evaluation panel.

The informations provided by Faculty of Manufacturing & Mechatronics Engineering Technology are based on University's Regulation and endorsement until 15 March 2019

CO 1 Analyze data, discuss and conclude the findings
CO 2 Manage the research work
CO 3 Practice positive attitude in research activities
CO 4 Present the research report cited latest publications on the subject

BTM4919 Industrial Training
Credit Hours: 9
Prerequisites: All Subject

Synopsis
In Industrial Training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

CO 1 Show and classify in-depth the industrial structure and organization and to understand roles of typical personnel in that particular industry.
CO 2 Manipulate the knowledge learned in the university and to practice them in problem solving direct or indirect application to any design, planning, production or management
CO 3 Practice the professionalism and work etiquette that comply to good and responsible engineer.
CO 4 Demonstrate management/ leadership skills to lead or manage effectively in a industry environment.
CO 5 Demonstrate the knowledge and ability to search and retrieve information and materials related to the industrial needs.

ELECTIVE COURSES

BTM4783 Safety and Ergonomics (Elective 1)
Credit Hours: 3
Prerequisites: None

Synopsis
This course provides a foundation for understanding the key concepts and principles related to ergonomics. The aim of ergonomics in industry is to increase productivity, and decrease accidents and illnesses by obtaining a good fit between the employer and the job. This course also examines the relationships between employer, work equipment and work environment. Case studies are also used to test student current knowledge and understanding of the way complex systems are designed and used.

CO 1 Evaluate occurrence of failing to consider ergonomics design procedure.
CO 2 Conduct risk measurement associated with ergonomics.
CO 3 Adapt best ergonomics practices to solve ergonomics problem arises from work practices and environment.

BTM4723 Advanced Manufacturing Process (Elective 2)
Credit Hours: 3
Prerequisites: BTM1114

Synopsis

This course intends to provide the in depth knowledge of the types of advanced manufacturing and machining processes (AMPs); evolution, and need. In this course students will study the fundamentals and advanced techniques related to manufacturing processes. In addition to the applied aspects of

manufacturing processes, a sound analytical basis for some of the processes will be taught. Through the use of analytical approaches in conjunction with laboratory practical's students will learn how to control a manufacturing process for optimal production. This course will build a foundation of capability for the solution, analysis and synthesis of a wide variety of manufacturing problems

CO 1 Explain the details of types of advanced manufacturing and machining processes, their evolution and need.
CO 2 Identify the correct advanced manufacturing processes by formulating and determining the correct AMPs for development of various complex shaped geometries.
CO 3 Hands on experiments on the Advanced Machines such as EDM, WEDM etc.
CO 4 Design and development of experimental apparatus of any one advanced or derived and hybrid manufacturing process (Team Project). Perform good workplace ethics in completing assigned projects as directed

BTM4773 Work Measurement (Elective 3)
Credit Hours: 3
Prerequisites: BTM3713

Synopsis
Expose to the students the techniques for improving and standardizing methods, procedures for measuring work and developing time standards in production and service activities, the importance of motion and time study in the lean manufacturing environment. The techniques to analyse operations and tasks of the current process using the established motion and time study and to create motion and time study data also will be introduced.

CO 1 Explain the importance of motion and time study in the lean manufacturing environment
CO 2 Analyse operations and tasks of the current process using the established motion and time study techniques.
CO 3 Create motion and time study data using the established techniques.
CO 4 Develop improved processes and explain the benefits of the improved process using the motion and time study data.

CURRICULUM STRUCTURE FOR DEGREE PROGRAMME 2020/2021

BVM1013 Product Drafting and Specification
Credit Hour: 3
Prerequisite: None

Synopsis
The course introduces the principle of drafting specification. Important topics like geometrics, sectional views and multi-view drawing will be covered. Lettering, interpreting tolerance and dimensioning, as well as drafting assembly drawings will also be covered. Students will also learn how to interpret drawings.

By the end of semester, students should be able to:

CO1: Examine, analyse, interpret and assess the technical drawing.
CO2: Deliver information via the set of drawings from engineering parts.
CO3: Draft the product to be machined according to the standard of engineering drawing

BVM1023 Standard Product Precision

Credit Hour: 3
Prerequisite: None

Synopsis
This course covers three key areas; dimensional metrology, measurement analysis, and surface/texture measurement. In the dimensional metrology, students will be exposed to three types of measurements; linear, angle and geometrical. In the measurements analysis, it will require students to describe the standard Measurement, measurement process, process capability, measurement errors, limits, tolerances and fits. In surface/texture measurement, students will perform the measurement of surface texture. This course equivalent to Geometric, Dimensioning and Tolerance in other engineering fields.

By the end of semester, students should be able to:

CO1: Explain the basic quality principles and practices, quality solving techniques and product reliability related to manufacturing process
CO2: Perform suitable measurement methods for a given issue
CO3: Solve the manufacturing process quality problem using quality solving techniques in a groupwork

BVM1033 Workpiece and Cutting Tool Properties
Credit Hour: 3
Prerequisite: None

Synopsis
This course covers types, setup, applications and specifications of common cutting tools and workpiece materials that frequently applied in industry.

By the end of semester, students should be able to:

CO1: Describe the common cutting tools and workpiece material tha tbeing applied in the automotive, aerospace and medical.
CO2: Manufacture cutting tool and/or workpiece material from powder metaalurgy and casting process.
CO3: Relate the usage of cutting tools and workpiece materials in the specifIc application in industry.

BVM1043 Jig and Fixture
Credit Hour: 3
Prerequisite: None

Synopsis
This course introduces students to jig and fixture. It starts with types and functions of jig and fixture. In addition, students will be exposed to knowledge about classification of jig and fixture for selected operation. This course also will introduce the student about the principles and analysis of a tool design in jig and fixture application. In this course, the tool drawing knowledge is important to design jig and fixture.

By the end of semester, students should be able to:

CO1: Perform to fabricate componet for jig and fixture with the specific application in machining.
CO2: Explain the types of jigs and fixtures, materials used, actuation method, components of jigs and fixtures
CO3: Coordinate a task to fabricate jig and fixture assembled ny multicomponents.

BVM1054 Tool Setup and Refurbishment
Credit Hour: 3
Prerequisite: None

Synopsis

The course introduces why the selection of the appropriate cutting tools and cutting fluids are essential in metal cutting operations to reduce the heat and friction produced during material removal operations and how the selection, setup and applications affect the quality, accuracy, efficiency and productivity of the workpiece produced.

By the end of semester, students should be able to:

CO1: Identify the importance specification of cutting tool design for turning, milling and drilling operations.
CO2: Perform the cutting tool setup for turning, milling and drilling operations.
CO3: Propose the usage of refurbished cutting tools in machining and other application.

BVM1063 Sustainable Machining
Credit Hour: 3
Prerequisite: None

Synopsis
This course provides an overview on current sustainable machining. Its topics cover the concept in cutting tool management, lubrication strategy, optimization, economic, environmental dimensions. The course also covers design of experiment in machining trials.

By the end of semester, students should be able to:

CO1: Describe the concept of green manufacturing and sustainability in machining practices.
CO2: Relate the sustainable issues and acts in machining industry.
CO3: Evaluate the principles and sustainability of using minimum resources for cost and energy saving.

BVM1073 Condition Monitoring in Machining
Credit Hour: 3
Prerequisite: None

Synopsis
This course expose the student in performing condition monitoring in determining the condition of machinery while in operation. Monitoring condition in machining can be categorized into three aspects: Knowing what to listen for; How to interpret it; When to put this knowledge to use. Understanding this course enables to repair of problem components prior to failure. Condition monitoring not only helps plant personnel reduce the possibility of catastrophic failure but also allows them to order parts in advance, schedule manpower, and plan other repairs during the downtime.

By the end of semester, students should be able to:

CO1: Relate the application of design, maintenance, process and inspection in condition monitoring.
CO2: Elaborate the potential of machining experts in condition monitoring.
CO3: Develop on skills that required to be applied in condition monitoring.

BVM1083 Assessment of Machinability
Credit Hour: 3
Prerequisite: None

Synopsis
This course provides students with the measurement of machining performances, i.e. machinability. Machinability is an indicator of one engineering material on how easy or difficult to be machined to achieve acceptable performances. Technologist

are often challenged to improve machinability without harming material performance, which are focused on the machining efficiency and productivity. However, unlike most material properties, machinability cannot be simplified into a unique work material property, but considering as a resultant property of the machining system which is mainly affected by work material's physical properties, heat treatment processes, work-hardening behavior, as well as cutting tool materials, tool geometry, machining operation type, cutting conditions and cutting fluids. In addition, factors and method for improving machinability are also covered in this course.

By the end of semester, students should be able to:

CO1: Define factors that is governed or influenced on the machinability.
CO2: Measure the machinability of machining process.
CO3: Organizing various methods of improvement for machinability.

BVM2094 Precision and Finishing in CNC Technologies
Credit Hour: 4
Prerequisite: None

Synopsis
This course provides students with concepts and practices in CNC machining that are computer programming of CNC milling and turning with specific processes such as drilling, tapping, boring, grooving, facing, pocketing, radius forming, angular cutting, and threading. Emphasis is on programming and production of parts, including investigation in 2 and 3-axis programming techniques.

By the end of semester, students should be able to:

CO1: Develop programs by using a coordinate system for milling and turning by using a ISO coding system.
CO2: Recognize the capabilities of 2, 3 axis CNC machining.
CO3: Manage production by using CNC machines to produce components.

BVM2103 Precision and Finishing in EDM and Grinding Technology
Credit Hour: 3
Prerequisite: None

Synopsis
This course introduces students to EDM and grinding technologies. It starts with an introduction of EDM and grinding technologies. In addition, students will be exposed to knowledge about classification of EDM and grinding technologies for selected operation. This course also will introduce students to identify the principles and analysis of a tool design and tool manufactured in both machine applications. In this course, the tool drawing is important to students to operate and manage the machine in the laboratory. The content in this lesson plan will guide the lecturer on the presentation.

By the end of semester, students should be able to:

CO1: Recognize the capabilities of EDM and Grinding Process.
CO2: Develop programs by using a coordinate system for EDM and Grinding for machining solution.
CO3: Manage production by using EDM and Grinding machines to produce components .

BVM2114 Prismatic CAD / CAM Machining
Credit Hour: 4
Prerequisite: None

Synopsis
This course covers complete integration of design, and manufacturing simplifies the creation of manufacturing components and geometry. The topics involved feature-based and geometry-based programming, for easy adaptability to design changes. Students will practice predictable and reliable machining speeds up delivery of products to customers. Other skills that can be obtained including capture and reuse your machining practices to streamline and standard manufacturing methodologies. This course provides a complete solution, from design through NC code generation. NC program creation, process documentation, post-processing and tool-path verification and simulation.

By the end of semester, students should be able to:

CO1: Design the product by using the CAD/CAM system
CO2: Apply the method of converting CAD/CAM design to the CNC programs
CO3: Manage the different procedures in CNC programming

BVM2123 Multi Axis Machining
Credit Hour: 3
Prerequisite: None

Synopsis
This course gives in-depth knowledge to students regarding multi axis machining. As compared to basic CNC machining which comprises 3 linear axes namely X, Y and Z axis, multi-axis machining gives further capability to machine complex parts with the additional rotary axis A, B and C, as well as mill-turn and turn-mill capability. Understanding machines configuration will be key to avoid collision during machining. Students will be introduced to various machine configuration and machine kinematics to have a better understanding of machine tools to create effective and safe CNC machining programs.

By the end of semester, students should be able to:

CO1: Create machining program for complex parts that require multi axis machining
CO2: Differentiate different types of machine configuration and machine kinematics
CO3: Present sources and possibility of machine collision during machining

BVM2124 Technopreneur Capstone 1
Credit Hour: 4
Prerequisite: None

Synopsis
Entrepreneurs need money to start and to grow their business. It is important to understand how revenue is generated, how to source for funds, how to control cash flow, how to assess the success of the company in monetary terms, and how to value a company for various purposes. The course exposes students to the various financial aspects relating to new ventures. These include approaches to secure start-up capital and venture financing. Students learn about the basic accounting, essential financial indicators, the funds available, the different categories of investors, the importance of intellectual property in securing finance, the financial details to be included in a business plan required for investment purpose, valuation of company and the art of negotiation with investors.

By the end of semester, students should be able to:

CO1: Apply various financial indicators & tools to prepare for financial information for a new business venture

CO2: Acquire skills to analyze financial statements
CO3: Present financial information for new business
CO4: Display the art of negotiation with investors

BVM2134 Complex CADCAM Product
Credit Hour: 4
Prerequisite: None

Synopsis
This course is the continuity from the course of Prismatic CADCAM Product. Complex CADCAM product will be produced by using either 3, 5 or 9 axis CNC machines. The topics involved with construction views; cross section surface construction; trim plane surface; extruded surface; surface of revolution; drive curve surface construction; surface fillet construction; extending surface; composite surface construction.

By the end of semester, students should be able to:

CO1: Develop the geometric features and method to design complex CAD/CAM
CO2: Apply the method of converting to the CNC programs
CO3: Distinguish the different procedures in NC programming for complex product

BVM2143 Heat Treatment and Rework of Machined Component
Credit Hour: 3
Prerequisite: None

Synopsis
This course will discuss the concept and application of heat treatment on various types of metal. The topics involved with the main alloying element that affected the hardenability of steel. The students will be exposed to the common heat treatment practice in industry. Student will also practice the quality control evaluation after heat treatment. Several advanced heat treatment processes also will be discussed.
.
By the end of semester, students should be able to:

CO1: Conduct heat treatment or rework to alter the properties of selected steel
CO2: Propose the methods and procedures that can be utilized for rework or heat treatment process
CO3: Verify whether reworked or heat treated parts are ready for use

BVM3124 Technopreneur Capstone 1
Credit Hour: 4
Prerequisite: None

Synopsis
This course comprises two parts: in the first part, organization and human resource management are introduced; in the second part, the focus is on writing a convincing business plan to attract venture capital investment. When enterprise company takes shape and grow, more people will be hired, proper organization, team building and human resource management will become important issues. In this course, students will be exposed to the various organizational aspects relevant to new ventures and established companies. These include the pros and cons of the unique organization structures, conflicts that may arise among employees, and approaches to building powerful teams. Human resource management techniques will also be introduced and discussed. In the second part of the course, the business model canvas will be described listing the connections among the different components of a business. The value of a business plan and the techniques of writing a business plan will be introduced.

By the end of semester, students should be able to:

CO1: Apply the business model canvas incorporating human and financial elements
CO2: Acquire skills to resolve organizational conflicts
CO3: Write a convincing business plan
CO4: Evaluate vital organizational behaviours necessary to grow a new venture
CO5: Motivate all stakeholders and build a cohesive venture team

BVM3154 Assembly Method
Credit Hour: 4
Prerequisite: None

Synopsis
This course introduces students to assembly method. It starts with types and functions of joining techniques in metal and plastic part. In addition, students will be exposed to knowledge about process assembly for metal and plastic parts. This course also will introduce students to design for manufacturing and assembly application. In this course, the principle of assembly method is important to students to design step by step of assembly.

By the end of semester, students should be able to:

CO1: Develop of product by assembly component manufacture various technique
CO2: Present the posibility to assemble components by using various techniques
CO3: Organize the components that can be assembled by design for manufacturing assembly (DMFA) approach

BVM3212 Industrial Training
Credit Hour: 12
Prerequisite: None

Synopsis
Industrial training is a compulsory component for degree program students at Universiti Malaysia Pahang (UMP). The experience and skills gained from a period of placement can be invaluable and provide the advantage to the students when applying for employment after graduation. During the training period with the relevant industry, students are expected to involve in the following areas of training to achieve the underlying objectives: Manufacturing, production process and/or its optimization process, mechanical design and production, maintenance and repair of equipments, product testing and quality control.

By the end of semester, students should be able to:

CO1: Solve technology related problems using methods, tools and techniques learnt throughout the training.
CO2: Explain effectively with the technical community and produce technical reports and presentations.
CO3: Demonstrate social ethique and professionalism in technology practice.

BVM3214 Rework and Rehabilitation of Machined Components
Credit Hour: 4
Prerequisite: None

Synopsis
This course gives an exposure on rework of machined part and rehabilitating machined components which are out of tolerance because of wear and tear. Rework are required when machined parts are under machined and still have unremoved

materials due to tool wear during machining. Thus, rehabilitation of parts is required when a machined part is out of tolerance after servicing its purpose in the field. Students will gain an understanding of rework and rehabilitation and be aware of its purposes in manufacturing.

By the end of semester, students should be able to:

CO1: Identify parts that can be reworked or rehabilitated
CO2: Propose the methods and procedures that can be utilized for rework and rehabilitation process
CO3: Verify whether reworked or rehabilitated parts are ready for use

BVM3224 Surface Aesthetics of Machined Component
Credit Hour: 4
Prerequisite: None

Synopsis
This course covers various types of coating method for performance and aesthetics purposes of machined component. It covers the fundamental of coating technologies, testing and procedures of each coating method.

By the end of semester, students should be able to:

CO1: Propose the suitable surface treatment process for suitable application.
CO2: Organize process to be applied to treat the surface from machining to coating process.
CO3: Present the benefit of fine surface finish of machined component to reduce operational cost.

BVM3234 Machine Maintenance
Credit Hour: 4
Prerequisite: None

Synopsis
The student will be exposed to the maintenance technique, trouble-shooting and fault diagnosis for mechanical equipment. Among the basic maintenance methods are: condition based monitoring, vibration analysis, alignment dynamic balancing and mechanical seals. Students also will also learn about trouble-shooting and maintenance of various machines and components such as valve, pump, compressor and gear. The essential steps of disassemble, check, trouble-shoot, repair and reassemble of mechanical components will be stressed in this course.

By the end of semester, students should be able to:

CO1: Present the different techniques in machine maintenance.
CO2: Propose preventive maintenance program with consideration of cost, manpower and time.
CO3: Demonstrate problem solving of real life condition regards to machine maintenance issues.

BVM3244 Project Management and Supervision
Credit Hour: 4
Prerequisite: None

Synopsis
This course embraces a broad basic overview and principles of project management which has become central to operations in manufacturing enterprises throughout five stages of managing project; initialization,

planning, execution, control and closing.

By the end of semester, students should be able to:

CO1: Present the case study that exhibit excellent project manager.
CO2: Analyzing the main factors influencing project management outcome with consideration of profesionalism and ethics.
CO3: Develop project management skills through theoretical understanding and practical application of the project management principles.

BVM3254 Acts and Risks Assesment in Machining Production

Credit Hour: 4
Prerequisite: None

Synopsis
The course will expose to students about health and safety and work in safer and healthier ways. Students will be exposed with the related act.

By the end of semester, students should be able to:

CO1: Be able to assess, analyse and interpret risks to the health and safety
CO2: Able to plan, organise, control, monitor and review the preventive and protective.
CO3: Implementing operational risk management (ORM)

BVM4014 Final Year Project 1

Credit Hour: 4
Prerequisite: None

Synopsis
The student needs to plan and implement the project individually that related to the respective engineering technology field. The student should implement a project, do the analysis and apply the theory to solve the problems related to topic. At the end, the student should write a problem based learning report that covers problem statement, literature review, methodology to overcome the problem. The student needs to achieve the objectives of the project and presented it in the report.

By the end of semester, students should be able to:

CO1: Explain the problem, objectives and scope of project associated to the industrial or community needs.
CO2: Use relevant theory to produce solution.
CO3: Choose a proper methodology
CO4: Present the preliminary findings in the oral and written forms effectively.

BVM4026 Final Year Project 2

Credit Hour: 6
Prerequisite: None

Synopsis
This is the second part of the Bachelor Degree Project. Students are expected to continue the project performed in Bachelor Degree Project until completion. At the end of the semester, students are required to submit the Bachelor Degree Project report and present their projects for assessment.

By the end of semester, students should be able to:

CO1: Perform project implementation.
CO2: Interpret data in a meaningful form using relevant tools.
CO3: Work independently and ethically.
CO4: Present the results in the oral and written forms effectively.

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FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY

FACULTY OF MECHANICAL & AUTOMOTIVE ENGINEERING TECHNOLOGY

INTRODUCTION

The Faculty of Mechanical and Automotive Engineering Technology (FTKMA) has been established in August 2019 ensuing UMP strategic restructuring earlier that year. The faculty is formed on the earlier foundation of Faculty of Mechanical Engineering (FKM) which has been established in September 2003 while UMP was still known as KUKTEM. The faculty is located on the main campus in Pekan, Pahang. The location is in the vicinity of ever-growing industrial zone, especially automotive industry which acts as a catalyst for research collaboration and academic proliferation. A landmark IT'S Mechanical stands proudly at the entrance of the faculty. The trademark is an initiative to create a sense of belonging among staffs and students of FTKMA as a way to enrich the teaching and learning processes as well as to promote the dissemination of learning and research products, thus exposing the latest research and development activities in the faculty to the local community.

The Faculty of Mechanical & Automotive Engineering Technology has been making significant contributions as a research and learning institution, equipped with high-end facilities and driven by capable faculties. Apart from undergraduate programmes in Mechanical and Automotive Engineering, the faculty offers postgraduate degrees in a wide range of research fields including:

- Advanced Structural Integrity & Vibration
- Automotive Engineering
- Structural Materials & Degradation
- Energy Sustainability
- Human Engineering
- Manufacturing
- Advanced Fluid

The faculty has strong links with various strategic partners in the automotive, manufacturing and oil & gas industries especially in the East Coast Region of Malaysia. Our undergraduate students are trained and developed through various structured soft-skill programmes and industrial schemes thus gaining vital professional competencies and enhancing their employment prospects.

The faculty is actively engaged with research and development activities in the areas of automotive, structural integrity & vibration, manufacturing, computer simulation, product design and development human engineering, corrosion & fracture and material engineering to generate technologies relevant to the needs of the industry. The faculty aims to be the centre for industries particularly in the East Coast Region of Malaysia.

The latest updated information regarding our faculty is available at: http://ftkma.ump.edu.my/

PROGRAMMES OFFERED

Three degree programmes and one diploma programme are offered by the faculty for the 2019/2020 academic session, as follows:

- B.Eng (Hons.) Automotive Engineering (Collaboration Programme with HsKA Germany)
- B.Tech Automotive (With Hons.)
- B.Tech Welding (With Hons.)
- Diploma of Mechanical Engineering

CAREER OPPORTUNITIES

Mechanical and automotive engineering is a discipline highly sought after by almost all working fields spanning from heavy industrial to agricultural including medical and financial sectors. The technical disciplines with high analytical and innovative skillset possessed by mechanical and automotive engineering graduates let them to assume main roles in providing technologies to serve the community and ease their everyday life. Examples of such technologies are; satellites, space ships, airplanes, ships, commercial vehicles, home utilities and healthcare products. Examples of industries and sectors that require the expertise of mechanical and automotive engineers and technologists are:

- Automotive industry
- Manufacturing, control system, robotic and automation industry
- Entrepreneur especially in automotive sector
- Rail industry – designs, constructs, manages and maintains rail system components from trains and tracks to electrical power systems and train control systems
- Marine industry – develops and helps operate vessels
- Petrochemicals, gas and mineral industry
- Plantations and food products industry
- Defence industry – provides equipment, support and services for the armed forces and national security
- Biotechnology and biomedical industry
- Service, research and development (R&D) and engineering management firm
- Quality & Inspection
- Electronics industry – designs and manufactures components and complete equipment for sectors from automotive to medicine and the military

- Fast moving consumer goods industry – manufactures products such as household cleaning items, personal hygiene goods and convenience foods
- Aerospace and satellites industry
- Construction industry – designs and builds infrastructure, buildings and buildings services
- Medical sector
- Academic sector
- Product, sales & distribution
- Welding Industry
- Maintenace

FACULTY OF MECHANICAL& AUTOMOTIVE ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
B.Eng (Hons.) Automotive Engineering (Collaboration Programme with HsKA, Germany)

YEAR	FIRST			SECOND			THIRD		FOURTH		FIFTH
SEM	FIRST	SECOND	THIRD	FIRST	SECOND	THIRD	FIRST	SECOND	FIRST	SECOND	FIRST
COURSES	**BHA1113** Engineering Materials	**BHA1413** Fundamentals Electrical Engineering 1		**BHA1133** Dynamics	**BHA2613** Machine Elements		**BHA3413** Fundamentals Electrical Engineering 2	**BHA3402** Vehicle Electronics	**BHA3912** Internship	**UGE2002** Technopreneurship	**BHA4022** Project Management
	BHA1103 Statics	**BHA2123** Mechanics of Materials		**BHA2513** Thermodynamics	**BHA3602** Automotive Product Development		**BHA2313** Microcomputer Technology	**BHA3323** Automatic Control	**BHA3931** Internship Follow-up	**BHA3223** Internal Combustion Engine	**BHA4902** Preparations for Bachelor Thesis
	BHA1602 Technical Drawing	**BHA2612** Computer Aided Design (CAD)		**BHA2342** Technical Informatics 1	**BHA2403** Manufacturing Processes		**BHA3313** Signals and Systems	**BHA3523** Mechnical Vibrations		**BHA4704** Team Oriented Project Study	**BHA4904** Bachelor Thesis
	BHA1811 Mechanical Laboratory	**BHA1821** Mechanical Laboratory 2		**BUM2413** Applied Statistics	**BHA2533** Fluid Mechanics		**BHA3622** Mechnical Design	**BHA3922** Internship Preparation		**BHA4224** Automotive Engineering	**BHA4931** Final Examination (Viva)
	BUM2123 Applied Calculus	**BUM2133** Ordinary Differential Equations		**UHS1011** Soft Skills 1	**BHA2021** Occupational Safety & Health		**BHA3921** Engineers and Society	**BHA3513** Heat Transfer		**BHA4532** Computational Fluid Dynamics	
	UHC1012 Falsafah Dan Isu Semasa	**UQB1011** Co-Curriculum 1		**UQB2091** Co-Curriculum 2	**UHS2011** Soft Skills 2		**BHA3342** Technical Informatics 2	**BHA3011** Quality Management		**BHA4012** Finite Element Method 2	
	UHG1003 Deutsche Sprache 1	**UHG1013** Deutsche Sprache 2	**UHG1016 Intensive German I**	***UHG2003** Deutsche Sprache 3 (optional)	***UHG2013** Deutsche Sprache 4 (optional)	***UHG2016** Intensive German 2 (optional)	**BHA3012** Numerical Programming	**BHA3302** Sensors			
							UHC2022 Penghayatan Etika dan Peradaban	**BHA3102** Finite Element Method 1			
TOTAL CREDIT	17	16	6	16	16	6	18	18	13	17	9
TOTAL CREDIT FOR GRADUATION	140										

FACULTY OF MECHANICAL& AUTOMOTIVE ENGINEERING TECHNOLOGY
CURRICULUM STRUCTURE
B. TECH. AUTOMOTIVE

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEM	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
COURSES	**UHL2400** Fund. of English Language	**UHL2422** English for Technical Comm.	**UHL2432** English for Professional Comm.	**UHF1111** Mandarin For Beginners	**UHF2111** Mandarin for Intermediate	**BVA3043** Asset & Inventory Management	**BVA3326** Final Year Project 2	**BVA3412** Industrial Training
	UHC1012 Falsafah Dan Isu Semasa	**UHC2022** Penghayatan Etika dan Peradaban	**BVA2013** Project Management	**BVA2034** Powertrain System Service	**BVA3024** Capstone Technopreneurs hip 2	**BVA3073** Risk Management		
	UHS1021 Soft Skills 1	**UHS2021** Soft Skills 2	**BVA2024** Autotronic System Service	**BVA2044** Capstone Technopreneu rship1	**BVA3032** Vehicle Marketing	**BVA3056** Quality Management		
	UGE2022 Technoprene urship	**BVA1043** Shopfloor Supervision	**BVA2**41** Elective 1	**BVA2**43** Elective 3	**BVA3013** Automotive Legislation	**BVA3314** Final Year Project 1		
	BVA1014 Automotive Industry & Technology	**BVA1064** Automotive Component Fabriacation	**BVA2**42** Elective 2	**BVA2**44** Elective 4	**BVA3**41** Elective 5			
	BVA1034 Automotive Workshop Practice	**BVA1054** Automotive Component Design & Assembly			**BVA3**42** Elective 6			
	BVA1023 Automotive Drafting	**UQB2**1** Co. Curriculum 2						
	UQB11** Co. Curriculum 1							
TOTAL CREDIT	17	17	17	17	18	16	6	12
TOTAL CREDIT FOR GRADUATION	120							

CURRICULUM STRUCTURE FOR DEGREE COLLABORATION PROGRAMME WITH HSKA (BHA) 2020/2021

BHA1113
Engineering Materials
Credit Hour: 3
Prerequisite : None

Synopsis

This course introduces students to the engineering materials fundamentals including the engineering materials application, atomic bonding, crystal structure, mechanical and physical properties, corrosion mechanism, micro structural analysis, phase diagram, ferrous and non-ferrous alloys, and polymer and advance materials.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse and Illustrate the materials' atomic bonding and crystal structure.
CO2: Evaluate and explain the mechanical, physical properties of engineering materials and concept of corrosion and metal alloys microstructure, phase diagram and heat treatment processes.
CO3: Evaluate and explain ferrous and non-ferrous alloys microstructure strengthening mechanism and its applications.
CO4: Analyse the polymeric materials and advanced materials classification, structure and properties.

BHA1103
Statics
Credit Hour: 3
Prerequisite: None

Synopsis

An introduction to solving engineering static problem, involving: force vector, equilibrium of particle and rigid body, friction effect on rigid body equilibrium, structural analysis, frame and machines, centroids, center of gravity and moment of inertia.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse equilibrium of particle and rigid body
CO2: Evaluate equilibrium of rigid body involve friction and structural analysis
CO3: Evaluate centroids and moment of Inertia, of composite cross sectional area.

BHA1602
Technical Drawing
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces technical drawing and engineering drawing base on BS 8888. It consists of basic shapes, tangencies, curve of intersection, orthographic views include sectioning, auxiliary view, isometric view, geometric dimensioning and tolerancing, and detail assembly drawings.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse tangencies, basic shapes and sketching of engineering components.
CO2: Evaluate orthographic view and sectional view with dimensioning.
CO3: Analyze auxiliary view, curve of intersection and isometric drawing.
CO4: Analyze knowledge to use for geometric dimensioning and tolerancing and assembly drawing with Bill Of Materials.

BHA1811
Mechanical Laboratory 1
Credit Hour: 1
Prerequisite: None

Synopsis

This course introduces students with safe working habits, identify common materials used in metal fabrication, reading blueprints,

identification, care & use basic measuring instruments, layout methods & basic hand tools. Emphasis is placed on operation of drill press, lathe & pedestal grinder.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse basic manual production techniques.
CO2: Analyse basic turning processes according to given dimensions, specifications and tolerances.
CO3: Integrates communication skills based on task given

BHA1413
Fundamentals Electrical Engineering 1
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces DC resistive network analysis, AC network analysis, diodes, bipolar junction transistors (BJT), operational amplifier (op-amp) and digital logic circuits..

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate DC resistive and AC network analysis.
CO2: Evaluate circuits involving diodes, bipolar junction transistor (BJT) and operational amplifier
CO3: Integrate solutions to solve simple logic circuits problem.

BHA2123
Mechanics of Materials
Credit Hour: 3
Prerequisite: BHA1113 Engineering Materials

Synopsis

This course introduces the concept of stress and strain under axial, torsion, bending, and transverse shear and combined loadings in elastic structural members. Plane stress transformation is also included.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the stress and strain in structural members subjected to axial loads and torsion loads.
CO2: Evaluate the stress and strain in structural members subjected to bending loads and shear loads.
CO3: Construct stress and strain in structural members subjected to combined loads and conduct the stress transformation.

BHA2612
Computer Aided Design
Credit Hour: 2
Prerequisite: BHA1602 Technical Drawing

Synopsis

This course introduces the types of fastener and spring types, AutoCAD, 2 – D drawing command, coordinate system, organizing the drawing, AutoCAD drawing setting, Introduction to Solid Works, 3 – D solid modeling, 3 – D drawing, Blue print drawing, 3 – D functioning and organizing, Solid Works Animator.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyze drawing information in CAD and Solid Works
CO2: Evaluate 2-D drawings using AutoCAD and 3-D solid modelings using Solid Works
CO3: Prepares mechanical engineering parts using learned software

BHA1821
Mechanical Laboratory 2
Credit Hour: 1
Prerequisite: BHA1811 Mechanical Laboratory 1

Synopsis

This course introduces student basic application of the dial indicator, gauge block, gauges, measuring instruments, milling machines and processes, CNC milling simulator operation and surface grinding machines and processes.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyze appropriate techniques when handling basic measuring equipment and instruments
CO2: Analyze conventional milling and CNC milling simulator operation and surface grinding process
CO3: Integrate skills based on professional ethics and responsibilities

BHA1133
Dynamics
Credit Hour: 3
Prerequisite: BHA1103 Statics

Synopsis

This course introduces the principles of kinematics of a particle and a planar rigid body, kinetics of a particle and a planar rigid body utilizing force and acceleration method, work and energy method and impulse and momentum method.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate and solve problems involving kinematics of a particle.
CO2: Evaluate and solve problems involving kinetics of a particle utilizing force and acceleration method, work and energy method and impulse and momentum method.
CO3: Create solutions involving kinematics of a planar rigid body, and kinetics of a planar rigid body utilizing force and acceleration method.

BHA2513
Thermodynamics
Credit Hour: 3
Prerequisite: None

Synopsis

This course focuses on the application of the thermodynamics knowledge in various engineering systems. The subject covers the review and analysis of energy, gas power cycles, vapour power cycles, refrigeration cycles, gas mixtures, gas-vapour mixture & air-conditioning and combustion.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the fundamentals of mass balance, 1st law, 2nd law of energy to identify, differentiate and solve engineering problem involving closed, open systems and unsteady-flow processes.
CO2: Evaluate the properties of pure, simple compressible substances and ideal gases, the concept of heat, work and mass to the typical problems and the entropy changes problems for pure substances and ideal gas.
CO3: Demonstrate skills based on task given

BHA2342
Technical Informatics 1
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces input and output, variables, constants, arithmetic operations and mathematical functions, user-defined functions, selection making decision and repetitive construct, and array data structure. The programming language used for the course is C language.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate C program using variables, constants declarations, arithmetic operations and mathematics function and selecteion making decision construct and loops.
CO2: Evaluate C program using user-defined functions, numeric arrays and develop C programmes for engineering applications.

BHA2021
Occupational Safety & Health
Credit Hour: 1
Prerequisite: None

Synopsis

This course introduces OSH in Malaysia, identification, types and inspection of industrial hazard, analysis and control of industrial hazard, mechanical hazard, chemical hazard, physical hazard, psycho-social hazard, industrial hygiene, accident causation phenomenon, accident investigation and analysis, managing safety and health, and industrial safety and health regulation.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify OSHA regulations and its implementation in Malaysia
CO2: Analyse industrial hazards and industrial hygiene programs
CO3: Identify causation of accident phenomenon, accident investigation and analysis
CO4: Integrates lifelong learning for safety and health management

BHA2403
Manufacturing Processes
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the various type of manufacturing processes including metal casting processes, forming and shaping processes for metal, plastics and composites, material removal processes, joining processes and finishing processes.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate metal-casting processes and forming processes
CO2: Evaluate material removal processes and joining processes
CO3: Identify the appropriate surface technology processes for advanced applications

BHA2533
Fluid Mechanics
Credit Hour: 3
Prerequisite: None

Synopsis

After successfully completed the course, the students should have basic knowledge of one-dimensional flows of incompressible fluids, be able to evaluate the effect of flow circulation on bodies and understand energy loss in the flow process.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe and evaluate the basic principles and applications of various fluid condition discussed in Fluid Mechanics 1.
CO2: Devise solutions for problems in fluid statics, dynamic pipe flow, flow measurement and dimensional analysis.
CO3: Evaluate problems related to fluid mechanics

BHA2613
Machine Elements
Credit Hour: 3
Prerequisite: None

Synopsis

Introduction to design process. Study of static and dynamic loading resulting normal and shear stresses, principles stresses. Engineering materials, static and fatigue failure theories. Machine element design including screws, bolts, fasteners, welded joints, keys and coupling and springs.

Course Outcome

By the end of semester, students should be able to:

CO1: Identify loading of the machine elements, stress and fatigue failure and to perform deformation and stress analysis to design safe machine components
CO2: Evaluate design shafts, keys, coupling, gear and spring to meet desired specifications, mechanical elements for non-permanent joint including screws, bolts, fasteners, keys and coupling to meet desired specifications and permanent joints
CO3: Organize and coordinate team to design mechanical components

BHA3602
Automotive Product Development
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces the concept of product development process and organizations, product planning, identifying customer needs, product specifications, concept generation, concept selection, concept testing, industrial design, prototyping, patents and intellectual properties.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate product development process, its organization, planning stages and process of identifying customer needs in products development.
CO2: Evaluate establishing the target specification, refining the specification process and design, select and perform testing analysis.
CO3: Display professional engineering practice in contextual knowledge

BHA2313
Microcomputer Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course is an introduction to PLC and microcontroller. Students are exposed to input/output PLC interface, PLC programming, input/output microcontroller interface and microcontroller programming.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate input/output of PLC interfacing and PLC programming.
CO2: Evaluate input/output of microcontroller interfacing and microcontroller programming.
CO3: Construct actuator and signal device through programming and interfacing

BHA3012
Numerical Programming
Credit Hour: 2
Prerequisite: BUM 2413 Applied Statistics

Synopsis

This course covers how to handle the numeric standard tools MATLAB and Simulink Solution of differential equations and modelling simple dynamic systems with MATLAB and Simulink.

Course Outcome

By the end of semester, students should be able to:

CO1: Creates programmes using the numeric software MATLAB,
CO2: Evaluate numerical programme to solve engineering-related problems and

construct programmes to simulate dynamic systems

BHA3313
Signal and Systems
Credit Hour: 3
Prerequisite: None

Synopsis

This course covers topics under signals: energy and power signals, discrete-time and continuous, linear systems and convolutions, Fourier transform, complex Fourier series; signal spectral properties and bandwidth, Laplace transform and transient analysis. Emphasis is also given to transfer functions, block diagrams, baseband and pass band signals with applications to communications systems. Matlab and Simulink is used as the tool for simulation and application.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the sampling theorem, its meaning and consequences for signal processing, understand the characteristic of stochastic signals and fundamental methods of stochastic signal analysis.
CO2: Develop description and design of analogue linear time invariant systems using appropriate tools
CO3: Characterize and design digital linear analogue linear time invariant systems using appropriate tools

BHA3342
Technical Informatics 2
Credit Hour: 2
Prerequisite: BHA 2342 Technical Informatics 1

Synopsis

This course cover topics under software process, software requirements, analysis, design concepts and principals. By completing this subject, the student will be able to explain the software engineering principles and techniques that are used in developing quality software products.

Course Outcome

By the end of semester, students should be able to:

CO1: Propose a broad range of concepts from software engineering, spanning all aspects the software engineering process and use of accepted software engineering terminology
CO2: Develop a software for engineering project by applying a representative cross section of software engineering techniques

BHA 3413
Fundamentals Electrical Engineering 2
Credit Hour: 3
Prerequisite: BHA1413 Fundamentals Electrical Engineering 1

Synopsis

This course cover topics with a comprehensive knowledge in the area of automotive mechatronics and familiarizes students with both analytical and computational approaches in evaluating and designing vehicle electrical and electronics components and systems as well as future automotive electronics systems.
Course Outcome

CO1: Evaluate the principle of designing an electro-mechanical drive-train.
CO2: Analyse actuators, power electronics, converters, power supply and control of a vehicle with electrical and electronics equipment.
CO3: Integrate electrical and electronics signals and circuit using hardware and software

BHA3622
Mechanical Design
Credit Hour: 3
Prerequisite: None

Synopsis

This course involves the application of knowledge of mathematics and mechanic for

design in mechanic element. The students will gain experience in designing the abstractions for similar elements.

Course Outcome

By the end of semester, students should be able to:

CO1: Design mechanic elements by applying knowledge of mathematics and mechanic for design
CO2: Evaluate design of the abstractions for similar elements.
CO3: Adapt complex engineering activities with the engineering community.

BHA3921
Engineers and Society
Credit Hour: 1
Prerequisite: None

Synopsis

This course introduces the engineering profession, local industries sector, issues in local industries, ethics and public responsibility, engineer and law, and contract law

Course Outcome

By the end of semester, students should be able to:

CO1: Apply engineering profession and code of ethics
CO2: Analyse the issues in local industries and public responsibilities
CO3: Explain the law which governing the engineering profession

BHA3011
Quality Management
Credit Hour: 1
Prerequisite: None

Synopsis

This course introduces the basics of process-oriented management systems, seven quality tools that have been used for quality improvement such as check sheets, scatter diagrams, cause and effect diagram, pareto charts, flow charts, histograms and statistical process control (spc). Besides that, students are introduced to quality management systems in the automotive industry (TS 16949), international quality standard (ISO 9000 series) and human factor engineering in quality management.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply key management concepts, quality and total quality management, Deming's management principles, ISO 9000, application of management tools.
CO2: Analyse fundamental knowledge on quality control, engineering, Management and basic quality tools
CO3: Construct frequency distribution, central tendency, dispersion and population analysis by using statistical analysis method on data

BHA3102
Finite Element Method 1
Credit Hour: 2
Prerequisite: None

Synopsis

This course covers introduces student to the commercial finite element software based on the tutorial and exercises provided. The students should capable to independently work in comparable calculation tools. To complete the module, the students should be able to perform the stress analysis with the help of commercial software independently and in team where the result should be tested based on accuracy plausibility. A comparison with the analytical solutions from the Technical Mechanics will show the advantages and disadvantages of the numerical methods.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate and perform stress analysis with the help of commercial software independently and in team where the

result should be tested based on accuracy plausibility

CO2: Evaluate and compare the analytical solutions with Technical Mechanics and demonstrate understanding of the advantages and disadvantages of the numerical methods.

BHA3302
Sensors
Credit Hour: 2
Prerequisite: None

Synopsis

Fundamentals of measurement and test engineering - terms such as accuracy, resolution, linearity, reproducibility and error. Physics of different sensors frequently used in automotive applications. Influence of electromagnetic disturbance. Electronic signal processing (usually analogue electronics). Physical fundamentals and functional principles of various (electrical) actuators.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyse fundamentals to measurement engineering, electro-magnetic compatibility (EMC) and signal conditioning.

CO2: Analyse appropriate sensors for measuring temperature, pressure, speed magnetic fields, angle, acceleration, rotation rate and flow, and understand types of actuators and electronic motors.

BHA3513
Heat Transfer
Credit Hour: 3
Prerequisite: BHA 2513 Thermodynamics

Synopsis

The basic modes of thermal energy transfer viz., conduction, convection and radiation are introduced with emphasis on understanding the fundamental concepts to be used in analysing and solving real-life problems. The applicability of 1-D heat conduction in various geometries, the validity of one dimensional heat conduction in fins, the distinction between steady and unsteady states, the concept of boundary layer, the analogy between fluid flow and convective heat transfer, the distinction between free and forced convection, the properties of materials which are responsible for energy transfer by radiation, the principles in the design of heat exchangers with emphasized on fundamental concepts and design methods.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the fundamental concept of conduction, convection and radiation heat transfer and related to one-dimensional heat flow and in different geometries.

CO2: Evaluate problem in single phase forced and free convection heat transfer, problem related to simple radiation heat transfer.

CO3: Integrate design and apply the heat transfer problem for application In the system of heat exchangers.

BHA3323
Automatic Control
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces linear, time-invariant (LTI) control system modelling, analysis and design. The covered topics are frequency domain modelling of mechanical, electrical and electro-mechanical systems; time response analysis, frequency response analysis, stability analysis and steady-state analysis. Control system design and analysis using PID controller technique.

Course Outcome

CO1: Develop basic control system concepts and illustrate the required control system into block design process.

CO2: Develop frequency domain transfer function of linear, time invariant (LTI) control systems for mechanical system

CO3: Develop the transient response, steady-state response and system stability of LTI control system compensators to achieve specified control system performances utilizing root-locus technique

BHA3402
Vehicle Electronics 1
Credit Hour: 2
Prerequisite: None

Synopsis

This course aims to familiarise students with the basics of the digital electronics and to the foundations of the alternating current calculation. In addition, student will also provide with the basic knowledge of the energy supply in the automobile, the lighting and electrical wiring.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate the basic theories alternating variables: Mean value, mean (root mean square) value, average absolute value and to master/control superposition of sinusoidal vibrations, the meaning of the complex pointer and to perform the circuit analysis by using complex calculation. To understand simple filter circuits, to design and to build up.
CO2: Assess the function of the three - phase generator and the controller in the vehicle and apply correct term of the colour temperature and to understand the usage of different lamp (light source) as well as its functional principles
CO3: Manipulate skills to translate logical expressions into electronic circuits, build and analyse logic circuits and to display simple, time-dependent variables in the frequency domain.

BHA3523
Mechanical Vibrations
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces fundamental of vibration, free vibration response for single, two and multi degree of Freedom, harmonically excited vibration response for single and two DOF system, vibration absorbers and isolators, whirling of shafts, basics of modal testing, balancing of rotating machines and others vibration measurement techniques.

Course Outcome

By the end of semester, students should be able to:

CO1: Synthesise vibrational elements and dynamic behaviour of the mechanical systems.
CO2: Formulate the solutions to vibration problems that contain free-vibration and forced-vibration analysis of one, two and multi degree of freedom systems
CO3: Justify vibration measurement techniques, tools and methods

BHA3922
Internship Preparation
Credit Hour: 2
Prerequisite: None

Synopsis

This training exposes the students to professional skills and experience in aspect of mechanical engineering practice. The exposure will help to produce an excellent, responsible and good attitude.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate basic professional engineering skills at industry level relate the theory that had been learned during the involvement of real problems solving such as planning, design, construction and management of the projects.
CO2: Devise a practical problem that exits, identify the company or department structure and recognize the job scope of specific post in the organization.

CO3: Integrate interpersonal skills with professional ethics to be excellent, motivated and responsible to the creator.

BHA3912
Internship
Credit Hour: 2
Prerequisite: None

Synopsis

This course is practical task in an industrial company or related with the appropriate training for the duration of 95 days. The student involved in actual project of the company from the fields of development, production or distribution. The projects studied by the students deal with topics from the vehicle technology and related fields and allow the practical application of the knowledge acquired at the university. It provides an insight view to the future professional life. The students are responsible to find a suitable project at the training company.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate professional engineering skills required in the industry
CO2: Evaluate the theory that had been learned during the involvement of real problems solving such as planning, design, construction and management of the projects.
CO3: Organise practical solution for problems in companies or department and recognize the job scope of specific post in the organization.
CO4: Integrate interpersonal skills with professional ethics to be an excellent, motivated and responsible to the creator

BHA3931
Internship Follow Up
Credit Hour: 1
Prerequisite: None

Synopsis

This training exposes the students to professional skills and experience in aspect of mechanical engineering practice. The exposure will help to produce an excellent, responsible and good attitude.

Course Outcome

By the end of semester, students should be able to:

CO1: Relates the theory that had been learned during the involvement of real problems and practice basic professional engineering skills at industry level solving such as planning, design, construction and management of the projects
CO2: Evaluate solutions to practical problems in companies or department structures and recognize the job scope of specific post in the organization.

BHA3223
Internal Combustion Engine
Credit Hour: 3
Prerequisite: None

Synopsis

This course provides the foundation understanding on the fundamental of internal combustion engine which includes the kinematics of combustion engine, the charge cycle and mixture formation in engine, the combustion process in engine, various combustion processes, such as petrol, diesel and HCCI engines. This course will also cover charging methods in internal combustion and the effect of combustion engine to the environment

Course Outcome

By the end of semester, students should be able to:

CO1: Construct engine performance and engine combustion design using fundamental principles of thermodynamics, construction elements and parameters.

CO2: Combining performances using knowledge from exhaust treatment, ignition, cooling and lubricant, charge cycle, combustion and mixture formation for diesel and gasoline engine, combustion engine and crank mechanism
CO3: Compiling engine performance using detail analysis to understand combustion and mixture formation for diesel engine, gas exchange process (supercharging/ turbocharging)
CO4: Organizing the impact of professional engineering solutions in the engine types, instrumentation and conduct the actual analysis of engines.

BHA4102
Finite Element Method 2
Credit Hour: 2
Prerequisite: BHA Finite Element Method 1

Synopsis

In this course, the students are to carry out simple mechanics tasks by using finite element method where the calculation should follow the matrices calculation. At the end of the course, students should be able to interpret the result of modern finite element program and test the plausibility.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate matrices calculations following finite element methods
CO2: Evaluate the result of modern finite element program and test the plausibility.

BHA4224
Automotive Engineering
Credit Hour: 4
Prerequisite: None

Synopsis

This course provides the complete foundation and working principles on the automotive engineering which including vehicle dynamics, powertrain, auxiliary system, vehicle safety, HVAC, drivetrain, tires, suspension, steering, braking unit and active safety system. In addition, significant projects are match with fundamental topics for practical utilization of techniques, skills and tools to solve engineering issues.

Course Outcome

By the end of semester, students should be able to:

CO1: Develop foundation knowledge and parameters of vehicle dynamics analysis & calculation.
CO2: Evaluate the performance characteristic of vehicle dynamics topics under various driving circumferences
CO3: Compile and evaluate powertrain designs, engine cycles and digital engine control parameters while analysing engine testing and performance parameters.
CO4: Demonstrate understanding drivetrain designs, gear selections, traction diagram, body control and alternative powertrains.

BHA4532
Computational Fluid Dynamics
Credit Hour: 2
Prerequisite: None

Synopsis

This subject is to introduce the fundamental and application of simulation of fluid mechanics phenomenon and solving fluids problem via simulation. Holistic approaches of programming and commercial software are essentials towards solving, analysing and evaluating the results of fluid mechanics problem-based simulation. The objective of this subject is to provide the basic of simulation focusing on fluid problem which is from mathematical model such as Navier Stokes equation and solve it numerically with the aid of programming software. The next step is to understand and utilize commercial software to solve engineering fluid problem base on actual physical shape appearance which is more complex boundaries.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyze the fundamental concepts of CFD and governing equations
CO2: Evaluate computational methods and simulation results of fluid problem

BHA4704
Team Oriented Project Study
Credit Hour: 4
Prerequisite: None

Synopsis

After the students have analyzed the main problem, they independently design and determine the specifications and requirements of the product. The documents are presented in form of a role play in which the participants act as another character, e.g. manager or customer, to discuss and improve the relevant documents. This mid-term presentations emulate industrial project team meetings with a fixed agenda, protocol, leadership, voting procedures, kick-off etc. They are followed by the evaluation phase which includes an assessment of the solution and problem solving as required from engineering and management principles. After the final kick-off meeting of the team session phase, the design and manufacturing process starts. This phase is critically accompanied by more reviews and laboratory presentations. At the end of the semester, the finished product will be presented to the panel.

Course Outcome

By the end of semester, students should be able to:

CO1: Create model of dynamic systems
CO2: Design dynamic systems with modern software
CO3: Assemble proposed design and manufacturing of product.
CO4: Create solutions to solve problems as required by engineering and management principles

BHA4022
Project Management
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces the project management concepts in order to enhance the skills and managerial abilities and provide a holistic and integrative view of project management. The covered areas for project management are strategic management, organization structure and culture, project management, cost estimating and budgeting and project plan.

Course Outcome

By the end of semester, students should be able to:

CO1: Analyze life cycle of the projects and project management organizational structures
CO2: Evaluate various frameworks and techniques of strategic plans of management and work breakdown structure (WBS) and project scheduling
CO3: Construct various methods for estimating project costs and analyze the project risk management.

BHA4902
Preparation For Bachelor Thesis Bachelor Thesis
Credit Hour: 2
Prerequisite:

Synopsis

Preparation for Bachelor thesis prepares students for real professional approach to engineering studies. It will teach students to structure/plan time and the content their final year project as well as approaches / procedure and tools for making scientific work/research. The task description and fundamental information of the bachelor thesis will be designed and structured.

Course Outcome

By the end of semester, students should be able to:

CO1: Evaluate project planning, design, construction and management of the project and theory that had been learned to solve the problems.
CO2: Evaluate project solution based on project methodology.

BHA4904
Bachelor Thesis
Credit Hour: 4
Prerequisite: Has passed more than 80 Credit hours

Synopsis

This course aims to train students to utilise their engineering knowledge and technical skill to solve an engineering problems. For this reason, the use of projects as a transport for teaching and for integration of subject area is strongly encouraged throughout the programme. Students should becapable of handling the problem independently with scientific and methodical in a given time.

Course Outcome

By the end of semester, students should be able to:

CO1: Devise solution to solve through project planning, design, construction and management.
CO2: Develop project solution based on project methodology.
CO3: Evaluate practical solution for problems in project through data collection, data analysis and discussion
CO4: Analyse research findings into a technical report.

BHA4931
Final Examination
Credit Hour: 1
Prerequisite: None

Synopsis

This course will test the mastery of the basic principles and important facts in learning content of the automotive studies and the bachelor thesis via written viva session between UMP/Company supervisor as well as HsKA supervisor.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply related content of the lectures and bachelor thesis to show profound technical knowledge
CO2: Explains and practice communication on technical subjects

CURRICULUM STRUCTURE FOR DEGREE TECHNOLOGY PROGRAMME 2020/2021

AUTOMOTIVE TECHNOLOGY

BVA1014
Automotive Industry & Technology
Credit Hour : 4
Prerequisite : None

Synopsis

This course is relevant to expose about knowledge about automotive industry and technology revolutions that happened in global. It is important to give knowledge about elements in automotive industrial revolutions, describe about additive manufacturing, figure aout about autonomous robots, supply chain, cloud computing, cyber security, internet of things, big data analytics, horizontal and vertical integration, and simulation and augmented reality.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: to elaborate the smartness technology in automotive industry
CLO2: to adapt knowledge on various systems used and their role in automotive industrial world
CLO3: to classify the opportunities, challenges brought about by Industry and how organisations and individuals should prepare to reap the benefits

BVA1023
Automotive Drafting
Credit Hour : 3
Prerequisite : None

Synopsis

This course introduced method that is used to generate the 2D drawing which usually applied by industries. The suitable view and method in generating dimension on the selected view will be applied. It also introduced the geometric dimensioning and tolerancing together with manufacturing processes symbols in the drafting process which helps producing the correctly and efficiently in term of technical communication. Students will have a mini project to re-create the existing automotive component CAD data and propose the 2D drafting drawing in term of manufacturing aspect.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply knowledge and comprehension in generating 2D drafting for technical communication purpose (C3, P2, A2, PLO1)
CLO2: Analyze 2D view and generate 2D drafting with proper dimensions, tolerances and symbols (C4, P5, A3, PLO2)
CLO3: Reconstruct automotive components drafting and decide the proper dimensions, tolerances and symbols (C5, P6, A4, PLO4)

BVA1034
Automotive Workshop Practice
Credit Hour : 4
Prerequisite : None

Synopsis

This course aims to expose students to the operation of the general vehicle servicing internal combustion engine technology. the course also discuss how the service, repair, maintenance, design and test the performance of conventional internal combustion engines. in addition, students have to solve engineering problems in real time by leveraging their knowledge and learn new information to solve problems of related engines.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Classify the functions of major automotive engine subsystems.
CLO2: Inspect automotive engine assembly and diagnose engine malfunctions
CLO3: Demonstrate good working relation with team members.

BVA1043
Shopfloor Supervision
Credit Hour : 4
Prerequisite : None

Synopsis

Shop Floor Supervision is the system by which standards for running day-to-day business are established, maintained, controlled and improved. This approach is to continously improve daily operation to gain better achievement in safety, quality, cost, delivery and morale of the business operation, as well as for the workers. This contributes to waste elimination at all levels throughout the manufacturing system. This module reviews the skills and techniques required to analyze manufacturing system and to design improved methods and layouts. The focus of this module will be on the application of the technique through studies and industrial experience, and will identify the benefits to be gained by their success.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the philosophy and foundation of shopfloor supervision. (C2, PLO1)
CLO2: Execute the shopfloor operation using related tools. (P2, PLO2)
CLO3: Display a good leadership and teamwork in shopfloor supervision (A5, PLO9)

BVA1054
Automotive Component Design & Assembly
Credit Hour : 4
Prerequisite : None

Synopsis

This course introduced method that is used to construct the 3D CAD data which usually applied in industrial field. The suitable features in constructing 3D CAD data will be applied which helps producing the correctly and efficiently 3D CAD data for technical communication purpose. Students will have a mini project to construct the 3D CAD data of automotive component which considering the related manufacturing process aspect.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply knowledge and comprehension in constructing 3D CAD data for technical communication purpose (C3, P3, A2, PLO1)
CLO2: Decide the proper features to use in constructing 3D CAD data based on the manufacturing process aspect (C5, P5, A3, PLO2)
CLO3: Construct 3D CAD data of automotive components and generate the complete assembly and exploded drawings (C5, P6, A4, PLO4)

BVA1064
Automotive Component Fabrication
Credit Hour : 4
Prerequisite : None

Synopsis

The automotive manufacturing processes play a major role in deciding on the vehicles' design characteristics and the overall cost. Thus it is important for technologist to identify suitable manufacturing process to fabricate automotive component. Technologist also should be able to pinpoint the manufacturing capabilities and limitations of each process in order to fabricate part according to the specified design tolerances.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the fundamental concepts of manufacturing processes in automotive (P2, PLO1)
CLO2: Construct various skills of manufacturing techniques as an individual or a group. (P5, PLO2)
CLO3: Perform the manufacturing process according to detail drawing or Standard Operating Procedure (SOP) (A2, PLO8)

BVA2013
Project Management
Credit Hour : 3
Prerequisite : None

Synopsis

This subject focuses on the principles of project management including the

importance and interrelationship of all its components. Students will be familiarized with the Project Management process group functions (initiating, planning, executing, controlling and closing) and project knowledge areas (integration, scope, time, cost, quality, human resources, communications, risks and procurement). Various tools for supporting the analysis of works in engineering project management will be introduced. Topics including initiating and planning the project, working with the management, project appraisal & sensitivity, creating budget and work breakdown structure, managing uncertainty & risk, building project plan, implementing and revising project plan, completing the project and contract laws

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the core concepts and principles, functions, and process in project management (PLO1, C2)
CLO2: Manage a project from planning, preparing project proposal until closing out the project (PLO4, A4)
CLO3: Ability to function effectively as memebers or group leader in achieving project goal. (PLO9, A4)

BVA2024
Autotronic System Service
Credit Hour : 4
Prerequisite : None

Synopsis

This course focuses on theory, operation and application of automotive electrical and electronic systems. Topic covered includevehicle electrical wiring systems, sensors and actuators, charging system, ignition system, starting system, lighting system, chassis electrical system, auxiliary systems, mechatronics, automotive networking, bus systems.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Identify the components of the electrical and electronicsin automotive systems. (PLO1, C2)
CLO2: Explain the functions and operations of automotive electrical and electronic systems. (PLO3, C3)
CLO3: Construct of automotive electrical and electronic system. (PLO2, P4)

BVA2034
Powertrain System Service
Credit Hour : 4
Prerequisite : None

Synopsis

This subject focuses on powertrain services for light/heavy vehicle and engine repair management

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Demonstrate vehicle service information, vehicle identification and routine maintenance (PL04,A3)
CLO2: Apply knowledge of comprehensive vehicle engine repair and assembly (PL02,P4)
CLO3: Apply knowledge of powertrain service management in real 3S Centre (PL07,A4)

BVA2044
Capstone Technopreneurship 1
Credit Hour : 4
Prerequisite : Technopreneurship

Synopsis

Entrepreneurs need money to start and to grow their business. It is important to understand how revenue is generated, how to source for funds, how to control cash flow, how to assess the succes of the company in monetary terms, and how to value a company for various purposes. The course exposes students to the various financial aspects relating to new ventures. These include approaches to secure start-up capital and venture financing. Students learn about the basic accounting, essential financial indicators, the types of funds available, the different categories of investors, the importance of intellectual property in securing finance, the financial details to be included in a business plan required for investment purpose, valuation of company and the art of negotiation with investors.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply various financial indicators & tools to prepare for financial information for a new business venture (PLO7, C4, A4, P2 Knowledge)
CLO2: Acquire skills to analyze financial statements (PLO7, C2, A2, P5, Entrepreneurial Skills)
CLO3: Present financial information for new business (PLO7, C6, A2, P4, Practical Skills and High Technology)
CLO4: Display the art of negotiation with investors (PLO9, C2, A4, P5 Communication Skills)

BVA3024
Capstone Technopreneurship 2
Credit Hour : 4
Prerequisite : Technopreneurship Capstone 1

Synopsis

The start-up and growth of an enterprise invariably involves both human and financial capital. To manage the increasing pool of human resources and to convince venture capitalists to invest become two main issues especially for growing venture. This course consists of two parts: in the first part, organization and human resource management are introduced; in the second part, the focus is on writing a convincing business plan to attract venture capital investment. When enterprise starts to take shape and grow, more people will be hired, proper organization, team building and human resource management will become important issues. In this course, students will be exposed to the various organizational aspects relevant to new ventures and established companies. These include the pros and cons of the different organization structures, conflicts that may arise among employees, and approaches to building strong teams. Human resourse management techniques will also be introduced and discussed. In the second part of the course, the business model canvas will be described listing the connections among the different components of a business. The value of a business plan and the techniques of writing a business plan will be introduced.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply the business model canvas incorporating human and financial elements (PLO7, C5, A4, P2 Knowledge)
CLO2: Acquire skills to resolve organizational conflicts (PLO8, C5, A2, P3 Critical Thinking and Problem Solving Skills)
CLO3: Write a convincing business plan (PLO7, C6, A2, P6, Entrepreneurial Skills)
CLO4: Evaluate vital organizational behaviours necessary to grow a new venture (PLO6, C5, A3, P6, Teamwork Skills)
CLO5: Motivate all stakeholders and build a cohesive venture team (PLO9, C3, A5, P7 Leadership Skills)

BVA3032
Vehicle Marketing
Credit Hour : 2
Prerequisite : None

Synopsis

This subject introduces the student to basic marketing concepts and how these concepts can be applied to entrepreneur technology setting in any organization. Additionally, they will be introduced to how management of the marketing function within technology based industries is critical to the entrepreneur's success. This subject will take a close examination of the definition of marketing. Through a dissection of the key terms in the definition we will show that marketing's primary focus is to identify and satisfy customers in a way that helps build a solid and, hopefully, sustained relationship that encourages customers to continue doing business with the entrepreneur. The student will come to understand that marketing consists of the strategies and tactics used to identify, create and maintain satisfying relationships with customers that result in value for both the customer and entrepreneur. This subject will help students plan, implement and evaluate decisions related to product know how, price, promotion and place to meet the needs of the technology based industries.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Acquire the knowledge of integrating technology into strategic marketing to create new business opportunities for entrepreneur.
CLO2: Analyze the various in marketing management activities and their roles in strengthening entrepreneur technology based industry competitiveness.
CLO3: Apply various marketing methods including presenting a marketing plan report.

BVA3013
Automomative Legislation
Credit Hour : 3
Prerequisite : None

Synopsis

This course provides the students with the basic knowledge and theory regarding legislative on every aspect related to automotive aspects. The students can apply the obtained theory to the practical activities involving inspection for many aspects in automotive parts. This subject exposed the students to handle the project related to inspection for lamp, wheel, noise and emission level, the safety features and the automotive homologation. Every inspection activities required the students to present the technical report according to the universal standard.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply the knowledge and implement the theory for inspection process (C3, A4, P4, PLO6)
CLO2: Evaluate technical specification for each components and identity the problems (C5, A4, P5, PLO9)
CLO3: Analyze the technical aspects and qualified the checked components in automotive parts (C4, A5, P5, PLO8)

BVA3043
Asset and Inventory Management
Credit Hour : 3
Prerequisite : None

Synopsis

Students will be introduced to the maintenance strategy, calculating the life of each unit machine and instrument. identifying maintenance workshop and scheduling, maintenance organisation, effective use of maintenance resources, maintenance system, maintenance best practices, engineering economy such as weibull and pareto analysis,cost estimation, asset replacement analysis, risk analysis and control,application of reliability data, accident prevention, fire protection and cost control.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Distinguish the method and strategy for maintenance and asset management (PL03, C4)
CLO2: Reproduce by using computerized maintenance management system in maintenance problem. (PL02, P4)
CLO3: Present the best practices of maintenance and asset management. (PL07,A2)

BVA3056
Quality Management
Credit Hour : 6
Prerequisite : None

Synopsis

This course provides a useful insight into concept, theories and application of quality management in an organization. Student will be introduced to tools and techniques of quality that are useful for practice, people and process improvement. This also includes approaches for planning, controlling and improving the quality management function of a system. Quality is a universal concept, its application and management encommpasses a wide variety of field. Therefore, this course is suitable for individuals who aspire to be managers in their organizations in future regardless of their area of specialization.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the basic quality principles and practices, quality solving techniques and product reliability related to manufacturing process (C2, PLO1)
CLO2: Solve the manufacturing process quality problem using appropriate problem solving techniques (P4, PLO2)
CLO3: Perform the ability to apply the quality control tools (A2, PLO4)

BVA3073
Risk Management
Credit Hour : 3
Prerequisite : None

Synopsis

Factors such as appropriate selection of personnel, adequate provision of training and thorough consideration of occupational safety and health issues all help to reduce the incidence of injury and illness resulting from inadequate examination of potential hazards, poor ergonomic design, equipment failure, defective products or hazardous materials. The working environment, suitability of equipment and the competencies of staff all have to be considered in the context of legislative requirements and good management of health and safety. This document presents a structured approach to good management of safety and describes a universal framework for task or activity planning. It defines steps and processes which, if used as a common reference, will simplify and unify our management of health and safety risk and streamline our approach to planning tasks and activities.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Determine and apply knowledge of complex risk assessment theory to your professional practice and/or further study. (C4, A1, P3 & PLO3)
CLO2: Apply logical, critical and creative thinking to analyse, synthesise and apply theoretical knowledge, and technical skills, to formulate evidenced based solutions to industry problems or issues. (C5, A2, P4 & PLO3)
CLO3: Collaborate effectively with others and demonstrate intellectual independence and autonomy to solve problems and/or address industry issues and imperatives. (C6, A3, P5 & PLO3)

BVA3314
Final Year Project 1
Credit Hour : 4
Prerequisite : None

Synopsis

The student needs to plan and implement the project individually that related to the respective engineering technology field. The student should implement a project, do the analysis and apply the theory to solve the problems related to topic. At the end, the student should write a problem based learning report that covers problem statement, literature review, methodology to overcome the problem. The student needs to achieve the objective of the project and presented it in the report.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the problem, objectives and scope of project associated to the industrial or community needs. (PLO1, C4, A3, P2)
CLO2: Use relevant theory to produce solution. (PLO6, C3, A1, P6)
CLO3: Choose a proper methodology. (PLO2, C5, A1, P1)
CLO4: Present the preliminary findings in the oral and written forms effetively (PLO4, C6, A2, P7)

BVA3326
Final Year Project 2
Credit Hour : 6
Prerequisite : Final Year Project 1

Synopsis

This is the second part of the Bachelor Degree Project. Students are expected to continue the project performed in Bachelor Degree Project until completion. At the end of the semester, students are required to submit the Bachelor Degree Project report and present their projects for assessment.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Perform project implementation systematically.(PO9, C3, A2, P4)
CLO2: Interpret data in a meaningful form using relevant tools. (PO2, C3, A5, P1)
CLO3: Work independently and ethically. (PLO6, C3, A3, P3)
CLO4: Present the results in the oral and written forms effectively. (PO4, C3, A2,P3)

BVA3412
Industrial Training
Credit Hour : 12
Prerequisite : None

Synopsis

Industrial training is a compulsory component for degree program students at Universiti Malaysia Pahang (UMP). The experience and skills acquired from a period of placement can be invaluable and provide the advantage to the students when applying for employment after graduation. During the training period with the relevant industry, students are expected to involve in the following areas of training in order to achieve the underlying objectives: Manufacturing, production process and / or its optimization process, mechanical design and product, maintenance and repair of equipments, poduct testing and quality control.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Solve technology related problems using methods, tools and techniques learnt throughout the training (PLO3, C3, A5, P3)
CLO2: Explain effectively with the technical community and produce technical reports and presentations. (PLO4, C2, A4, P2)
CLO3: Demonstrate social ethique and professionalism in technology practice. (PLO8, C3, A3, P5)

BVA Elective Courses

BVA2114
Commercial Vehicle Servicing & Maintenance
Credit Hour : 4
Prerequisite : None

Synopsis

A commercial vehicle is any type of motor vehicle used for transporting goods or paying passengers. The European Union defines a "commercial motor vehicle" as any motorized road vehicle, that by its type of construction and equipment is designed for, and capable of transporting, whether for payment or not. In this course, student will learn the rules and regulations service, maintainence and repair or commercial vehicles system and the engine.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the rules, regulation and commercial vehicle system (P2, PLO1)
CLO2: Construct various skills of servicing and repair as an individual or a group. (P5, PLO2)
CLO3: Perform the servicing and maintenance according to Standard Operating Procedure (SOP) (A2, PLO8)

BVA2124
Drivetrain Maintenance
Credit Hour : 2
Prerequisite : None

Synopsis

Introduction to chassis load and tire contact forces. modeling of chassis dynamics in vertical, lateral and longitudinal directions. Performance criteria in suspension design. The use of suspension test machine for investigating the suspension characteristics. Effects of suspension parameters to the chassis dynamics. Semi-active and active suspension system.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply kinematics and dynamics principle to determine suspension forces due to chassis loads and tire contact forces. (PL01, C3)
CLO2: Undertake some basic tests for determining suspension parameters in the forms of force-velocity and

force displacement characteristics (PLO2, P4)

CLO3: Explain the concept and the working principles of some advanced suspension systems such as active and semi-active suspension system (PLO3, C2)

BVA2134
Surface Design
Credit Hour : 4
Prerequisite : None

Synopsis

This course introduced surfacing method that is used to construct the 3D CAD data which usually applied in industrial field. The suitable features in constructing industrial design surfacing will be applied which helps producing the quality and efficiently surfaces data data for technical communication purpose. Students will have a mini project to construct the 3D CAD data of automotive vehicle or component using surfacing module with quality verification.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Demonstrate knowledge and comprehension in constructing surfacing data for technical communication purpose (C3, P3, A2, PLO1)

CLO2: Justify the proper features to use in constructing surfacing data which emphasize the quality aspect (C5, P5, A3, PLO2)

CLO3: Construct surfacing data from the scanning data of automotive vehicles or components (C6, P6, A4, PLO4)

BVA2144
Automotive Modelling
Credit Hour : 4
Prerequisite : None

Synopsis

This course provides the knowledge and skills regarding modelling process in automotive design development. From this course,students enable to apply various method and technique in modelling scale vehicle model, automotive component and fabricate working parts for automotive purposes.The course outlines opportunities to value add to professional skills developed during the course.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Demonstrate proficiency in working with and exploration of relevant materials,technology and processes

CLO2: Integrated various types of materials, tools and equipments used in modelling process

CLO3: Construct 3-Dimensional physical model based on 2-Dimensional data using suitable tools,equipments and materials

BVA2154
Vehicle Performance Analysis
Credit Hour : 2
Prerequisite : None

Synopsis

History of vehicle engines.Engine geometry, performance parameters of gas exchange for 4-stroke and two stroke. Spark ignition engine combustion. The market situation for the development of vehicles, gearboxes and components.The selection of the transmission ratio of the vehicle. Basic approach to the performance of automotive engines, power conversion, adjustment of the engine and transmission, transmission system design principles.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Analyse the historical development and future trend of engine (PL01, C2)

CLO2: Determine the design principle of engine (PL03, C4)

CLO3: Utilize the engine and chassis dynamometer for engine performance test. (PL02, P6)

BVA2164
Vehicle Fault Diagnosis
Credit Hour : 4
Prerequisite : None

Synopsis

This course introduces the diagnostic equipment, tools, engine diagnostic and general eelctrical system diagnostics.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Describe the various diagnostic tools and method used to check vehicle performance systems (drivetrain, powertrain and electrical components).
CLO2: Demonstrate the proper method to diagnos vehicle system (drivetrain, powertrain and electrical components).
CLO3: Present the precaution and methodology during diagnostic the vehicle system (drivetrain, powertrain and electrical components).

BVA2174
Exterior Design
Credit Hour : 4
Prerequisite : None

Synopsis

This courses aims to introduce exterior components. Important concept consideration of safe environment for the occupants. Active and passive safety system will be intorduce. Location, shape, surface hardness and supporting structures have to be carefully designed to protect the occupants.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Ability to describe the concept of exterior components and system developed and manufactured components by various suppliers who work with OEM from beginning of design process. (PL01, C2)
CLO2: Ability to demonstrate and establish the car interor components with consideration of design for safety. (PL05, A4)
CLO3: Ability to consider and construct car exterior components, cargo and interface design, with consideration of ergonomics, design for cargo and human machine interface (HMI). (PL02, P5)

BVA2184
Component Remanufacturing
Credit Hour : 4
Prerequisite : None

Synopsis

This course aims to implement additive manufacturing and reverse engineering in retrofitting process. Student will be exposed with process in 3D Scanning until fabrication process by using Additive Manufacturing Technology. At the end of this course, student will be able to redesign and reconstruct automotive component by using selected tools and process.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Ability To correlate the broad range of Additive Manufacturing process, parameters,devices,capabilities and materials that available in remanufacture quality automotive component. (C4, PLO3)
CLO2: Ability To produce the parts and components by using selected additive manufacturing process and materials (P6, PLO2)
CLO3: Ability to organize systematic workflow and process in completing the task that have been given (A4,PLO9)

BVA3114
Hybrid Servicing
Credit Hour : 4
Prerequisite : None

Synopsis

Hybrid technology is an emerging technology. Development of high performance batteries and downsizing engines requires technologies to be familiar with this technology and manage to perform maintenance and servicing activities.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the functions and operations of hybrid powertrain system and components (P2, PLO1)
CLO2: Construct various skills of servicing and repair as an individual or a group. (P5, PLO2)
CLO3: Perform the servicing and maintenance according to Standard Operating Procedure (SOP) (A2, PLO8)

BVA3124
EV Servicing
Credit Hour : 4
Prerequisite : None

Synopsis

This subject focuses on EV servicing and repair management

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Analyse knowledge of EV Vehicle technology
CLO2: Apply knowledge of EV Vehicle Safety and Service Procedure
CLO3: Apply knowledge of EV Service Management at 3S Centre

BVA3134
Interior Design
Credit Hour : 4
Prerequisite : None

Synopsis

This courses aims to introduce interior components. Important concept consideration of safe environment for the occupants. Active and passive safety system will be intorduce. Location, shape, surface hardness and supporting structures have to be carefully designed to protect the occupants.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Ability to describe the concept of interior components and system developed and manufactured components by various suppliers who work with OEM from beginning of design process.
CLO2: Ability to demonstrate and establish the car interor components with consideration of design for safety.
CLO3: Ability to consider and construct car interior components, cargo and interface design, with consideration of ergonomics, design for cargo and human machine interface (HMI).

BVA3144
Painting
Credit Hour : 4
Prerequisite : None

Synopsis

This courses aims to introduce the process and technique of automotive paiting. This course will help student to execute paiting jobs for automotive steel and plastic parts. Sticker wraping and water transfer will be introduced.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Ability to describe the concepts and methodologies of automotive painting process, technology and materials in industrial practice.
CLO2: Ability to apply and produce surface preparation for painting, wrapping and water transfer on steel and plastic parts.
CLO3: Ability to apply and produce good technique on painting, wrapping and water transfer on finished steel and plastic parts.

WELDING TECHNOLOGY

BVW1014
Safety In Welding
Credit Hour : 4
Prerequisite : None

Synopsis

The aim of this course is to expose students on safety practices and procedures. The students are required to identify types of hazards that may incur in industries especially related to welding processes. The students are required to understand equipment, instruction and carefully review the material safety data sheets.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Identify welding hazards that impact the safety, health, and environment at working area. (PLO2, P1)
CLO2: Explain the welding risk control by various procedures in the working environment. (PLO4, A4)
CLO3: Suggest control method or procedure to minimize or remove the impact of possible hazard in the working environment. (PLO5, A1)

BVW1024
CAD And Welding Graphic
Credit Hour : 4
Prerequisite : None

Synopsis

The course will provide students with an understanding of the importance of engineering graphics as a communication tool specially for welding application. Student will be exposed to geometry drawing, orthographic drawing, section view, isometric drawing, assembly drawing, dimension, tolerance, welding symbol and standard codes using manual sketches and computer aided design (CAD) software.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the engineering drawings include welding symbol and standard codes (PLO1, C2)
CLO2: Construct technical drawing using manual sketching and computer aided design (PLO2,P4)
CLO3: Communicate by using engineering drawings for welding application (PLO4, A2)

BVW1034
Metal Fabrication Technology
Credit Hour : 4
Prerequisite : None

Synopsis

This course is to equip students with the knowledge of metal fabrication and welding technology to improve manufacturing expertise in providing human capital development at par with global technological developments.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Organizing themselves either its individuals or in groups during project generating process. (PLO9, A4)
CLO2: Manipulating the basic principles and scientific processes and materials to produce products with reasonable judgment. (PLO3, C4).
CLO3: Demonstrate understanding of the concept and use of the terms contained in metal fabrication and welding technology. (PLO4, P6).

BVW1043
Product Design In Welding
Credit Hour : 3
Prerequisite : None

Synopsis

This subject covers product design problems, formulating design problems, concept design, configuration design, parametric design, product costing, project and teamwork exspecially for welding product application

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply an appropriate design method of developing a practical solution of product design problem. (PLO1, C3)
CLO2: Develop a practical design solution through a systematic investigation of the product design problem exspecially welding product application. (PLO2,P2)
CLO3: Communicate effectively in written, oral and visual including teamwork. (PLO8 , A3)

BVW1054
Welding Documentation
Credit Hour : 4
Prerequisite : None

Synopsis

The job of welding inspection requires that the inspector possess or have access to agreat deal of information and guidance. Welding inspectors cannot evaluate a welded structure without information from the designer or the welding engineer regarding weld quality. The inspector also needs to know when and how to evaluate the welding. To satisfy this need, there are documents available to be performed. Many of these documents also include acceptance criteria with codes and standards. The course identifies the competence required in welding design, welding joint detail and welding symbol according to AWS/BS/ISO standard

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply welding procedure qualification and welder qualification Interpret various type of drawing design and symbol in welding according to related standard (PLO3, C4)
CLO2: Construct various type of drawing design and symbol in welding according to related standard (PLO2, P3)
CLO3: Demonstrate type of drawing design and symbol in welding as required according to related standard (PLO6, A3)

BVW1064
Non-Conventional Welding Process
Credit Hour : 4
Prerequisite : None

Synopsis

This subject is to provide student with welding processes that are not commonly used in the current industries that can be categories as new or advanced welding technology. Students will be exposed all welding processes and required should be able to perform process selection when deal with the special and complex demand of welding work.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Identify types of joining processes applied in manufacturing sector (PLO1, C4)
CLO2: Explain the characteristics of joining in terms of process, equipment and setup (PLO5, A3)
CLO3: Practice the joining processes using certain equipment to make variety of joints. (PLO2, P4)

BVW2074
Imperfection In Welding And Testing
Credit Hour : 4
Prerequisite : None

Synopsis

The course will provide students with knowledge of identifying types of defects and the strategy of controlling the imperfection. The students will also require to perform mechanical destructive test that is tensile, bending, copy and hardness test. The competence required for checking fabrication materials , structural alignment & dimensions, checking welding quality (welding defect/distortion and weld repair).

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply welding inspection method (PLO2, C3, A4, P4)
CLO2: Implement the characteristics of metal properties and destructive testing (PLO1, C5, A4, P4)
CLO3: Analyse the inspection and other NDE methods (PLO4, C5, A3, P1)

BVW2084
Materials Behaviour In Welding
Credit Hour : 4
Prerequisite : None

Synopsis

This course describes the materials used in engineering. Scope covers Materials introduction; latest developments in materials, introduction to metal, metal forging. Metal structure; scale relationship with nature, and phase diagram. This course also will provide the students with understanding of the Microstructure development with heat treatment and mechanical properties. The students will be exposed to light alloy processing and diffusion process with microstructural

appearance on thermal and mechanical properties. This course also covers the knowledge of the ceramic classification, polymer classification and composite on microstructure relationship and mechanical properties.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Classify metals based on generic properties, structural relationships with properties, especially the emergence of microstructures by heat treatment methods for the metal class (PLO1, C2)
CLO2: Explain the behaviour of structural in fusion welding and testing of materials welded joints (PLO3, A3)
CLO3: Identifying the classification of composite and ceramic based on the testing and the microstructure (PLO2, C3)

BVW2094
Safety Management
Credit Hour : 4
Prerequisite : None

Synopsis

This subject covers OSH act and legislation, Risk Assessment and control, policy and procedures. Safety management is a course that design to provide knowledge for comprehensive management system designed to manage safety elements in the workplace. It includes policy, objectives, plans, procedures, organisation, responsibilities and other measures.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Identify welding hazards that impact the safety, health, and environment at working area.
CLO2: Explain the welding risk control by various procedures in the working environment.
CLO3: Suggest control method or procedure to minimize or remove the impact of possible hazard in the working environment.

BVW2104
Welding Design Analysis
Credit Hour : 4
Prerequisite : None

Synopsis

The subject covers: Static: General principle, Force vector and Equilibrium of Particle; Mechanics: Principle of Stress & Strain, Torsion; Mechanics:Pure Bending and analysis and design of beams for bending; Welded design Program; Design Equations; Welded design Considerations ; Design for welded join; Weld join design

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Describe basic concepts and fundamental principles of mechanical applications. (PLO1, C3)
CLO2: Apply basic concepts and fundamental principles to solve design for welding application (PLO1, P4)
CLO3: Analyze basic problems in design considerations for welding (PLO3, C4)

BVW2144
Computer Aided Analysis
Credit Hour : 4
Prerequisite : None

Synopsis

This course will empower the students with fundamental knowledge and technical skills of 3D solid modeling skills using industry-proven 3D mechanical CAD software. The students will learn about the different techniques for creating solid models and surface with emphasis on design intent. The students also will expose to the introduction to FEA structure/stress analysis, FEA application for weld product (welding connection analysis). The course includes hands-on exercises and best practice methods for students during drafting stage, part, assembly (weld product) and Finite element Analysis (weld product)

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply fundamental sketching and feature modeling, build feature based models of parts and assemblies for easy editing (PLO1, C4)
CLO2: Produce document design intent of parts and assemblies (include weld design) in manufacturing drawings. (PLO4,P4)
CLO3: Analyse basic stress analysis for welding connection. (PLO3, C4)

BVW2124
Electrical Welding Equipment
Credit Hour : 4
Prerequisite : None

Synopsis

This subject is aimed to provide the students with the understanding of static and dynamic characteristics of the electric arc and its associated power characteristics. Students will learn the basic principles, methods and circuit components that control operating power and the volt-ampere characteristics in electrical resistance and arc welding. Through that students will gain knowledge of the operating principles of Alternators, D.C. generators and motors used for welding.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the physical phenomenon occurring in the arc and the types of forces and metal transfer in the arc based on measurements of power source characteristics. (PLO1, C4)
CLO2: Select the right choice of diode material, thyristors and inverters based on the understanding of the basic principles and methods for controlling the volt-ampere characteristics of the electric welding machines. (PLO2, P4)
CLO3: Measure the welding current, voltage, temperature, load and displacement using equipment's such as clamp meter, LVDT, arc welding analyzer and resistance welding monitors.(PLO9, A3)

BVW2134
Non Destructive Test
Credit Hour : 4
Prerequisite : None

Synopsis

This course introduces the basic principles of non-destructive testing and the methods of non-destructive testing that are widely use in the industry, which are Visual Inspection, Penetrant Test, Magnetic Particle Testing, Eddy Current Testing, Ultrasonic Testing and Radiographic Testing. This course also covers the execution, evaluation and interpretation of each NDT techniques. The advantages, limitations and main application of each NDT techniques are also provided.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the current basic and some advanced principles of Non-Destructive Testing (NDT) techniques to satisfy complex engineering problems. (PLO1, C2)
CLO2: Select and propose suitable NDT techniques based on their analysis on engineering problems that fulfill the standard practice (PLO2, P1)
CLO3: Develop the ability to communicate effectively using available resources to disseminate knowledge of NDT techniques in relation with industrial problem. (PLO4, A5)

BVW3144
Economic Of Welding And Procument
Credit Hour : 4
Prerequisite : None

Synopsis

The aim of this course is to provide participants with a clear understanding of the principles of effective procurement by utilising the capabilities to plan, implement, and evaluate a sourcing process appropriate to the value/ risk of the joining technology, materials/ part/ equipment being procured, communication and negotiation skills, and capacity to to manage strategic supply, services and consultancy contracts. Besides To acquire knowledge in welding economics in the

selection of process, consumables and workpiece materials.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the importance of effective costing and the factors influencing welding costs. (PLO1, C2)
CLO2: Calculate welding costs that iclude machine, material and labour. (PLO3, C4)
CLO3: Record of transactions in jurnal and ledgers, trial-balance and preparation of final account. (PLO2, P4)

BVW3124
Welding Quality Assurance
Credit Hour : 4
Prerequisite : None

Synopsis

This subject provides students with knowledge related with welding quality assurance. They will be taught with various topics covering Introduction to Welding Quality Assurance, Quality System Management and Responsibilities, Quality Assurance Planning, Welding Quality Standards, Inspections and Tests, Statistical Process Control, Nonconformances and Corrective Actions, Preventive Actions, Quality Audits, Records and Documents Control.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Design a plan for quality assurance and control in welding manufaturing process using according specifications and standards. (PLO1, C5)
CLO2: Demonstrate the procedure and inspection techniques related to welding assurance and control.(PLO2, P4)
CLO3: Apply creative thinking in problem solving to solve the problems associated with welding assurance and control. (PLO3, C3)

BVW2154
Capstone Technopreneurship 1
Credit Hour : 4
Prerequisite : Technopreneurship

Synopsis

Entrepreneurs need money to start and to grow their business. It is important to understand how revenue is generated, how to source for funds, how to control cash flow, how to assess the succes of the company in monetary terms, and how to value a company for various purposes. The course exposes students to the various financial aspects relating to new ventures. These include approaches to secure start-up capital and venture financing. Students learn about the basic accounting, essential financial indicators, the types of funds available, the different categories of investors, the importance of intellectual property in securing finance, the financial details to be included in a business plan required for investment purpose, valuation of company and the art of negotiation with investors.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply various financial indicators & tools to prepare for financial information for a new business venture (PLO7, C4, A4, P2 Knowledge)
CLO2: Acquire skills to analyze financial statements (PLO7, C2, A2, P5, Entrepreneurial Skills)
CLO3: Present financial information for new business (PLO7, C6, A2, P4, Practical Skills and High Technology)
CLO4: Display the art of negotiation with investors (PLO9, C2, A4, P5 Communication Skills)

BVW3154
Capstone Technopreneurship 2
Credit Hour : 4
Prerequisite : Technopreneurship Capstone 1

Synopsis

The start-up and growth of an enterprise invariably involves both human and financial capital. To manage the increasing pool of human resources and to convince

venture capitalists to invest become two main issues especially for growing venture. This course consists of two parts: in the first part, organization and human resource management are introduced; in the second part, the focus is on writing a convincing business plan to attract venture capital investment. When enterprise starts to take shape and grow, more people will be hired, proper organization, team building and human resource management will become important issues. In this course, students will be exposed to the various organizational aspects relevant to new ventures and established companies. These include the pros and cons of the different organization structures, conflicts that may arise among employees, and approaches to building strong teams. Human resourse management techniques will also be introduced and discussed. In the second part of the course, the business model canvas will be described listing the connections among the different components of a business. The value of a business plan and the techniques of writing a business plan will be introduced.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply the business model canvas incorporating human and financial elements (PLO7, C5, A4, P2 Knowledge)
CLO2: Acquire skills to resolve organizational conflicts (PLO8, C5, A2, P3 Critical Thinking and Problem Solving Skills)
CLO3: Write a convincing business plan (PLO7, C6, A2, P6, Entrepreneurial Skills)
CLO4: Evaluate vital organizational behaviours necessary to grow a new venture (PLO6, C5, A3, P6, Teamwork Skills)
CLO5: Motivate all stakeholders and build a cohesive venture team (PLO9, C3, A5, P7 Leadership Skills)

BVW3193
Cyber Physical System In Welding
Credit Hour : 3
Prerequisite : None

Synopsis

The aim of this course is to provide participants with a clear understanding of the potential application of cyber-physical systems (CPS) in welding industry. Competency in applying CPS technology, both with standalone and built-in CPS in analysis of welding parameters (e.g. current, temperature) and welding outputs (e.g. fume composition, welding bead) is thought for improving the marketability of the graduates in the era industrial revolution 4.0

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the added value that can be achieved through application of CPS in welding process. (PLO1, C5)
CLO2: Demonstrate effectively the appropriate CPS tools in acquiring process variables in real time. (PLO3, C3)
CLO3: Criticise the logged data acquired from conventional and non conventional welding techniques. (PLO8, A5)

BVW3124
Managing Production And Supervision
Credit Hour : 4
Prerequisite : None

Synopsis

Welding production planning is another very important element in manager's responsibility to allocate the resources required to achieve cost-effectiveness in welding processes. Furtheremore , this subjet shall cover managers responsibility to maintain equipment and consistently meet throughput requirements with a level of quality that conforms to the required standards.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Identify the standardize the welding procedure (PLO1, C1)
CLO2: Identify required maintenance of equipment and record (PLO2, P1)
CLO3: Explain supervisor scope to minimize reject, scrap and rework reduce rework analyze the quality management system (PLO9, A4)

BVW3204
Reclaimination In Welding
Credit Hour : 4
Prerequisite : None

Synopsis

The aim of this subject is to to acquire knowledge and to solve problems associated with failure and to update personal on the latest technology to ensure welded subject would be maintained in good operating condition and at low maintenance cost.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Repair quality of welding which will benefit the industry in term of productivity and savings (PLO2, P6)
CLO2: Develop the skills to carry out practical feasible repair techniques maintaining low cost (PLO8, A5)
CLO3: Selection of repair welding and apply techno-economics for practical problems (PLO3, C4)

BVW3284
Final Year Project 1
Credit Hour : 4
Prerequisite : None

Synopsis

The student needs to plan and implement the project individually that related to the respective engineering technology field. The student should implement a project, do the analysis and apply the theory to solve the problems related to topic. At the end, the student should write a problem based learning report that covers problem statement, literature review, methodology to overcome the problem. The student needs to achieve the objective of the project and presented it in the report.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the problem, objectives and scope of project associated to the industrial or community needs. (PLO1, C4, A3, P2)
CLO2: Use relevant theory to produce solution. (PLO6, C3, A1, P6)
CLO3: Choose a proper methodology. (PLO2, C5, A1, P1)
CLO4: Present the preliminary findings in the oral and written forms effetively (PLO4, C6, A2, P7)

BVW3286
Final Year Project 2
Credit Hour : 6
Prerequisite : Final Year Project 1

Synopsis

This is the second part of the Bachelor Degree Project. Students are expected to continue the project performed in Bachelor Degree Project until completion. At the end of the semester, students are required to submit the Bachelor Degree Project report and present their projects for assessment.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Perform project implementation systematically.(PO9, C3, A2, P4)
CLO2: Interpret data in a meaningful form using relevant tools. (PO2, C3, A5, P1)
CLO3: Work independently and ethically. (PLO6, C3, A3, P3)
CLO4: Present the results in the oral and written forms effectively. (PO4, C3, A2,P3)

BVW4212
Industrial Training
Credit Hour : 12
Prerequisite : None

Synopsis

Industrial training is a compulsory component for degree program students at Universiti Malaysia Pahang (UMP). The experience and skills acquired from a period of placement can be invaluable and provide the advantage to the students when applying for employment after graduation. During the training period with the relevant industry, students are expected to involve in the following areas of training in order to achieve the underlying objectives: Manufacturing, production process and / or its optimization process, mechanical design and product, maintenance and repair of equipments, poduct testing and quality control.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Solve technology related problems using methods, tools and techniques learnt throughout the training (PLO3, C3, A5, P3)
CLO2: Explain effectively with the technical community and produce technical reports and presentations. (PLO4, C2, A4, P2)
CLO3: Demonstrate social ethique and professionalism in technology practice. (PLO8, C3, A3, P5)

BVW Elective Courses

BVW3154
Non Destructive Test For Professional
Credit Hour : 4
Prerequisite : None

Synopsis

This subject covers the preparation for the certification in the selected NDT technology. Certification is important because NDT personnel need to make critical judgments that can have safety and/or significant financial consequences. Therefore, in this subject elements of technology preparation, operation, planning, data collection and interpretation, and maintenance are being provided.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Construct testing instruction and work planning. (PLO1, C6)
CLO2: Analyze the NDT data for evaluating the condition of the tested materials. (PLO3, C4)
CLO3: Recommend the maintenance and calibration of the NDT equipment. (PLO4, A4)

BVW3164
Welding Technology For Professional
Credit Hour : 4
Prerequisite : None

Synopsis

This subject provides students with knowledges and skills related with welding technology. They will be taught with various topics covering Introduction to Welder Certification Scheme, Welding Processes and Procedures, Welding Codes and Standards, Welding Procedure specification (WPS), Welding Procedure Qualification Test (WPQT), Pre and Post-weld Inspection, Reports and Documentations and Welder Qualification Training and Testing (WQT).

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Design a WPS and WPQTusing according specifications and standards. (PLO1, C5)
CLO2: Demonstrate the welding procedure based on knowledge related to welding techniques and position. (PLO2, P5)
CLO3: Apply creative thinking in problem solving to solve the problems associated with welding qualifiaction. (PLO5, A3)

BVW3174
Welding Inspection For Professional
Credit Hour : 4
Prerequisite : None

Synopsis

This course will teach the duties and responsibilities of a welding inspector including fusion welding processes, typical weld defects, types of steel (including carbon-manganese, low alloy and stainless steels), the hardening of steels, weldability, heat treatment, and parent metal defects. The course also includes visual inspection, the testing of parent metals and welds, and destructive and non-destructive test techniques. It is also learnt in the course about welder and procedure approval, codes and standards, and an outline of safe working practices.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the duties and responsibilities of a welding

inspector including fusion welding processes, typical weld defects, types of steel (including carbon-manganese, low alloy and stainless steels), the hardening of steels, eldability, heat treatment, and parent metal defects. (PLO1, C2)

CLO2: Perform visual inspection, the testing of parent metals and welds, and destructive and non-destructive test techniques. (PLO3, C3)

CLO3: Practice procedure approval based on codes and standards, and an outline of safe working practices (PLO2, P3)

CURRICULUM STRUCTURE FOR DIPLOMA OF MECHANICAL ENGINEERING 2020/2021

DMM1313
Computer Programming
Credit Hour: 3
Prerequisite: None

Synopsis

This course formally introduces the concept of computers, algorithms, problem solving, and programming languages. The programming language introduced in this course is C. Students will use the C language programming to solve simple mechanical engineering problem.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Construct C program that utilizes standard input output operations, variables, arithmetic operation, and math functions.

CLO2: Apply C program that utilizes control structure, looping, functions, and numeric arrays to solve Mechanical Engineering problems.

DMM1413
Engineering Drawing & CAD
Credit Hour: 2
Prerequisite: None

Synopsis

This subject is design to teach engineering drawing to the student using drawing tools such as free hand drawing, instrument drawing & Computer Aided Design Drawing (CAD) software. This will include from beginning to intermediate level of CAD. Student should be able to draw 2D as well as 3D drawing standard upon complete this course.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain a knowledge in engineering drawing principles and standard practice using drawing tools.

CLO2: Apply the orthographic view, section view, auxiliary view, isometric views and tolerances in engineering drawings to solve visualization problem.

CLO3: Interpret blue print of working drawing.

CLO4: Apply knowledge and techniques to create standard drawing relating to design engineering by using 2D CAD software

CLO5: Apply knowledge and techniques to create standard drawing relating to design engineering by using 3D CAD software

DMM1423
Electrical & Electronic Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces fundamental of electric circuit, circuit network analysis, inductance and capacitance. The electronics technology involved with basic understanding of usage and application of semiconductors devices: diodes, transistor, and digital logic circuits.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply knowledge of basic electrical circuit and semiconductor devices in mechanical engineering.

CLO2: Construct electrical circuit based on basic electrical and electronic knowledge.

CLO3: Solve mechanical engineering problem involving basic electrical and electronic.

DMM1523
Engineering Materials
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the engineering materials application, atomic bonding, crystal structure, mechanical and physical properties, microstructure, phase diagram, ferrous and non-ferrous alloys, polymer and advance materials.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the materials' atomic bonding and crystal structure.
CLO2: Prepare the mechanical testing to investigate the mechanical properties of engineering materials.
CLO3: Relates microstructures of alloys with phase diagram
CLO4: Distinguish the microstructure, properties and applications of ferrous and non ferrous alloys.
CLO5: Explain the polymeric and advanced materials classification, structure and properties.
CLO6: Demonstrate material selection process, with focus on selecting materials that optimize product performance, reliability and cost.

DMM1533
Statics
Credit Hour: 3
Prerequisite: DUF 1113

Synopsis

This course is an introduction to solving engineering static problems involving force vector, equilibrium of particle and rigid body in structures, frame and machines, friction effect on rigid body equilibrium, centroids, center of gravity and moment of inertia.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Solve equilibrium of particle using scalar method and vector notation
CLO2: Solve equilibrium of rigid body in structure, frame and machine problems
CLO3: Solve equilibrium of rigid body involving friction and structure
CLO4: Compute centroid, center of gravity and moment of inertia of composite cross sectional area

DMM1911
Mechanical Technology Laboratory 1
Prerequisite: None

Synopsis

This course introduces students with safe working habits, reading blueprints, identification, care and use basic measuring instruments, layout methods & basic hand tools. Emphasis is placed on operation of drill press, lathe, pedestal grinderand grinding operations..

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the fundamentals of safety and regulation in mechanical lab
CLO2: Apply bench work and drilling operation
CLO3: Apply various basic turning operations
CLO4: Apply grinding process
CLO5: Respond to team members in completing task

DMM 1921
Mechanical Technology Laboratory 2
Credit Hour: 1
Prerequisite: DMM1911 Mechanical Technology Laboratory 1

Synopsis

The course provides students hands-on experience of milling operations using conventional milling machine, welding operations using different types of welding equipments including electrode, MIG, TIG and spot weld and basic application of sheet metal fabrication.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain various basic conventional milling operations.
CLO2: Apply various welding operations using different types of welding
CLO3: Apply basic application of sheet metal fabrications.
CLO4: Respond to team members in completing task

DMM2412
Metrology
Credit Hour: 2
Prerequisite: None

Synopsis

This course covers the engineering measuring instruments such as micrometer, Vernier caliper, mechanical dial indicator, gauge block, surface plate, instruments of testing angles and gauges. Additionally, we will cover the principle of surface metrology and roundness measurement. Lastly, we will learn the relationship between drawing dimensions and the measurement parts, aspect of accuracy, precision and measurement errors.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply the fundamental of metrology, measurement errors and basic inspection by utilizing various methods and techniques.
CLO2: Demonstrate linear and angular measurements and inspection by using various measurement instruments.
CLO3: Apply the principles of surface metrology in order to calculate surface roughness by various methods.
CLO4: Understand the principles of roundness measurement by various methods.

DMM2513
Solid Mechanics
Credit Hour: 3
Prerequisite: DMM 1532

Synopsis
This course introduces the concept of stress and strain under axial loading, torsion, pure bending, and analysis and design of beam for bending.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Compute the simple stress problems in load-bearing structures.
CLO2: Estimate the stresses and strains in structural members subjected to axial loads.
CLO3: Solve the circular shafts subjected to twisting couples or torques.
CLO4: Calculate the stresses in beams subjected to pure bending.
CLO5: Solve the stresses in beams subjected to transverse loading by using shear force and bending moment diagram.

DMM2523
Dynamics
Credit Hour: 3
Prerequisite: DMM 1532

Synopsis

This course introduces kinematics of particles, kinetics of particles utilizing force and acceleration principles, kinetics of particles utilizing work and energy principles and kinetics of particles utilizing impulse and momentum principles.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Solve kinematics of particle problem
CLO2: Solve kinetics of particle problem utilizing force-acceleration principles
CLO3: Analyse kinetics of particle problem utilizing work-energy principles
CLO4: Analyse kinetics of particle problem utilizing impulse and momentum principles

DMM2533
Fluid Mechanics
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces properties of fluids, fluid statics, fluid in motion, flow measurement, friction in fluid flow and pumps & pumping.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Solve fluids properties and fluids statics problems
CLO2: Apply concept of fluid in motion and solve the problems involving flow measurements and friction
CLO3: Analyze the concept flow, work and pump to the typical problems

DMM2543
Thermodynamics
Credit Hour: 3
Prerequisite: None

Synopsis

This course includes a study of properties of a system, properties of pure substance, first law and second law of thermodynamics and entropy

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply the basic concepts of thermodynamics and properties of pure substances to the typical problems
CLO2: Solve the problems involving first law, second law, and entropy changes of thermodynamics systems
CLO3: Display teamwork ability through solving and presenting thermodynamics complex problems

DMM2632
Industrial Design
Credit Hour: 2
Prerequisite: None

Synopsis

This course cover several aspects related to product design and industrial design. The aspects covered are product planning and customer needs, product specification, concept generation and concept selection, industrial design, design of environment and design of engineering.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply the understanding of customer needs and product design specification in concept generation
CLO2: Produce a 3D design product by using Solidwork software
CLO3: Relate DFM and DFE with quality of product
CLO4: Build a positive communication within group members to present the project work

DMM2633
Manufacturing Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the student to various types of manufacturing processes used for converting raw material into finished products. This course will cover basic principles in metal casting processes, plastics processes, metal and sheet metal forming processes, powder metallurgy processes, materials removal processes, rapid prototyping and joining processes. Student will construct and present a process flow to manufacture a conceptual product.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain different types of manufacturing processes
CLO2: Apply different types of manufacturing processes
CLO3: Construct and present a process flow to manufacture a conceptual product

DMM3011
Occupational Safety & Health
Credit Hour: 1
Prerequisite: None

Synopsis

This course introduces OSH in Malaysia, identification, types and inspection of industrial hazard, analysis and control of industrial hazard, mechanical hazard, chemical hazard, physical hazard, psycho-

social hazard, industrial hygiene and diseases, accident causation phenomenon, accident investigation and analysis, managing safety and health, and industrial safety and health regulation.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Demonstrate the OSHA regulation and implementation in Malaysia
CLO2: Explain the industrial hazards and industrial hygiene
CLO3: Analyse the accident phenomenon

DMM3623
Hydraulics & Pneumatics Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces hydraulic and pneumatic systems, actuators, sensors, valves and accessories. This course also introduces the design, analysis and simulation method of hydraulic and pneumatic system. Electromechanical control and programmable logic control of hydraulic/pneumatic system are introduce to enhance the hydraulic and pneumatic system design.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Understand basic hydraulic/ pneumatics components and circuits
CLO2: Analyze basic hydraulic/ pneumatics components and circuits
CLO3: Analyze electro- hydraulic/ pneumatics components and circuits
CLO4: Assemble and test actual electro-hydraulic/ pneumatics systems
CLO5: Produce and simulate actual electro- hydraulic/ pneumatics system model using software

DMM3663
CNC Technology
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces the student to modern manufacturing processes which focused on CNC machining technology. This course will teach manual CNC programming and simulation using CNC simulator. This course will also cover troubleshooting for common programming errors. Student will construct a CNC program to manufacture a workpiece according to a technical engineering drawing..

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Construct CNC programme for CNC milling machine
CLO2: Construct CNC programme for CNC lathe machine
CLO3: Apply CNC programme to develop a CNC project
CLO4: Constructs and present a CNC project

DMM3673
Mechanical Design
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces simple design process of machine components for static and dynamic loading. Machine elements design including screws, bolts, nuts, welded joints, springs and shafts.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Identify static failure on structures and fatigue failure on shafts.
CLO2: Select the helical compression springs.
CLO3: Determine the non-permanent joints including bolts, nuts and screws.
CLO4: Analyse the welding in torsion and bending.

DMM3914
Final Year Project
Credit Hour: 4
Prerequisite: DMM2513

Synopsis

This course involves the project assignment to the students concerning selected topics related to the mechanical engineering. The technical project requires a particular design of appropriate equipment/system, development of the manufacturing process, testing and analysis of the system or equipment, preparation and presentation of the project report.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Deconstructs a project and its development process based on proper knowledge of engineering and current practices of engineering tools.
CLO2: Prepares the project report in both writing and oral communication with regard to ethical and professional practices in technology and engineering.
CLO3: Organizes techniques for literature review and independently formulates the gather information towards of accomplishment of the project
CLO4: Perform entrepreneurship knowledge in managing projects by considering cost effectiveness, practicality, and marketability.

DMM3912
Industrial Training
Credit Hour: 12
Prerequisite: Pass all core subjects with the status “Kedudukan Baik (KB)” on current evaluation.

Synopsis

This training exposes the students to professional skills and experience in aspect of mechanical engineering practice. The exposure will help to produce an excellent, responsible and good attitude..

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply and practice basic professional engineering knowledge/skills at industry level.
CLO2: Identify and solve the industrial problem using available or learnt modern tools such as CAD, CNC machine etc.
CLO3: Analyse and solve the industrial problems such as planning, design, construction and management of the projects.
CLO4: Build communication/presentation skill when dealing with colleagues at industry.
CLO5: Identify the company or department structure and recognize the job scope of specific post in the organization.
CLO6: Explain the industrial training at industry in a complete report by end of the industrial training program.
CLO7: Organize/manage a small group of people for special task/assignment.

CENTRE FOR MATHEMATICAL SCIENCES

CENTRE FOR MATHEMATICAL SCIENCES

INTRODUCTION

The Centre for Mathematical Sciences (PSM) offers one undergraduate academic programme in the field of Applied Science. The Bachelor of Applied Science in Data Analytics with Honours - 2u2i mode (MQA/PA 12425) is developed in line with UMP's vision, mission and educational goals to be a distinguished Technological University. The three and half year programme (2.5 years in university and 1 year in industry) is designed to produce highly skilled and competent graduates in the field of Data Science who are capable to gain insights of the data and make effective decisions using Data Science and Analytics skills.

Data Science is a new exponentially growing field that consists of a set of tools and techniques, and requires an integrated skill set from statistics, mathematics, computer science and the use of current technology in computer software or programming language. The Data Science elements are part of the main pillars of the Fourth Industrial Revolution (4IR). The Industrial Revolution gives birth to new emerging technologies which includes automation, digitilasation and artificial intelligence that bring forward new challenges in data science with the discovery of information from large volumes of data. For this programme, PSM has approached various industries which has potential to be appointed as the 2u2i Strategic Industry Partner. The Strategic Industry Partner will accept the students of Bachelor of Applied Science in Data Analytics with Honours to experience Work Based Learning (WBL) at their company.

PSM also offers a wide range of courses for undergraduate students in other disciplines. Students seeking to transfer credits should be requested in advance. The department also runs a very successful Mathematics Support Centre (MSC) which provides a drop-in centre for all undergraduate students taking mathematical courses.

PROGRAMMES OFFERED

- Bachelor of Applied Science in Data Analytics with Honours.
- Mathematics Service Courses to all Faculties

CAREER OPPORTUNITIES

Bachelor of Applied Science in Data Analytics with Honours:

- Data Analyst
- Digital Data Analyst
- Statistician
- Data Scientist
- Data Technopreneur
- Business and Marketing Analyst
- Programmer

CENTRE FOR MATHEMATICAL STRUCTURE
CURRICULUM STRUCTURE
BACHELOR OF APPLIED SCIENCE IN DATA ANALYTICS WITH HONOURS
2u2i MODE (2.5u 1i)

YEAR	FIRST		SECOND		THIRD		FOURTH
SEM	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND (Block Release - Industry)	FIRST (Block Release - Industry))
FACULTY & PROGRAMME COURSES	UHL2400 FUNDAMENTALS OF ENGLISH LANGUAGE	UHL2412 ENGLISH FOR ACADEMIC COMUNICATION	UHF 2**1 FOREIGN LANGUAGE II	UHL2422 ENGLISH FOR TECHNICAL COMMUNICATION	UHL2432 ENGLISH FOR PROFESSIONAL ACADEMIC REPORT WRITING	BSD4**3 ELECTIVE I	BSD4812 INDUSTRIAL TRAINING
	UHC1012 FALSAFAH DAN ISU SEMASA	UHF 1**1 FOREIGN LANGUAGE I	UHC2022 PENGHAYATAN ETIKA DAN PERADABAN	UQ* 20*1 CO CURRICULUM II	UHS2021 SOFT SKILL II	BSD4**3 ELECTIVE II	
	UHL1021 SOFTSKILL I	UQ* 10*1 CO CURRICULUM I	UGE2002 TECHNOPRENEUR	BSD2223 DATA SCIENCE PROGRAMMING II	BSD3143 OPERATIONAL RESEARCH	BSD4**3 ELECTIVE III	
	BSD1113 DISCRETE MATHEMATICAL STRUCTURE	BUM2123 APPLIED CALCULUS	BSD1133 DIFFERENTIAL EQUATION	BSD2333 DATA WRANGLING	BSD3433 EXPERIMENTAL DESIGN ANALYSIS	BSD3724 DATA SCIENCE PROJECT II	
	BSD1123 LINEAR ALGEBRA	BUM2413 APPLIED STATISTICS	BSD2213 DATA SCIENCE PROGRAMMING I	BSD2343 DATA WAREHOUSING	BSD3443 STATISTICAL MODELLING AND SIMULATION		
	BSD1313 INTRODUCTION TO DATA SCIENCE	BSD1323 STORYTELLING AND DATA VISUALIZATION	BSD2423 MATHEMATICAL STATISTICS	BSD2513 ARTIFICIAL INTELLIGENCE	BSD3523 MACHINE LEARNING		
	BSD1412 COUNTING AND PROBABILITY	BCI1023 PROGRAMMING TECHNIQUES	BCI1093 DATA STRUCTURE & ALGORITHM	BSD3712 RESEARCH METHODOLOGY	BSD3533 DATA MINING		
	BCI1143 PROBLEM SOLVING	BPQ1223 PRINCIPLES OF OPERATION MANAGEMENT	BCI2023 DATABASE SYSTEM	BSF2112 INDUSTRY QUALITY MANAGEMENT	BSD3722 DATA SCIENCE PROJECT I		
TOTAL CREDIT	17	19	20	19	20	13	12
TOTAL CREDIT FOR GRADUATION	120						

The information provided by Centre for Mathematical Sciences are based on University's Regulation and endorsement until 1 July 2020

CENTRE FOR MATHEMATICAL STRUCTURE
MATHEMATICS SERVICE

Courses in
Mathematics Service

NO.	CODE	COURSE	CREDIT HOUR
1	DUM1113	BASIC MATHEMATICS	3
2	DUM1123	CALCULUS	3
3	DUM1213	FUNDAMENTAL DISCRETE STRUCTURE	3
4	DUM2113	TECHNICAL MATHEMATICS	3
5	DUM2413	STATISTICS & PROBABILITY	3
6	BUM1113	TECHNICAL MATHEMATICS	3
7	BUM1123	MATHEMATICS FOR MANAGEMENT	3
8	BUM1133	MATHEMATICS FOR COMPUTER GRAPHICS	3
9	BUM1153	INTERMEDIATE MATHEMATICS	3
10	BUM1223	CALCULUS	3
11	BUM1233	DISCRETE MATHEMATICS AND APPLICATIONS	3
12	BUM1433	DISCRETE STRUCTURE & APPLICATIONS	3
13	BUM2113	APPLIED MATHEMATICS	3
14	BUM2123	APPLIED CALCULUS	3
15	BUM2133	ORDINARY DIFFERENTIAL EQUATIONS	3
16	BUM2312	NUMERICAL METHODS	3
17	BUM2433	STATISTICS FOR MANAGEMENT	3

COURSE SYNOPSIS FOR BACHELOR OF APPLIED SCIENCE IN DATA ANALYTICS WITH HONOURS

BSD1113
Discrete Mathematical Structure
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces and discusses the fundamental of the discrete for computer science, which focuses on providing a basic theoretical foundation for further work. Students will be exposed to basic logic, proof techniques, set theory, functions & relations, elementary number of theory, graphs, trees and modelling finite state machine. This course integrates symbolic tools, graphical concepts, and numerical calculations for mathematical discrete structure.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of discrete mathematical structure.
CO2: Analyse mathematical problems using discrete mathematical structure knowledge.
CO3: Provide solution to discrete mathematical structure problems arise into real life data.

BSD1123
Linear Algebra
Credit Hour: 3
Prerequisite: None

Synopsis

This course covers fundamentals of matrix theory followed by some applications. The first part of this course covers introduction to vectors, solving linear equations, vector spaces and subspaces, orthogonality, determinants, eigenvalues and eigenvectors, linear transformations, complex vectors and matrices. The second part are the applications which cover applications of linear algebra in data science.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of linear algebra.
CO2: Analyse mathematical problems using linear algebra knowledge.
CO3: Provide solution to linear algebra problems arise into real life data.

BSD1313
Credit Hour: 3
Prerequisite: None

Synopsis

Data science is an emerging field of study and requires a powerful combination of various disciplines namely mathematics, statistics, computer science and domain expertise. This course presents the overview of data science including the definition and foundation of data science, the process of data science, its infrastructure, computing for data science and issues related to data science. Case studies are discussed to illustrate the data science application.

Course Outcome

By the end of semester, students should be able to:
CO1: Explain the terminologies used in data science.
CO2: Distinguish the components and requirements of data science.
CO3: Communicate effectively in written and oral forms by completing the task given.

BSD1412
Counting and Probability
Credit Hour: 2
Prerequisite: None

Synopsis

This course introduces the basic concepts and rules of counting and probability as they apply to data analytics, focusing on providing a theoretical foundation for further and idealized situations drawn from everyday life data. Students will be exposed to basic of counting, advanced counting techniques, probability theory and its relationship with counting rules, and review on random variables and probability distributions. Students will be able to determine the number of outcomes of an event and determine the possibility of an event which occurs in various fields and apply the knowledge into real life data such as in science, engineering, technology, industrial, computing, games, sports, political, business, security and history. This course integrates symbolic tools, graphical concepts, and numerical calculations of counting and probability.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of counting and probability.
CO2: Solve any related problems of counting and probability in various fields.
CO3: Apply appropriate concepts and methods of counting and probability into real life data.

BCI1143
Problem Solving
Credit Hour: 3
Prerequisite: None

Synopsis

This course expose to the students with the appropriate computing methods in solving problem through programming approach, which consists of programming design, algorithm, pseudo code, flow chart and logic structure.

Course Outcome

By the end of semester, students should be able to:
CO1: Produce the solutions for a given problems using appropriate problem solving approach.
CO2: Demonstrate logical thinking skills in problem solving.
CO3: Demonstrate team working skills through group assignment.

BUM2123
Applied Calculus
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces four main topics which are Polar Coordinates and Vector, Vector-Valued Functions, Partial Derivatives and Multiple Integrals. Students will learn basic sketching in two-dimensional coordinate system, three-dimensional coordinate system and polar curves that will help them in visualization courses. At the end of this course, students also will be able to find maximum/minimum value, finding area and volume for multi variable functions. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental calculus concepts of equations and vectors.
CO2: Analyse various problems involving derivatives and integrals.
CO3: Provide solution for a wide range of problems in science and engineering by using concept of calculus.

BUM2413
Applied Statistics
Credit Hour: 3
Prerequisite: None

Synopsis

This course is primarily focuses on the statistical data analysis knowledge in various types of everyday life data. This course aims to expose students to the practical knowledge of statistical methods in any area of interest. Students are exposed to statistical problem-solving methodology and descriptive statistics; confidence interval; hypothesis testing; analysis of variance (ANOVA); regression and correlation including simple and multiple linear regressions; goodness-of-fit test and contingency tables. Appropriate software such as Microsoft Excel shall be used in this course.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of statistics.
CO2: Perform statistical analysis by using appropriate statistical theory and methodology.
CO3: Analyse real life data to solve related problems in various disciplines.

BSD1323
Storytelling and Data Visualization
Credit Hour: 3
Prerequisite: None

Synopsis

Data visualization is increasingly important and useful to complement data analytics in order to communicate the findings, especially to the non-technical audience. Creating an effective storytelling through the correct data visualization skill is vital in making sure the information presented is clear and easy to understand. In this course, various aspects of data visualization from simple to complex

tables, graphs and charts are demonstrated using Microsoft Excel, Tableau or Power BI. By the end of this course, student will be able to generate powerful reports and dashboards that will help people make decisions and take action based on real world data. Students will learn how to create high-impact visualizations of common data analyses to help them see, understand and effectively tell a story about the data.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental skill of data visualization.
CO2: Demonstrate the data visualization skill using an effective storytelling.
CO3: Display a powerful report and dashboard in solving various applications using appropriate software.
CO4: Work collaboratively as part of a team to solve given problem through group discussion and presentation.
CO5: Demonstrate an active communication through group discussion and presentation.

BCI1023
Programming Techniques
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses on understanding problems and translating them into computer solution techniques using programming language such as C. This course enables students to apply programming techniques, write programming codes from given problems and execute programming codes successfully.

Course Outcome

By the end of semester, students should be able to:

CO1: Demonstrate various techniques in solving a problem.
CO2: Construct and run programs.
CO3: Differentiate various techniques in solving a problem.

BPQ1223
Principles of Operation Management
Credit Hour: 3
Prerequisite: None

Synopsis

The course provides a range of academic knowledge, operations understanding, operational management techniques. It will focus on the main decision areas of operations management and their impact on business functions and the role of the operations manager and the relationship with productivity improvement.

Course Outcome

By the end of semester, students should be able to:

CO1: Apply the fundamental concept and the main areas of operation management.
CO2: Demonstrate operation decisions in solving operational problems.
CO3: Justify operations management requirements.

BSD1133
Differential Equations
Credit Hour: 3
Prerequisite: None

Synopsis

This course comprises selected topics in Ordinary Differential Equations (ODE) and Partial Differential Equations (PDE) that will be used in Data Analytics program. This course starts with the first-order and second order ordinary differential equations, Laplace transform and Fourier Series. The second part of the course discuss PDE topics which are first-order and second order partial differential equations and Laplace transform. The knowledge gained in this course is very important to assist student in other statistical/mathematical subjects. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental principle of first and second order differential equations, Laplace transforms and Fourier series.
CO2: Solve various first and second order ordinary differential equations, Laplace transforms and Fourier series for various periodic functions.
CO3: Solve various first and second order partial differential equations and Laplace's equation.

BSD2213
Data Science Programming I
Credit Hour: 3
Prerequisite: None

Synopsis

Numerical programming skill is vital to solve practical problems in various disciplines such as in science, engineering, technology and industries. This course introduces programming concepts and language construction using Python software. Students will learn about variable, loop and branching, functions, class and object-oriented programming to visualize mathematical solution. Case studies in selected disciplines are presented to provide a motivating experience to student. At the end of this course, students will be able to develop a friendly graphical-user interface using Python programming.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental knowledge in numerical programming.
CO2: Produce mathematical solution for the given problem.
CO3: Develop programming codes to visualize the solution of mathematical problems.
CO4: Demonstrate teamwork among group members to solve assigned task.

BSD2423
Mathematical Statistics
Credit Hour: 3
Prerequisite: BSD1412, BUM2413

Synopsis

This course primarily focuses on the mathematical foundation of statistical theory in data analytics. Students will experience multiple activities designed to help them master the core concepts of mathematical statistics and prepare them with a solid foundation for the other data analytics courses. Students will be exposed to discrete and continuous random variables and their probability distributions, bivariate random variables, functions of random variables, sampling distributions and estimation theories, optimal test of hypotheses, and introduction to Bayesian methods for inference. This course provides an indication of the relevance and importance of the statistical theory in solving practical problems in various disciplines such as in science, engineering, technology and industries. The applications of the statistical theory may provide a refreshing and motivating experience for students.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire mathematical foundation concepts of statistical theory.
CO2: Perform statistical analysis by using appropriate mathematical statistics theory and methodology.
CO3: Analyse real life data to solve related problems in various disciplines.

BCI1093
Data Structure & Algorithms
Credit Hour: 3
Prerequisite: BCI1023

Synopsis

This course is designed to expose the students to the data structures and algorithm. It provides theoretical basis in data structures and the application of data structures is based on standard algorithms. Students must also be able to transform the data structure and algorithms problems into the computer programs.

Course Outcome

By the end of semester, students should be able to:
CO1: Analyse various types of data structures and algorithms techniques in solving a related problem.
CO2: Construct a programme by applying the data structure and algorithms techniques for a related problem.
CO3: Use online application to find solution for a related problem.

BCI2023
Database System
Credit Hour: 3
Prerequisite: None

Synopsis

The course emphasizes on the importance of data to an organization and how the data should be managed. Database management system (DBMS) will be viewed as a solution to the problems of file processing system. Aspects of relational database design will be covered in details. This includes database

development life cycle, database architecture, data models, and normalization process. Several query languages such as relational algebra, Structured Query Language (SQL) and Query by Example (QBE) will be discussed but the emphasis is on SQL. Students will be given a real life problem to design and develop a database application system. In the later part of the course students will be exposed to the latest developments in database architecture. uncertainty will be addressed.

Course Outcome

By the end of semester, students should be able to:

CO1: Distinguish appropriate concepts, principles and applications of database systems.
CO2: Manipulate queries using the syntax of Structure Query Language (SQL), Relational Algebra and Query By Example.
CO3: Construct innovative solution through the representation of data model using ER and EER Diagrams and normalize database to be implemented in database application system using appropriate DBMS.
CO4: Work in group in order to complete the given assessments in specific time frame.

BSD2223
Data Science Programming II
Credit Hour: 3
Prerequisite: None

Synopsis

Programming skills is required in data related study. This course presents basic R programming language which are widely used and open-source based. The course discusses fundamental feature of R, data exploration and data presentation tools. Students will be able to identify appropriate tools to write codes, manipulate, analyse and present their own analysis using R. This is a hands-on project-based course to enable students to develop programming and critical thinking skills. The students should be able to extend these basic knowledge and skills using R for advanced application in data science.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental knowledge on basic functions of programming language.
CO2: Analyse and summarise data using appropriate programming tools.
CO3: Develop programming codes to solve problems.
CO4: Demonstrate verbal and written communication skills.

BSD2333
Data Wrangling
Credit Hour: 3
Prerequisite: None

Synopsis

Data wrangling is the process of cleaning, structuring and enriching complex raw data into a desired format for analysis and better decision making. This course introduces the knowledge and skills to wrangle data from diverse sources and shape it to enable data-driven applications. In this course, some main topics are covered including introduction of data wrangling, dynamics of data wrangling and data transformation. Students will learn how to gather and extract data from widely used data formats. Python will be used for implementation.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire data wrangling fundamental concepts and knowledge.
CO2: Apply data wrangling techniques to handle heterogeneous and distributed data.
CO3: Manipulate data to required format and location for data-driven applications.
CO4: Develop leadership skill in grouping assessment.

BSD2343
Data Warehousing
Credit Hour: 3
Prerequisite: None

Synopsis

The recent rapid growth of various open source and proprietary big data technologies allows deep exploration of these vast amounts of data. However, many of them are limited in terms of their statistical and data analytics capabilities. The main goal of the course is to navigate through the complex layers of Big Data and data warehousing, while providing information on how to effectively think about using all these technologies and the architectures to design

the next-generation data warehouse. Throughout the contents of this course, the students will be exposed to core technologies that have evolved to solve large-scale data processing, including Hadoop and its ecosystem, NoSQL databases, and other technologies. In addition, students also will experience various cases on how real world companies have benefited from Big Data and data warehousing.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental Big data and data warehousing concepts.
CO2: Analyse mathematical problems using appropriate Big data and data warehousing concepts.
CO3: Manipulate Big data and data warehousing concepts in solving real-life problems using appropriate software.
CO4: Work in group in order to complete the given assessments in specific time frame.

BSD2513
Artificial Intelligence
Credit Hour: 3
Prerequisite: None

Synopsis

Artificial Intelligence (AI) is the field which focuses on the creation of intelligence in machines which able to mimic human intelligence. This course aims to introduce students to the theory and practice of the AI. In this course, student will learn basic search, heuristics and metaheuristics, knowledge representation system, information processing and robotics. Students will utilise personal and technical skills to develop artificial intelligence system in various applications including robotics and automation, intelligent manufacturing and information technology, with the assistance of computer software such as Python.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire artificial intelligence concepts and methodologies in data science.
CO2: Demonstrate critical thinking ideas of artificial intelligence knowledge in problem-solving situation.
CO3: Develop an artificial intelligence system prototype using appropriate software.
CO4: Develop leadership skills in grouping assessment.
CO5: Integrate artificial intelligence knowledge to the project and future problems.

BSD2712
Research Methodology
Credit Hour: 2
Prerequisite: None

Synopsis

This course will provide students to establish their understanding of research through a critical exploration of research terminology, ethics, and approaches. The course introduces the terminology of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed methods approaches. Students will use these theoretical underpinnings to begin to critically review literature which relevant to their field or interests of research, and determine how research findings are useful in forming their understanding of their work, social, local and global environment. In this course, we will introduce students possible writing and reference softwares such as LaTeX and Mendeley.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire knowledge of research terminology, research process, quantitative, qualitative and mixed methods approaches to research.
CO2: Organise the research proposal by including the research elements accordingly.
CO3: Explain effectively in written and oral form through project proposal presentation.
CO4: Demonstrate of the ethical principles of research, ethical challenges and approval processes in proposal report and presentation.

BSF2112
Industry Quality Management
Credit Hour: 2
Prerequisite: None

Synopsis

This course focuses on the management of

quality for manufacturing, service and public sectors to achieve global competitiveness. Emphasis is placed on new techniques for managing quality. This course is divided by two parts. Part one provides an introduction to quality assurance principles, including (i) Good Manufacturing Practices (GMP), (ii) ISO 9000 family and (iii) various continuous improvement techniques such as six sigma, lean manufacturing, 5S and total quality management and (iv) audit process. Part two focuses on the quality control system, which is concerned with (i) quality control tools used in industries, (ii) acceptance sampling, (iii) statistical data analysis, (iv) reliability and maintainability, and (v) cost of quality. Lectures will be conducted two hours per week; with one assignment throughout the semester. Learners are required to sit for one test, and series of quizzes to ensure sufficient fundamental knowledge. Upon completion of the course, the learners should be able to (i) hypothesize alternative approaches to solve problems related to industrial quality management systems, and (ii) gather information from multiple sources related to quality assurance and quality control in industries.

Course Outcome

By the end of semester, students should be able to:

CO1: Describe the basic concept of quality assurance (QA) and quality control (QC) in industries.
CO2: Analyse suitable approach to solve problems related to industrial quality management.
CO3: Gather information from multiple sources related to quality assurance and quality control in industries.

BSD3143
Operational Research
Credit Hour: 3
Prerequisite: BSD1123

Synopsis

Operational research is the fundamental knowledge and skill set which can be used to determine the best solution for real world industrial problems via mathematical modelling. This course aims to expose students to the concept and methods of optimization using data, and the required tools to solve various applications in industry. In this course, students will be trained to use powerful optimization techniques which includes linear programming, simplex method and sensitivity analysis, transportation and assignment model, network models, integer programming and queuing models. This course utilizes both students' personal and technical skills to make the best decision which is applicable in various industry settings i.e. manufacturing, service industry, transportation, marketing, finance, medicine, law, military and public policy, with the assistance of various computer modelling solver of TORA.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental principle of operational research.
CO2: Provide solution to industrial problems using operational research methods.
CO3: Work collaboratively as part of a team to solve given problem through group discussion and presentation.

BSD3433
Experimental Design Analysis
Credit Hour: 3
Prerequisite: BUM2413

Synopsis

This course will give students an exposure to various experimental design methods. Then course emphasized students working with data and understanding the different methods of designing and analysing of the data. Students are exposed to experimental design, including basic principles and guidelines to design experiments, experiments with single factor, Randomized Blocks, Latin Squares and Related Designs, Factorial Design, the 2k Factorial Design, and Fractional Factorial. The methods are developed and applied to various data sets from many different fields. Excel software is used by students to implement these ideas in practice. Students will experience the theoretical and practical aspects of experimental design.

Course Outcome

By the end of semester, students should be able to:

CO1: State a clear and generally accepted statement of problem.
CO2: Apply the basic principle of experimental design for various data sets from many different fields.
CO3: Construct a powerful data analysis by using an appropriate software tools.
CO4: Communicate effectively in written and oral form through group discussion

(assignment) and presentation session.

BSD3433
Statistical Modelling & Simulation
Credit Hour: 3
Prerequisite: BSD2423

Synopsis

The course focuses on methods to model and analyse a variety of random phenomena. The analysis will in practice often be done by simulation, but also the theoretical analysis is important. Students shall be able to implement statistical models on a computer, generate, interpret and present results. Topics that are appropriate to address: the general statistical model building, assessing the goodness of the model, estimation of distribution and parameters of the model and assess the uncertainty of estimates, bootstrap, number generators, variance reduction techniques, modelling and simulation of dependencies. The R statistical package will be used throughout the course.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire various approaches and knowledge of statistical modelling.
CO2: Formulate statistical models for various problems in science, engineering and industry.
CO3: Manipulate statistical modelling theory and methodology in solving various applications using appropriate statistical software.
CO4: Demonstrate good interest and initiative for exploring issues in statistical modelling analysis for a given task.

BSD3523
Machine Learning
Credit Hour: 3
Prerequisite: None

Synopsis
Machine learning is a subfield of data science that focuses on designing algorithms that can learn from data and make predictions on it. This course provides an introduction to machine learning which includes the basic components of building and applying prediction functions with the emphasis on practical applications. Students will be provided with basic concepts such as training and tests sets, overfitting, and error rates. Range of models based and algorithmic machine learning methods are covered including regression, classification trees, Naive Bayes, random forests and so forth. In addition, the course will cover the complete process of building prediction functions including data collection, feature creation, algorithms, and evaluation. Weka/ Python/ SAS Enterprise Miner/ Knime software shall be used by students to implement these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Distinguish the machine learning concepts and methodologies in computer science.
CO2: Apply the machine learning models in solving real world problems.
CO3: Construct the programming codes or workflows using appropriate machine learning tools.
CO4: Develop leadership skill in grouping assessment.
CO5: Integrate machine learning knowledges to the project and future problems.

BSD3533
Data Mining
Credit Hour: 3
Prerequisite: None

Synopsis

Data mining is the process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems. This course introduces basic concepts, tasks, methods, techniques, model building and testing, and interpreting and validating results in data mining. The predictive analytics methods are applied to various data sets from many different fields. At the end of the lecture, students will create their own programming codes/ predictive workflow models in order to solve real world problems for their project. The students experience the theoretical and practical aspects of data mining knowledge in lecture and laboratory session. WEKA/ Python/ SAS Enterprise Miner/ Knime software is used by students to implement these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Distinguish the data mining concepts

and methodologies in computer science.
CO2: Apply data mining techniques in real world phenomena.
CO3: Construct the programming codes or workflows using appropriate predictive analytics tools.
CO4: Develop leadership skill in grouping assessment.
CO5: Integrate data mining knowledges to the project and future problems.

BSD3722
Data Science Project I
Credit Hour: 2
Prerequisite: None

Synopsis

Learning activities are focused on developing workable research project proposal comprising identification of (i) problem statement, (ii) objectives, (iii) literature reviews and (iv) methodology. Each student is assigned to a supervisor (lecturer); based on field of expertise. The stated focus are planned to be delivered by direct active/engaged learning with the advisor (weekly basis); to understand the project direction. Students are also required to gather information through reading of recently-published articles on related field. Identification of data and suitable characterization tools to ensure completion of project will be finalised and justified with guidance of supervisor. A problem-based project is designed to encourage the students to incorporate managerial skills (e.g., project management, ethics, time management and log book keeping). Students are assessed based on written project proposal and efficiency of communications of project strategies during oral presentation. Students will continue laboratory work upon approval of project proposal by faculty members. Students should be able to choose appropriate data science tools and techniques and suggest suitable solutions to be applied for their data science project upon completion of the course.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve various problems by using various appropriate principles of data science.
CO2: Develop solution to the problem by using various data science technologies.
CO3: Demonstrate effective communication skills.
CO4: Practice independent learning, good enthusiasm and professionalism in completing the task.

BSD3724
Data Science Project II
Credit Hour: 4
Prerequisite: None

Synopsis

This course is a continuation of BSD3722 Data Science Project I. Learning activities are directed on completion of individual project (by supervisor monitoring) including preparation and presentation. The project objectives are planned to be delivered by active/engaged learning with supervisor and industrial coach, practical laboratory work, self-reading and draft preparation. Students will gather suitable data to answer project objectives; handling data analysis and discussion prior project writing. Students are assessed based on complete draft of project; effective communications of their findings during oral presentation and log book arrangement. Each student is expected to submit a fully developed and presentable project that reflects the student's command of the project process, appropriate tools usage and applications involved.

Course Outcome

By the end of semester, students should be able to:
CO1: Solve various problems by using various appropriate principles of data science.
CO2: Develop solution to the problem by using various data science technologies.
CO3: Demonstrate effective communication skills.
CO4: Practice independent learning, good enthusiasm and professionalism in completing the task.

BSD4453
Multivariate Data Analysis
Credit Hour: 3
Prerequisite: BSD2423

Synopsis

The problem arise in physical phenomena are widely involve multivariate data analysis since multivariate data analysis is a central tool whenever many variables need to be

considered at the same time. It is the extension of common univariate statistical procedures to analogous multivariate techniques that involve several dependent variables. Hence, this course is designed to strengthen the fundamental knowledge of multivariate data analysis which lead to understanding to the real problem in life. This course builds on knowledge of introductory to the theoretical and practical techniques in multivariate analysis. The theoretical links between multivariate techniques and corresponding univariate techniques, where appropriate is highlighted. Also, selected multivariate techniques such as principal components analysis, factor analysis and discrimination and classification are introduced. An introduction to matrix algebra and multivariate normal distribution theory are also discussed. The course also covers relevant multivariate methods in R Language.

Course Outcome

By the end of semester, students should be able to:

CO1: Differentiate between multivariate and univariate methods and discuss the assumptions placed on multivariate methods in detail.
CO2: Analyse multivariate data using the appropriate assumptions and statistical methods.
CO3: Manipulate multivariate statistical methods in solving various applications and carry out analysis by using appropriate statistical software.
CO4: Work collaboratively in groups to analyse multivariate data and document the results.
CO5: Organise various approaches to use the information and other related skills in solving any related problems.

BSD4463
Time Series Analysis
Credit Hour: 3
Prerequisite: None

Synopsis

This course will expose students to time series modelling and forecasting. The course is designed to provide students to learn time series modelling in theory and practice with emphasis on practical aspects of time series. The topics include theory and applications of linear time series for univariate and multivariate data in statistics, economics and finance, science, engineering and quantitative social science. Two approaches of time series analysis are discussed here that are Box-Jenkins and regression models. Time series models play an important role in analysing the variability inherent in biological, medical and engineering processes, and in dealing with the uncertainties affecting managerial decisions. Appropriate software such as R language or Minitab shall be used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:

CO1: Describes different types and patterns of time series data and model time series.
CO2: Develop the BoxJenkins model, regression model and exponential smoothing for trend and seasonality time series.
CO3: Analyse time series data by using an appropriate software tools.
CO4: Work collaboratively in groups to analyse real time series data and document the results.
CO5: Demonstrate good interest and initiative for exploring issues in time series data analysis for a given task.

BSD4543
Deep Learning
Credit Hour: 3
Prerequisite: BSD3523

Synopsis

Deep Learning is a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called artificial neural networks. This course introduces student to the theory and practice of the deep learning. Students experience to the main deep learning topics including the fundamental issues, terminology, techniques, mathematics of deep learning, fundamental neural network architectures, feedforward networks, convolutional networks and recurrent networks. Practical examples of how to appropriately build and train these models and to use per-trained models for the best results will be covered. Matlab/ Python/ SAS Enterprise Miner/ Knime software will be used by students to implement these ideas in practice.

Course Outcome

By the end of semester, students should be able to:

CO1: Distinguish the deep learning concepts and methodologies in

computer science.
CO2: Apply deep learning techniques in real world phenomena.
CO3: Conduct appropriate tools to solve deep learning problems.
CO4: Demonstrate verbal and written communication skills.
CO5: Integrate deep learning knowledges to the project and future problems.

BSD4613
Circular Data Analysis
Credit Hour: 3
Prerequisite: BUM2413

Synopsis

Circular statistics is a branch of statistics that involve circular data which deal with direction or cyclic time. This course introduces the basic theory, methodology and applications of circular statistics as they apply to circular data through real life examples. The applications of circular statistics can be found in various areas such as in biology, physics, geology, environmental, psychology, astronomy, meteorology and medical. Over the course, students will experience multiple activities designed to help them master these core concepts and apply the theory in solving practical problems in the real world. Students will be exposed to circular data focusing on the data display, summary statistics, probability functions and circular models, parameter estimation, hypothesis testing, correlation and regression, and some modern methodology for circular statistics. Appropriate software such as R shall be used in this course to implement these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire mathematical foundation concepts of circular data analysis.
CO2: Produce statistical analysis for circular data by using appropriate statistical theory and methodology.
CO3: Manipulate circular statistics theory and methodology in solving various applications using appropriate statistical software.
CO4: Work collaboratively as part of a team to solve given problem through group discussion and presentation.
CO5: Demonstrate good interest and initiative for exploring issues in circular data analysis for a given task.

BSD4623
Decision Analysis
Credit Hour: 3
Prerequisite: None

Synopsis

Decision analysis is a systemic fundamental knowledge which is needed to justify a complex decision which usually involves many uncertainty, conflicting objectives and risks. This course aims to expose students to the knowledge and methods of decision analysis and tools to solve various decision-making situations in industry. In this course, student will learn the essence of decision making process which includes introduction to decision theory, decision under uncertainty, decision under risk, game theory, social choice theory and multi attribute decision making. This course catalyses both personal skill and technical skill in analysing the best decision which is applicable in various industry settings i.e management, manufacturing, service industry, transportation, marketing, finance, medicine, law, military and public policy, with the assistance of various conceptual tools and models for decision making support.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of decision analysis.
CO2: Analyse mathematical problems using decision analysis methods.
CO3: Provide solution to industrial problems using decision analysis tools.
CO4: Demonstrate verbal and written communication skills.
CO5: Demonstrate good interest and initiative to explore decision making and analysis in real world applications.

BSD4633
Forensic Data Analysis
Credit Hour: 3
Prerequisite: None

Synopsis

The resulting challenge for forensic scientists or statisticians is to produce, process, and present accurate data that will assist legal decision makers in reconstructing past events. The concomitant challenge for the legal system is to achieve an optimal balance between completeness and comprehensibility of quantitative testimony. This course describes the tools of modern Bayesian

decision theory, by illustrating their application to paradigmatic, types of data in forensic science, and by defending the procedures against various objections. The course cover elements of the theory probability, likelihood, and utility then apply them in the form of Bayes' rule and loss functions to the recurrent statistical problems of estimation, classification, and decision.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire knowledge on the process of forensic data analysis.
CO2: Analyse forensic data by using statistical estimation, classify and decide.
CO3: Provide solution to forensic data problems arise into real life data.
CO4: Demonstrate verbal and written communication skills.
CO5: Demonstrate good interest and initiative for exploring issues in forensic data analysis for a given task.

BSD4643
Econometrics
Credit Hour: 3
Prerequisite: BUM2413

Synopsis

This course provides an introduction to the economics sciences discipline and deals with the analysis of mathematical and statistical data for testing and experimenting with economic theory. Statistical research and quantitative analysis are used to clarify and develop principles of economics. The econometrics methods such as simple linear regression model, multiple linear regression model, heteroscedasticity, logistic regression model and simultaneous equation models will be discussed in this course. The aim is to equip graduate students with the econometric methods in the area of economics, business, finance, marketing, management and other disciplines. This course also designed to train students in practical aspects of empirical economics using appropriate software such as Minitab.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire the basic principles of econometric modelling and analysis.
CO2: Analyse various economic data by using appropriate econometric modelling and methods.
CO3: Adapt appropriate software to analyse the economic data of the various application.
CO4: Work collaboratively in groups to analyse real econometric data and document the results.
CO5: Demonstrate good interest and initiative for exploring issues in econometrics for a given task.

BSD4653
Fuzzy Set Theory and Applications
Credit Hour: 3
Prerequisite: None

Synopsis

This course will provide the fundamental idea to provide basic and concrete concepts of the fuzzy theory and its applications, and thus on easy illustrations of the basic concepts. It consists of two parts: a theory part and an application part. The first part (theory part) includes introduce basic concepts of fuzzy sets and operations, multi-dimensional fuzzy sets, extensions of the fuzzy theory to the number and function, developments of fuzzy properties on the probability and logic theories. The second part (application part) focusing on application of fuzzy set theory in computerised tasks using any appropriate software such as Python.

Course Outcome

By the end of semester, students should be able to:

CO1: Distinguish the application of fuzzy set theory concepts and methodologies in real world phenomena.
CO2: Apply fuzzy system prototype/module and demonstrate critical thinking ideas in fuzzy knowledge and problem-solving.
CO3: Conduct appropriate tools to solve uncertain event.
CO4: Demonstrate verbal and written communication skills.
CO5: Initiate fuzzy knowledge to the project and future problems.

BSD4663
Geographical Information System
Credit Hour: 3
Prerequisite: None

Synopsis

This course is designed to introduce the

student to the basic principles and techniques of GIS (Geographic Information Systems). GIS is a computer-based tool that uses spatial (geographic) data to analyse and solve real-world problems. The lab material will emphasise GIS data collection, entry, storage, analysis, and output using appropriate software such as ArcGIS. The students will be able to describe what geography and GIS are; will understand the importance of scale, projection, and coordinate systems in GIS; will understand vector and raster data structures and the appropriate use of each of these data structures; will understand the basics of data capture, storage, analysis, and output in a GIS; and will understand typical uses of GIS in business, government, and resource management.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire basic concepts and principles of GIS.
CO2: Analyse spatial data of GIS.
CO3: Conduct appropriate tools to solve GIS problems.
CO4: Demonstrate verbal and written communication skills.
CO5: Demonstrate good interest and initiative for exploring issues in GIS for a given task.

BSD4673
Risk Analysis
Credit Hour: 3
Prerequisite: BSD2423

Synopsis

This course is an introduction to risk management in several fields, including engineering risk analysis, environmental risk analysis, and security risk analysis. It is also identifying and structuring risk problems, probability and statistics for risk analysis, analytic approaches to risk analysis, simulation models, introduction to multi attribute utility, and application of risk analysis and pitfalls of risk analysis. Many examples will come from real life data.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire knowledge of the basic concepts of risk analysis including probability theory and modelling, risk and decision analyses.
CO2: Apply probability, probabilistic modelling and probabilistic simulation for risk analysis including decide the issues/problem of real problems.
CO3: Apply appropriate software tools such as R to help the implementation of risk analysis.
CO4: Work collaboratively in groups to analyse risk analysis problem and document the results.
CO5: Organise various approaches to use the information and other related skills in solving any related problems.

BSD4683
Stochastic Analysis and Applications
Credit Hour: 3
Prerequisite: None

Synopsis

Stochastic analysis is a new way of reasoning which has wide application in all fields of science and engineering. Different from the traditional deterministic approach, stochastic analyses try to obtain useful information from seemingly random data, and stochastic models try to develop insights into the nature of randomness. The stochastic mathematics is particularly relevant to statistical physics, biology and life science, nanotechnology, signal processing and communications, and many branches of science and engineering, as well as economics and finance. The course will be taught from an application standpoint with examples from many different fields.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire principle of stochastic process.
CO2: Analyse mathematical problems using stochastic process knowledge.
CO3: Provide solution to stochastic problems arise into real life data.
CO4: Work collaboratively in groups to analyse stochastic problems and document the results.
CO5: Demonstrate good interest and initiative for exploring issues in stochastic analysis for a given task.

BSD4812
Industrial Training
Credit Hour: 12
Prerequisite: None

Synopsis

This course aims to provide chances for the students to practice and apply their knowledge and skills that they have gained during their study. During the industrial training, the students are required to record, report and describe all the activities in a log book. Students will be supervised by industry coach and university supervisor to guide and ensure that the students are able to accomplish the given task and achieve the objectives of this course. At the end of the industrial training period, students need to provide and present final report to describe their personal and technical developments.

Course Outcome

By the end of semester, students should be able to:

CO1: Adapt data science tools to manage data related process.

CO2: Demonstrate interpersonal and social skills.

CO3: Integrate ideas and skills at different level of tasks effectively.

CO4: Develop leadership skill and work collaboratively.

CO5: Practice good ethics and professionalism in the workplace.

COURSE SYNOPSIS FOR MATHEMATICS SERVICE COURSES

BUM1113
Technical Mathematics
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces and discusses the fundamental of mathematics focusing on providing a solid concept of foundation for further work. Student are exposed to functions and graphs, exponential and logarithmic functions, trigonometric functions, analytic trigonometry, polar coordinates, and conic sections. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of functions and trigonometric.
CO2: Apply appropriate mathematics concepts to solve various problems.

BUM1123
Mathematics for Management
Credit Hour: 3
Prerequisite: None

Synopsis

This subject introduces the use of mathematical technique in the field of business administration and management. The topics introduce to the inequality, matrices, functions and the key business topics such as simple interest, compound interest, promissory notes, trade and cash discount, markup and markdown.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire basic principles and methodologies of mathematics to solve problems.
CO2: Apply mathematical concepts and techniques in business administration, management and finance.

BUM1133
Mathematics for Computer Graphics
Credit Hour: 3
Prerequisite: None

Synopsis

The aim of this course is to introduce and develop mathematical skills that underpin the technical aspects of computer graphics application. It will emphasize on matrix, vector, geometry and parametric representation, general concept of Basic Mathematics, Vector Calculus and Numerical Methods. For further understanding about this subject, a lot of exercises will be given. At the end of the course, students should be able to grasp key concept and uses each of the mathematical concept in computer graphics application. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of mathematics for computer science
CO2: Demonstrate the calculations through mathematical formulas and equations.
CO3: Provide solution for the wide range of problems in computer science by using mathematics principle.

BUM1153
Intermediate Mathematics
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Student are exposed to number system, equations, inequalities and absolute value, polynomials, sequences and series, matrices and system of linear equations, functions and graphs, and trigonometric functions. This course also integrates symbolic tools, graphical concepts, and numerical calculations.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire the fundamental principles of basic mathematics.
CO2: Apply the appropriate method to solve mathematical problems.

BUM1223
Calculus
Credit Hour: 3

Prerequisite: None

Synopsis

This course discusses in depth of functions and differentiation. Topics cover under this course are: The Concepts of Limit, Computation of Limit, continuity and Its Consequence, Limit Involving Infinity, The Derivative, Computation of derivative, The Product and Quotient Rule, The Chain Rule, Higher Derivatives, Implicit Differentiation, Rates of Change and Related Rates, Maximum and Minimum Values, Mean Value Theorem, Concavity and Second Derivatives Test, Overview of Curve Sketching, Optimization Problems, Antiderivatives, Indefinite Integral, Definite Integral, Integration by Substitution, Integration by Parts, Integration of Rational Function using Partial Fractions, Area Between Curves. Arc Length and Surface Area, Volume: Slicing Method, Volume: Disks Method, Volume by Cylindrical Shells

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental principle of differentiation.
CO2: Apply appropriate calculus concepts to solve various technological problems.
CO3: Use appropriate software and tool to solve the graphical and computational problems in calculus.

BUM1233
Discrete Mathematics and Applications
Credit Hour: 3
Prerequisite: None

Synopsis

This subject introduces and discusses the fundamental of the discrete as apply to computer science, focusing on providing a basic theoretical foundation for further work. Students are exposed to logic and proof techniques, set theory, elementary number of theory, functions and relations, graph, tress, modelling computations and abstract algebra. This course integrates symbolic tools, graphical concepts, and numerical calculations.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental principle of discrete mathematics.
CO2: Analyze mathematical problem using discrete mathematics.
CO3: Provide solution to discrete mathematics problems arise from computer science and engineering field.

BUM1433
Discrete Structure & Applications
Credit Hour: 3
Prerequisite: None

Synopsis

This subject introduces and discusses the fundamental of the discrete as apply to computer science, focusing on providing a basic theoretical foundation for further work. Students are exposed to basic counting; discrete probability; numerical, precision, accuracy and errors; graph; tress and modelling computations. This course integrates symbolic tools, graphical concepts and numerical calculations.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental principle of discrete structure.
CO2: Analyze mathematical problems using discrete structure knowledge.
CO3: Provide solution to discrete structure problems arise in computer science and engineering fields.

BUM2113
Applied Mathematics
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces ordinary differential equations (analytically and numerically), Laplace transforms and Fourier series. Related applications are also discussed.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental principle of first and second order ordinary differential equations, Laplace transforms and Fourier series.
CO2: Analyze and solve various differential equation of first and second order differential equations, Laplace transforms and find Fourier series for various periodic functions.

BUM2123
Applied Calculus
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces Polar Coordinates and Vector, Vector-Valued Functions, Partial Derivatives, and Multiple Integrals. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental calculus concepts of equations and vectors.
CO2: Analyse and solve wide range of problems in science and engineering by using concept of calculus.

BUM2133
Ordinary Differential Equations
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces to the Ordinary differential equations, Laplace transform and Fourier series and their applications in solving engineering problems.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of first and second order ordinary differential equations, Laplace transforms and Fourier series.
CO2: Analyze and solve various differential equation of first order differential equations, second order differential equations, Laplace transforms and find Fourier series for various periodic functions.

BUM2313
Numerical Methods
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces basic concepts of round-off and truncation errors, roots of equations, linear algebraic equations and matrices, curve fitting, numerical integration and ordinary differential equations of initial and boundary value problems. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principles of numerical methods.
CO2: Analyze mathematical and engineering problems using numerical methods as an alternative to analytical methods.

BUM2413
Applied Statistics
Credit Hour: 3
Prerequisite: None

Synopsis

This course discusses on statistical problem-solving methodology and descriptive statistics; sampling distribution and confidence interval; hypothesis testing; analysis of variance (ANOVA); goodness-of fit test and contingency tables; regression and correlation including simple and multiple linear regressions. Microsoft Excel software will be used in this course as a statistical package (other statistical packages are SPSS, R Language, S Plus, EViews and Minitab shall be used in this course).

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of statistics.
CO2: Perform statistical analysis by using appropriate statistical theory and methodology.
CO3: Analyse real life data to solve related problems in various disciplines.

BUM2433
Statistics for Management
Credit Hour: 3
Prerequisite: None

Synopsis

This course discussess on descriptive statistics; graphical summary; common probability distributions; statistical analysis for means; regression and correlation

including simple and multiple linear regressions, and goodness of fit test and contigency tables. Statistical packages such as Microsoft Excel, SPSS, R Language, S plus, EViews and Minitab shall be used in this course.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of statistics.
CO2: Perform statistical analysis by using appropriate statistical theory and methodology.
CO3: Analyse real life data to solve related problems in various disciplines.

DUM1113
Basic Mathematics
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Student are exposed to number system, equations, inequalities and absolute value, polynomials, sequences and series, matrices and system of linear equations, functions and graphs, and trigonometric functions. This course also integrates symbolic tools, graphical concepts, and numerical calculations.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire the fundamental principles of basic mathematics.
CO2: Apply the appropriate method to solve mathematical problems.

DUM1123
Calculus
Credit Hour: 3
Prerequisite: DUM1113

Synopsis

Calculus is the mathematics of change, of calculating problems that are continually evolving. This is possible by breaking such problems into infinitesimal steps, solving each of those steps, and adding all the results. Rather than doing each step individually, calculus allows these computations to be done simultaneously. There are two primary branches of calculus: differential calculus (differentiation) and integral calculus (integration). Therefore, students are exposes to limits and continuity, differentiation, application of differentiation, integration, and application of integration. This course integrates symbolic tools, graphical concepts and numerical calculations.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire and apply the fundamental principles of calculus.
CO2: Apply the appropriate method studied to solve mathematical problems.
CO3: Provide solution to solve mathematical problem arise from real life.

DUM1213
Fundamental Discrete Structure
Credit Hour: 3
Prerequisite: None

Synopsis

This subject introduces and discusses the fundamental of the discrete as apply to computer science, focussing on providing a basic theoretical foundation for further work. Students are exposed to logic, set theory, elementary number theory, functions and relations, basic of counting, boolean algebra, and proof techniques. This course integrates symbolic tools, graphical concepts, and numeral calculations.

Course Outcome

By the end of semester, students should be able to:
CO1: Acquire fundamental principle of discrete mathematics.
CO2: Analyze mathematical problem using discrete mathematics.
CO3: Provide solution to discrete mathematics problems arise from computer science and engineering field.

DUM2113
Technical Mathematics
Credit Hour: 3
Prerequisite: None

Synopsis

This course introduces Analytic Geometry & Conic Section, Parametric Equations, Polar

Coordinates, Three-Dimensional Spaces, Vectors, and First Order Differential Equations. Appropriate software is used by students to implement some of these ideas in practice.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental principles of technical mathematics.

CO2: Apply the knowledge of Analytic Geometry & Conic Section, Parametric Equations, Polar Coordinates, Three-Dimensional Spaces, Vectors and First Order Differential Equations to solve various science and engineering problems.

DUM2413
Statistics & Probability
Credit Hour: 3
Prerequisite: None

Synopsis

In this course, students are exposed to basic statistics and analyse statistically. The topics covered are introduction to statistics, descriptive statistics, probability, discrete probability distributions, continuous probability distributions, and correlation and simple linear regression.

Course Outcome

By the end of semester, students should be able to:

CO1: Acquire fundamental principles statistics.

CO2: Perform statistical analysis by using appropriate statistical theory and methodology.

CO3: Analyse real life data to solve related problems in various disciplines.

CENTRE FOR HUMAN SCIENCES

CENTRE FOR HUMAN SCIENCES (CHS)

INTRODUCTION

The Centre for Human Sciences (CHS) is established to complement the development of students' knowledge in technology and engineering; as knowledge and skills in engineering alone are insufficient to produce competitive graduates. The centre consists of two departments, which are the Human Sciences Department and Soft Skills Department. Apart from providing university core subjects, CHS also offers elective and value added courses to develop students' compentencies such as study skills workshops, intervention program etc. CHS also provide trainings to enhance skills, knowledge and competencies for UMP staffs and others learning organisations, government agencies and multinational companies in east coast region.

VISION

Advanced Centre For Holistic Human Development

MISSION

We provide education research and services in holistic human development based on UMP core values to community

OBJECTIVES

1. To produce holistic graduate by providing competitive humanities courses.
2. To spearhead inspiring community-based research projects.
3. To be a recognized centre in humanities niche area based services

ADDRESS

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Universiti Malaysia Pahang
Lebuhraya Tun Razak
26300 Gambang
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COURSES OFFERED

The courses offered by CHS include:

- Courses offered by Human Sciences Department
- Courses offered by Soft Skills Department
- Elective courses

Human Sciences Courses

Degree and Diploma – 2 credit hours

UHC1012 Falsafah & Isu Semasa
UHC2022 Penghayatan Etika & Peradaban

Soft Skills Courses

Degree and Diploma – 1 credit hour

UHS1021 Soft Skills 1
UHS2021 Soft Skills 2

Elective Courses

1. UHE3012 Contemporary Leadership in Community
2. UHE3032 Introduction to Human Behaviour
3. UHE3042 Organizational Counseling
4. UHE3062 Malaysia: The Impact of Globalization
5. UHE3072 Technology for Human Capital Development
6. UHE3122 Islamic Institutions
7. UHE3162 Family System in Islam
8. UHE3182 Malaysian Studies
9. UHE3192 Fundamental Ibadah in Islam
10. UHE3202 Introduction to Halal Studies
11. UHE3212 Global Competencies
12. UHE3222 Al Quran Memorization 1
13. UHE3232 Al Quran Memorization 2
14. UHE3242 Fiqh Haji and Umrah
15. UHE3252 Positive Physhology

COURSE SYNOPSIS

HUMAN SCIENCES DEPARTMENT

Degree and Diploma

Course code : UHC1012
Course : FALSAFAH & ISU
SEMASA
Pre-requisite: none

Synopsis

This course covers the association between Philosophy, National Education Philosophy, and Rukun Negara (National Pillars). The art of logical reasoning and the concept of humans in this Philosophy course will enhance thinking skills while simultaneously cultivating good values and behaviors. This course allows students the opportunity to discuss current issues relating to Epistemology, Metaphysics, and Ethics. Furthermore, this course emphasizes Philosophy to promote cross-cultural dialogues and increase common values between students. By the end of this course, students will be able to identify the disciplines of knowledge comprehensively and integratively.

Course Outcomes

CO1 Explain current issues of Philosophy, National Education Philosophy, and Rukun Negara (National Pillars).
CO2 Elaborate on current issues according to the mainstream of thought in various schools of Philosophy.
CO3 Analyze current issues from the perspective of the comparative philosophies to promote cross-cultural dialogues.

References

1. Al-Attas, S. M. Naquib. (1991). The Concept of Education in Islam. Kuala Lumpur: ISTAC
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8. Solomon, R.C. & Higgins, K.M. (2010). The Big Questions: A Short Introduction to Philosophy (8th Ed.). Wadsworth: Cengage Learning.
9. Weiming, T. & Ikeda, D. (2011). New Horizons In Eastern Humanism: Buddhism, Confucianism and The Quest for Global Peace. London: I. B.Tauris.

Course code : UHC2022
Course : PENGHAYATAN ETIKA & PERADABAN
Pre-requisite : none
Synopsis

This course explains the ethical concepts from different civilizational perspectives. It aims to identify the systems, growth stages, developments and cultures across the races in strengthening the social cohesion. Furthermore, the discussions and debates on contemporary issues in the economic, politic, social, cultural and environment from ethical and civilizational perspectives will enhance the morale and professionalism among students. The High Impact Educational Practises (HIEPs) relevant approach will be applied in the course delivery. At the end of this course, the students will be able to correlate the ethics and civic-minded citizenship.

Course Outcomes

CO1 Explain the ethical concept from different civilizations.
CO2 Compare the systems, development stages, social advancements and cultures beyond race.
CO3 Discuss contemporary issues on economy, politic, social, culture and environment based on ethical perspectives and civilizations.

References

1. Shamsul Amri Baharuddin, Modul Hubungan Etnik, Edisi Kedua, Institut Kajian Etnik, Universiti Kebangsaan Malaysia, Bangi 2012.
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SOFT SKILLS DEPARTMENT

SOFT SKILLS

Course code : UHS1021
Course : SOFT SKILLS 1
Pre-requisite: none

Synopsis

This course exposes students to Soft Skills which are non-job specific skills that can be used in different occupations. This module aims at creating the sense of awareness and responsibilities as UMP students in nurturing well-rounded personalities. This could be developed through the seven elements which are leadership, teamwork, communication, critical thinking and problem solving, life-long learning entrepreneurship and ethics and moral skills. Students could develop these skills through course work, internship, voluntary jobs and life experiences. Hence, allowing students to enhance their marketability nationality.

Course Outcomes

CO1 Identify Soft Skills elements.
CO2 Analyse issues related to Soft Skills.
CO3 Apply Soft Skills element in selected activities.

References

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3. Larson, LaFasto. (1989). Teamwork: What Must Go Right, What Can Go Wrong. Sage Publications
4. (2008). Modul Pembangunan Kemahiran Insaniah (Soft Skills) untuk Institusi Pengajian Tinggi Malaysia. Penerbit: UPM: Serdang.
5. (2005). Panduan Program Soft Skills untuk Pelajar.Penerbit KUKTEM: Kuantan
6. (2005). *Panduan Program Soft Skills untuk Pensyarah*. Penerbit KUKTEM: Kuantan
7. Mohd Janib, J. (2001). Etika Professional.Cetakan Pertama, Universiti Teknologi Malaysia, Johor

Course code : UHS2021
Couse : SOFT SKILLS 2
Pre-requisite: UHS1021 Soft Skills 1

Synopsis

This course is the extension of Soft Skills 1 (UHS1021). It focuses on the dynamic and integrated approach required by the industry through critical thinking and problem solving, ethic and moral for professional, communications skills and project closure. In the end, students will be more competent, competitive and prepare to venture the workplace challenges.

Course Outcomes

CO1 Display the ability to work as a team to deal with challenges.
CO2 Demonstrate Soft Skills elements through practical activities.
CO3 Analyze Soft Skills issues at workplace.

References

1. Blyth C. (1997). Great Jobs for Art Majors. VGM Career Horizons: Chicago
2. Nelson B. R. (1996). What Color is Your Parachute? Ten speed Press: Berkeley, CA.
3. (2005). Panduan Program Soft Skills untuk Pelajar.Penerbit KUKTEM: Kuantan
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ELECTIVE COURSES

Course code : UHE3012
Course : CONTEMPORARY LEADERSHIP IN COMMUNITY
Pre-requisite : none

Synopsis

This course explores the basic concept of leadership and ways of being a good leader. It includes the theoretical and practical aspects of leadership as well as issues related to contemporary leadership in community. In general, the philosophy of the course is to equip students with knowledge and skills of good leadership.

Course Outcomes

CO1 Identify the nature and concept of leadership
CO2 Explain and demonstrate the characteristics of good leadership
CO3 Analyse the current issues of good leadership and demonstrate the values and skills of effective leadership

References

1. Dent, F. E. (2014) The Leadership Pocketbook. London: Management Pocketbooks Limited
2. Yukl, G.A. (2020) Leadership in Organizations: Fifth Edition, Upper Saddle River, NJ, Prentice-Hall.
3. Covey, S. (2012). Principle-Centred Leadership. New York: Summit Books
4. Hart, M.O. (2000). The 100: A ranking of the most influential persons in history. New York: Hart Publishing Company Inc
5. Hisham al Talib. (2016) Training guide for Islamic workers. A Simon & Schuster Company. The International Institute of Islamic Thought, USA

Course code : UHE3032
Course : INTRODUCTION TO HUMAN BEHAVIOR
Pre-requisite : none

Synopsis

This course is designed to expose students to the basic concepts and major aspects of psychology that related to human behavior. It discusses the part of human being (physical, mental, spiritual and emotion) from various perspectives. It also emphasizes on the application of psychology in diverse human activities. In general, the philosophy of this course is to provide students with correct ways of understanding their behaviour as well as others.

Course Outcomes

CO1 To explain the concept related to human behavior in human activities.
CO2 To apply the principles of psychology in dealing with the issues related to human behaviour through project.
CO3 To analyze issues related to human behaviour.

References

1. Akbar Hussin, et al. (eds). (2008). Horizons of Spiritual Psychology. 1st ed. New Delhi, India, Global Vision Publishing House.

2. Baron, R.A. (1995). Psychology. 3rd ed. USA: Ally & Bacon
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5. Noraini M. Noor (Ed.). (2009). Psychology from an Islamic Perspective: A Guide to Teaching and Learning. 1st ed. Kuala Lumpur: International Islamic University Malaysia Press, IIUM.

Course code : UHE3042
Course : ORGANIZATIONAL COUNSELING
Pre-requisite : none

Synopsis

This course will discuss the theoretical and application of counselling in the work setting. It covers the basic framework of counselling skills, techniques and process of counselling dealing with workplace issues. This course also discusses related personality theories, common problems in the workplace and ways to deal with them. In general, the philosophy of this course is to expose students to the knowledge and basic counselling skills related to workplace in an organization.

Course Outcomes

CO1 Identify the concept, principles and issues related to counselling in organization.
CO2 Demonstrate the ability to employ basic counselling skills and techniques in helping clients.
CO3 Adopt the values and principles of counselling in dealing with self and others.

References

1. Amir Awang. (1987). Teori dan amalan psikoterapi. Pulau Pinang: Penerbitan USM
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3. Carroll, M. (1996). Workplace counselling: a systematic approach to employee care. 1st ed. London, UK: Sage Publications Ltd
4. Corey, Gerald. (2009). Theory and Practice of Counseling and Psychotherapy. 8th ed. USA: Thomson Brooks/Cole
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Course code : UHE3062
Course : MALAYSIA: THE IMPACT OF GLOBALIZATION
Pre-requisite : none

Synopsis

This course discusses the influence and impact of globalization on Malaysia and international relations. The influence highlighted will be in the perspective of politics, economics, social and culture. The contemporary issues and challenges related to the globalizational impact in Malaysia and other countries are also discussed. In general, the philosophy of the course is to facilitate borderless thinking among the students about the globalization impact towards human and environmental aspects

Course Outcomes

CO1 Identify the concept of globalization in terms of its working definition, key features, and perspectives.

CO2 Explain the Malaysia involvement and reactions towards the globalization impact in various aspects of life.

CO3 Analyze contemporary issues and challenges of globalization across national and international boundaries.

References

1. Abdul Ghafur Hamid. 2011. Public interntional Law: A Practical Approach. Thomson Reuters Malaysia.
2. Jamaluddin Hj. Ahmad Damanhuri, Zulkurnain Hj. Awang, Sarojini Naidu (ed.,). (2003). Globalisation Meeting Future Challenges, INTAN
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4. M. Bakri Musa. (2002). Malaysia In The Era of Globalization. United States of America
5. Norani Othman, Sumit K. Mandal (ed), (2000). Malaysia Menangani Globalisasi (Peserta atau Mangsa). Bangi, Selangor: Penerbit Universiti Kebangsaan Malaysia
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7. Zulhilmi Paidi & Asrar Omar. (2003). Hubungan Luar Antarabangsa. Kuala Lumpur: PTS Publications & Distributors Sdn. Bhd

Course code : UHE3072
Course : TECHNOLOGY FOR HUMAN CAPITAL DEVELOPMENT
Pre-requisite: none

Synopsis

This course will enable students to understand the concept and process of human capital development and technology in the industry. They will learn the uses of training needs analysis, information technology, and biofeedback techniques in the human development programs. This will also cover several technologies in human development such as personality

profiling, program design, basic quantitative and qualitative design, data analysis, heart rate variability, skin conductance biofeedback systems, biofeedback script, and protocol. The uses of technology and human development theory are integral in providing a hands-on approach to students in designing and implementing human capital development activities.

Course Outcomes

CO1 Recognize the concept and process of human capital development.
CO2 Analyze and integrate technology and human capital development.
CO3 Apply the uses of technology in human capital development.

References

1. Muhammad Nubli (2008), Modul Meningkatkan Prestasi Diri, Universiti Malaysia Pahang.
2. Muhammad Nubli (2008), Pembangunan Insan Pendekatan Personaliti Kontemporari, Universiti Malaysia Pahang.
3. Mark S. Schwartz (2005), Biofeedback, Second Edition: A Practitioner's Guide, New York: The Guilford Press.
4. John T. Cacioppo (2007), Handbook of Psychophysiology, Cambridge University Press.
5. Raymond A. Noe (2008) Employee training and development, McGraw-Hill.
6. Bray Tony, The training design manual: the complete practical guide to creating effective and successful training programmes. Kogan
7. Kenneth G. Brown (2017), The Cambridge handbook of workplace training and employee development, Cambridge University Press

Course code : UHE3122
Course : ISLAMIC INSTITUTIONS
Prerquisite : none

Synopsis

This course is designed to equip students with a deeper understanding on the basic functions of institutions such as values, ethics, objectives, sources, tools, characteristics and other management principles and concepts. This subject will expose the students to the managerial approaches pertinent in education, social, judicial, legislative, political, banking, zakat, takaful, sports, halal institutions and several management issues are also covered. In general, the philosophy of the course is to develop students to become more knowledgeable on managerial duties, skills, roles and decisions.

Course Outcomes

CO1 Explain the concept, principles, sources and values in managing institutions

CO2: Identify the philosophy and characteristics of Islamic institutions

CO3: Apply the Islamic ethics in managing activities in a daily life.

References

1. Hassan Ahmad (Ed). (2008). Institusi Institusi Islam. Kuantan, Pahang: Penerbit UMP.
2. Muhammad Nubli Abdul Wahab.(2008). Siri Kecemerlangan Pengurusan Organisasi dalam Islam 1. Kuantan, Pahang: Penerbit UMP.
3. Muhammad Nubli Abdul Wahab. (2009). Pembangunan Insan: Pendekatan Personaliti Kontemporari. Kuantan, Pahang: Penerbit UMP.
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8. Surtahman Kastin Hasan (1990) Ekonomi Islam. Bangi, Selangor: Universiti Kebangsaan Malaysia.

Course code : UHE3162
Course : FAMILY SYSTEM IN ISLAM
Pre-requisite : none

Synopsis

This course is designed to equip students with a deeper understanding of basic family management in Islam. It covers the concept of marriage in Islam including pre and post marriage management and laws according to Imam Shafie school of thought. However, a comparative mazahib (school of thoughts) discussion will also be covered in certain issues as well as contemporary local laws. The course also discusses contemporary issues that are related to this topic such as gamophobia, rulings on foster child and others.

Course Outcomes

CO1 Explain the values of Islamic family system in the task given.
CO2 Analyze Islamic family system of marriage.
CO3 Evaluate Islamic family system of marriage to overcome related issues.

References

1. Al Jaziri, Abd Rahman. (1990). Kitab al Fiqh ala Mazahib al Arbaah. Beirut: Dar al Kutub al Ilmiyyah.
2. Al Qardawi, Yusuf.(2005). Fatawa Muasirah. Cetakan ke 5 Al Qahirah: Dar al Qalam.
3. Al-Zuhaili, Wahbah. (1989). *Al-Fiqh al-Islami wa Adillatuh*. Cetakan ke-4. Beirut: Dar al-Fikr.
4. Mustafa Khin, Mustafa al Bugha& Ali al Syarbaji, (terj. ZulkifliMohamad)(2009). Al Fiqh

al Manhaji. Bandar Baru Bangi, Selangor: Dar al Syakir.
5. Muhammad Ali Qutb, (terj.) (2003). Mutiara Perkahwinan. Kuala Lumpur: Pustaka Haji Abdul Majid.
6. Enakmen syariah negeri Pahang.

Course code : UHE3182
Course : MALAYSIAN STUDIES
Pre-requisite : none

Synopsis

This course discusses history and politic, Malaysian Constitution, system and structure of administration, society and national unity, national development and religion and belief in Malaysia. This course aims to produce graduates who have a national identity and a spirit of patriotism. Teaching and learning will be out in the form of lectures, assignments, test and learning experiences.

Course Outcomes

CO1 Describe diversity in society.
CO2 Explain the importance of national identity towards strenghtening the spirit of patriotism.
CO3 Build social relationships and interaction among students.

References

1. Hasnah Hussiin & Mardiana Nordin. (2011). *Malaysian Studies*. Petaling Jaya, Selangor: Oxford Fajar
2. Hasnah Hussiin & Mardiana Nordin. (2007). *Pengajian Malaysia*. Petaling Jaya, Selangor: Oxford Fajar
3. Abdul Aziz Bari. (2000). *Perlembagaan Malaysia: Asas-asas dan Masalah*. Kuala Lumpur: Dewan Bahasa dan Pustaka.
4. Asnarulkhadi Abdul Samah, Ismail Hj. Mohd Rashid, Ma'rof Redzuan & Nazaruddin Hj. Mohd Jali. (2003) *Malaysian Studies Nationhood and Citizenship*. Kuala Lumpur: Prentice-Hall
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9. INTAN. (2004). *Malaysia Kita*. Kuala Lumpur: Percetakan Nasional
10. Mahdi Shuid & Mohd. Fauzi Yunus (2003). *Malaysian Studies*. Petaling Jaya, Selangor: Pearson Malaysia Sdn. Bhd.

Course code : UHE 3192
Course : FUNDAMENTAL IBADAH IN ISLAM
Pre-requisite: none

Synopsis

This course is designed to equip students with a deeper understanding on basic principles of Islamic Jurisprudence and its application in fundamental ritual of worship in Islam. It covers the contemporary issue and study according to Shafie school of thought that commonly will be encountered by professionals in their working surrounding. Students will also learn contemporary ijtihad (Islamic scholars' opinions) on the current issues of modern lifestyles. In general, the philosophy of the course is to develop students to become more knowledgeable on the basic of Islamic teaching which is very vital in shaping a spiritually strong individual.

Course Outcomes

CO1 Explain the basic principles of Islamic Jurisprudence.
CO2 Produce the basic worship procedures of taharah, solah and saum in complex situation in work place
CO3 Analyze the selected contemporary issues based on principles and values of Islamic Jurisprudence.

References

1. Kamali, Mohammad Hashim. (2003). Principles of Islamic Jurisprudence. Cambridge: The Islamic Text Society.
2. Zaini Nasohah, Mohammad Zaini Yahya & Anwar Fakhri Omar. (2017). Fiqah dan Persoalan Semasa. Bangi: Penerbit UKM.
3. Basri Ibrahim. (2017). Fiqh Sunnah: Berdasarkan Mazhab Al-Imam Al-Shafie. Shah Alam: Karya Bestari.
4. Ramli Awang et al. (2013). Sains Tamadun Islam. Skudai: UTM Press
5. Al Qardawi,Yusuf.(2005). Fatawa Muasirah. Cetakan ke 5 Al Qahirah: Dar al Qalam
6. Al-Zuhaili, Wahbah. (1989). *Al-Fiqh al-Islami wa Adillatuh*. Cetakan ke-4. Beirut: Dar al-Fikr.
7. Mustafa Khin, Mustafa al Bugha & Ali al Syarbaji, (terj. Zulkifli Mohamad)(2009). Al Fiqh al Manhaji**.** Bandar Baru Bangi, Selangor: Dar al Syakir

Course code : UHE 3202
Course : INTRODUCTION TO HALAL STUDIES
Pre-requisite: none

Synopsis

This course is designed to equip students with basic understanding of halal and the halal administration particularly in Malaysia. Therefore, the subject covers the study of shariah-based halal principles and requirements pertaining to halal as stipulated in the halal authority guidelines. The course also discusses the current administration of halal especially on the Malaysian Halal Certificate and its enforcement. Student will also be exposed to an academic project on halal application in the food and non-food industry. In addition, some contemporary issues related to halal regionally and globally will be discussed as well as exposure to halal act and standards. In general, the aim of the course is to develop students to have knowledge on halal and its specific administration.

Course Outcomes

CO1 Explain basic concept of halal in

Islam.
CO2 Analyse halal ruling according to standards.
CO3 Apply knowledge of halal values.

References

1. Al-Zuhaili, Wahbah. (1989). Al-Fiqh al-Islami wa Adillatuh. Cetakan ke-4. Beirut: Dar al-Fikr.
2. Mustafa Khin, Mustafa al Bugha & Ali al Syarbaji, (terj. Zulkifli Mohamad)(2009). Al Fiqh al Manhaji. Bandar Baru Bangi, Selangor: Dar al Syakir.
3. Al Jaziri, Abd Rahman. (1990). Kitab al Fiqh ala Mazahib al Arbaah. Beirut: Dar al Kutub al Ilmiyyah

Course code : UHE 3212
Course : GLOBAL COMPETENCIES
Pre-requisite: none

Synopsis

Global competence refers to the acquisition of in-depth knowledge and understanding of international issues, an appreciation of and ability to learn and work with people from diverse linguistic and cultural world community. This definition contains four basic elements:

a. International awareness
b. Appreciation of cultural diversity
c. Proficiency in foreign languages
d. Competitive skills

The overall aim of this course is to develop students intercultural awareness and copetence in order to enable them to better reflect on their own roles and ability to initiate change in professional situations. It is also to provide the students with a critical understanding of issues relating to cultural identity, cultural difference and cultural diversity. Acquiring intercultural competence is both a cognitive and an affective process and its a long-term process during which the student must understand the relativity of all beliefs, values and behavior practice all over the world. The students should be able to identify and engaging in any topics of local and global significance.

Course Outcomes

CO1 Identify the impact of globalizations and the competencies required.
CO2 Classifying the competencies that suit and effective for various situations backgrounds.
CO3 Applying the competencies in every tasks given.

References

1. Aness Janee Ali. 2000. The Intercultural Adaptation of Expatriate Spouses and Children An Empirical Study on The Determinants Factors Contributing to The Success of Expatriation. Gronigen, Holland.

2. Bennett, MJ. 2014. Basic Concepts of Intercultural Communication: Paradigms, Principles, & Practices. Intercultural Press

3. _____. 2014. Significantly revised edition of Basic Concepts of Intercultural Communication: Selected Readings.

4. _____. 2010. A Conceptual History of Intercultural Learning in Study Abroad in Hoffa, B. & S. DePaul (Eds) A History of US Study Abroad: 1965-Present.

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13. Jamal Rizal Razali 2014. Negaraku Negara Kita. UMP:Kuantan.

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Language and Social Psychology 25, 3:283-300.

16. _____. 2008. "Toward Intercultural Personhood: Globalization and a Way of Being." Globalization and Diversity [Special Issue]. International Journal of Intercultural Relations 32, 4:359-368.

Course code : UHE 3222
Course : AL-QURAN MEMORIZATION 1
Pre-requisite: none

Synopsis

This course is designed to equip students with a deeper understanding on basic principles of memorizing the Holy Quran. It covers the method of how to memorize , maintain and strengthen of memorizing . A part of that, students will be given practical training for memorizing from surah al-Naba until an-Nas. Students will also be trained in theoretical and practical how to prounce the accurate maharij huruf. In general, the philosophy of the course is to develop students to become more knowledgeable on the basic of memorizing which is very vital in shaping potential hafiz.

Course Outcomes

CO1 Explain the methods and elements in strengthening the memorizing the al-Quran
CO2: Identify the rules of tajwid and maharaj of al-Quran.
CO3 :Demonstrate the reading and memorizing of the Holy Quran in a way that retains the correct general rules of maharij

References
Main references:

1. Al-Quran Al-Karim .
2. Rashidi Abbas, Jamal Rizal Razali, Muhammad Nubli Abd Wahab (2016). *Anjakan Minda Huffaz Belia Malaysia*. Kuantan: Universiti Malaysia Pahang.
3. Rashidi Abbas (2016). *Hebatnya Kuasa Hafazan*. Kuantan: Universiti Malaysia Pahang (Manual).
4. Rashidi Abbas & Azhar Jaafar (2019). Pendidikan Tahfiz dan Kemahiran Insaniah.Penerbit Universiti Malaysia Pahang: Kuantan.
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6. Amjad Qasim, Siti Nur Akma Ahmad (2013). Menghafal al-Quran dalam Sebulan. Kuala Lumpur: SynergyMedia.
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8. Haji Abdul Qadir Leong (1994). Tajwid al-Quran.Pustaka Slam Sdn Bhd: Kuala Lumpur.

Additional references:

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2. AbdurRahman Lubis (2011). Tips Meghafal Al-Quran Bagi Profesional. Selangor: Pustaka Al-Ehsan.

Course code : UHE 3232
Course : AL-QURAN MEMORIZATION 2
Pre-requisite: Al-Quran Memorization 1

Synopsis

This course is designed to equip students with a deeper understanding on basic principles of memorizing the Holy Quran. It covers the method of how to memorize , maintain and strengthen of memorizing . A part of that, students will be given practical training for memorizing from surah al-Mulk until al-Mursalat. Students will also be trained in theoretical and practical how to prounce the accurate maharij huruf. In general, the philosophy of the course is to develop students to become more knowledgeable on the basic of memorizing which is very vital in shaping potential hafiz.

Course Outcomes

CO1 Explain the methods and elements in strengthening the memorizing the al-Quran
CO2: Identify the rules of tajwid and maharaj of al-Quran CO3 Demonstrate the reading and memorizing of the Holy Quran in a way that retains the correct meaning and the general rules of phonics.

References
Main references:

1. Al-Quran Al-Karim.
2. Rashidi Abbas, Jamal Rizal Razali, Muhammad Nubli Abd Wahab (2016). *Anjakan Minda Huffaz Belia Malaysia*. Kuantan: Universiti Malaysia Pahang.
3. Rashidi Abbas (2016). *Hebatnya Kuasa Hafazan*. Kuantan: Universiti Malaysia Pahang (Manual).
4. Rashidi Abbas & Azhar Jaafar (2019). Pendidikan Tahfiz dan Kemahiran Insaniah.Penerbit Universiti Malaysia Pahang: Kuantan
5. Ibrahim Abdul Mun'im Asy-Syaarbani (2014). Cara Mudah Menghafal Al-Quran.Kuala Lumpur: Pustaka Al-Shafa.
6. Amjad Qasim, Siti Nur Akma Ahmad (2013). Menghafal al-Quran dalam Sebulan. Kuala Lumpur: SynergyMedia.
7. Mohammad Ashraff Ayob Al-Hafiz (2011). Kaedah Jibril. Selangor: PTS Darul Furqan Sdn.Bhd.
8. Haji Abdul Qadir Leong (1994). Tajwid al-Quran.Pustaka Slam Sdn Bhd: Kuala Lumpur.

Course code : UHE3242
Course :FIQH HAJI AND UMRAH
Pre-requisite: None

Synopsis

This course is designed to equip students with a deeper understanding on basic principles of Hajj and Umrah. It covers the theoretical and practical elements of hajj and umrah. In addition, this subject will provide the methods of hajj and umrah problem solving, especially those related to the contemporary issues and special rulings. In general, the philosophy of the course is to develop students to become more knowledgeable on the

basic of hajj and umrah.

Course Outcomes

CO1 Explain the meaning of Hajj and Umrah according to the al-Quran and Al-Sunah.
CO2 Discuss the rules of Hajj and umrah.
CO3 Demonstrate the contemporary knowledge about Hajj and umrah.

References

1. Nota Kursus Asas Haji 1440 (2019) Bahagian Bimbingan Jabatan Haji Lembaga Tabung Haji .
2. Jamaluddin Hashim (2017) *Fiqh Umrah Kontemporari*. Selangor: Darul Syakir Enterprise.
3. Al-Fatani, Muhammad ibn Isma'il Dawudi (t.th). *al-Bahr al-Wafi wa al-Nahr al-Safi,* Kuala Lumpur: Khazanah Fataniah
4. Mustafa Khin, Mustafa al Bugha & Ali al Syarbaji, (terj. Zulkifli Mohamad)(2009). Al Fiqh al Manhaji. Bandar Baru Bangi, Selangor: Dar al Syakir.
5. Abdul Basit Abdul Rahman (2008) *Makkah al-Mukarramah : Kelebihan & Sejarah*. Kuala Lumpur: Telaga Biru.
6. Al-Zuhaili, Wahbah. (1989). *Al-Fiqh al-Islami wa Adillatuh*. Cetakan ke-4. Beirut: Dar al-Fikr.

Course code : UHE3252
Course :POSITIVE PSYCHOLOGY
Pre-requisite: None

Synopsis

Positive Psychology is built on the belief that there are many things that can be achieved in life. As everyone wants a meaningful and satisfying life; everybody needs the opportunity to build and nurture the best in themselves, to experience appreciation, love, work and play. Celebrating these human potentials, the course will focus on three key issues: positive emotions, positive attitudes, and positive institutions. Positive emotions include topics related to satisfaction with what we have gone through, the excitement of what is to come and hope for what the future would bring. Positive attitude also includes topics associated with the strengths and virtue of a person. While a positive institution involves the topic of things that can foster a better society.

Course Outcomes

CO1 Identify major theories and application of positive psychology from scientific and Islamic prospective.
CO2 Explain the concept and principles related to positive psychology and its application.
CO3 Analyze scientific and ethical principles in the application of positive psychology in everyday life.

References

1. Compton, W.C. & Hoffman, E. (2013). *Positive psychology: The science of Happiness and flourishing.* US: Wadsworth, Cengage learning.
2. Joseph, S., Linley, P.A., & Maltby, J. (2006). Positive psychology, religion, and spirituality. *Mental Health, Religion, & Culture*, 9,209-212.

3. Ong, A.D., Bergeman, C.S., Bisconti, T.L., & Wallace, K.A. Psychological resilience, positive emotions, and successful adaptation to stress in later life. *Journal of Personality & Social Psychology, 91.730-749*
4. Sligman, M. & Cskszentmihalyi, M. (2000). Positive psychology: an introduction. *American Psychologist*, 55-5-14.
5. Turner, N., Berling, J., Zacharatos, A. (2002). Positive Psychology at work: *Handbook of positive psychology*. NY: Oxford University Press.

HUMAN SCIENCES DEPARTMENT

1. Course code : UHC1012
Course : FALSAFAH & ISU SEMASA
2. Course code : UHC2022
Course :PENGHAYATAN ETIKA & PERADABAN

SOFT SKILLS DEPARTMENT

1. Course code : UHS1021
Course : SOFT SKILLS 1
2. Course code : UHS2021
Couse : SOFT SKILLS 2

ELECTIVE COURSES

1. Course code : UHE3012
Course : CONTEMPORARY LEADERSHIP IN COMMUNITY
2. Course code : UHE3032
Course : INTRODUCTION TO HUMAN BEHAVIOR
3. Course code : UHE3042
Course : ORGANIZATIONAL COUNSELING
4. Course code : UHE3062
Course : MALAYSIA: THE IMPACT OF GLOBALIZATION
5. Course code : UHE3072
Course :TECHNOLOGY FOR HUMAN CAPITAL DEVELOPMENT
6. Course code : UHE3122
Course : ISLAMIC INSTITUTIONS
7. Course code : UHE3162

   Course : FAMILY SYSTEM IN ISLAM
8. Course code : UHE3182

   Course : MALAYSIAN STUDIES
9. Course code : UHE 3192
Course : FUNDAMENTAL IBADAH IN ISLAM
10. Course code : UHE 3202
Course : INTRODUCTION TO HALAL STUDIES
11. Course code : UHE 3212
Course : GLOBAL COMPETENCIES
12. Course code : UHE 3222
Course : AL-QURAN MEMORIZATION 1
13. Course code : UHE 3232
Course : AL-QURAN MEMORIZATION 2
14. Course code : UHE3242
Course :FIQH HAJI AND UMRAH
15. Course code : UHE3252
Course :POSITIVE PSYCHOLOGY

The information provided by Centre for Human Sciences are based on University's Regulation and endorsement until 29 Mei 2020

CENTRE FOR MODERN LANGUAGES

CENTRE FOR MODERN LANGUAGES (CML)

INTRODUCTION

The Centre for Modern Languages (CML) was established to complement the development of students' technical and engineering knowledge, as knowledge and skills in engineering alone is insufficient to produce competitive graduates. The centre consists of two (2) departments; the Department of English Language and the Department of Foreign Languages. Apart from providing university core subjects, CML also offers courses to develop student and staff competencies such as MUET, IELTS and study skills workshops. CML also provides external trainings to multinational organizations. Our list of clientele includes BASF Petronas, AMM Pekan and the Pahang State Secretary Office.

VISION

We aspire to be a centre of excellence, contributing to academic achievements, human development and nation building.

MISSION

To achieve our vision, we conduct outstanding academic programmes, training and research to nurture lifelong learners who uphold universal values. The expertise of our associates and the use of advanced technology are integral towards realizing our aspiration.

OBJECTIVES

- To develop academic programmes in human sciences which contribute to producing competitive graduates
- To be a centre of excellence in research, consultancy and training recognised in the region as well as the global arena

ADDRESS

Centre for Modern Languages
Universiti Malaysia Pahang
26600 Pekan
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COURSES OFFERED

Courses offered by CML include:

- Courses offered by the Department of English Language
- Courses offered by the Department of Foreign Languages
- Elective courses

English Language Courses

Diploma (3 levels) – 2 credit hours

UHL1412 Foundation English
UHL1422 English for Academic Skills
UHL1432 English for Occupational Communication

Degree (4 levels) – 2 credit hours

UHL2400 Fundamentals of English Language
UHL2412 English for Academic Communication
UHL2422 English for Technical Communication
UHL2432 English for Professional Communication

Foreign Language Courses

*Offered to degree students only

*Students select one foreign language and complete two levels of the selected language.

Beginners Level – 1 credit hour

UHF1111 Mandarin for Beginners
UHF1121 German for Beginners
UHF1131 Japanese for Beginners
UHF1141 Arabic for Beginners
UHF1151 Spanish for Beginners
UHF1161 Malay for Beginners (For international students only)
UHF1271 Turkish 1 (Not offered)

Intermediate Level – 1 credit hour

UHF2111 Mandarin for Intermediate

UHF2121 German for Intermediate
UHF2131 Japanese for Intermediate
UHF2141 Arabic for Intermediate
UHF2151 Spanish for Intermediate
UHF2161 Malay for Intermediate (For international students only)
UHF2271 Turkish 2 (Not offered)

Double Degree Programme

Faculty of Industrial Management (FIM)

UHG1002 Deutsch 1
UHG1012 Deutsch 2
UHG2002 Deutsch 3
UHG2012 Deutsch 4

Faculty of Manufacturing and Mechatronics Engineering Technology (FTKPM)

Faculty of Mechanical and Automotive Engineering Technology (FTKMA)

UHG1003 German 1
UHG1013 German 2
UHG1016 Intensive German 1
UHG2003 German 3
UHG2013 German 4
UHG2016 Intensive German 2
Elective Courses

UHE3022 Critical Thinking through Literature
UHE3082 Creative Writing
UHE3092 English Mechanics
UHE3132 Public Speaking
UHE3142 Project Based Proposal Writing
UHE3152 Interpersonal Effectiveness

COURSE SYNOPSIS

DEPARTMENT OF ENGLISH LANGUAGE

Diploma Courses

Course Code: UHL1412
Course: FOUNDATION ENGLISH
Pre-requisite: None

Synopsis

The course develops students' proficiency through appropriate listening, speaking, reading and writing skills and strategies using a variety of texts. It also aims to enhance their critical thinking skills by focusing on students' ability to give opinions and justifications through critical analysis as well as reviews, written and verbal.

Course outcomes

CO1 Employ accurate language in their spoken and/or written discourse.
CO2 Produce relevant content in their spoken and/or written discourse.
CO3 Transfer information from various non-linear/ linear texts accurately.
CO4 Demonstrate effective delivery skills in presentations/discussions.
CO5 Apply reading skills to comprehend various texts.

References

1. Choo, W.Y.,Yeoh,W.T., Nyanaprakasan, S., & Yee, S.F. (2019). Ace Ahead MUET. Oxford Fajar Sdn. Bhd.
2. Choo, W.Y.,Yeoh,W.T., Nyanaprakasan, S., & Yee, S.F. (2018). Ace Ahead MUET. Oxford Fajar Sdn. Bhd.
3. Harbans Kaur & Jones, F. (2017). Effective Practice MUET. Oxford Fajar Sdn. Bhd.
4. Choo, W.Y., Yeoh, W.T. & Yee. S. F. (2016). MUET Writing Practice. Oxford Fajar Sdn. Bhd.

Course Code: UHL1422
Course: ENGLISH FOR ACADEMIC SKILLS
Pre-requisite: UHL1412 Foundation English

Synopsis

This course primarily aims to help students improve communicative performance in academic settings. This is achieved by involving the four essential language skills and grammar practices. Students are exposed to the principles of verbal and written communications for academic purposes, namely presentation skills and academic writing. They are also introduced to effective listening and note-taking strategies which are aimed to help them cope with the learning environment. Additionally, students are conditioned to different types of descriptive essays. The use of related online materials are incorporated in the course to include the element of technology in language learning.

Course Outcomes

CO1 Transfer main information from general listening texts using appropriate language.
CO2 Apply reading comprehension strategies to extract information from reading texts.
CO3 Apply appropriate and accurate language in written and spoken communication.
CO4 Produce appropriate and relevant content in written and spoken communication.
CO5 Demonstrate appropriate and effective delivery styles in spoken communication.

References

1. Brooks, M. (2015). Q: Skills for Success: Listening & Speaking (2nd ed.). Oxford.
2. Craven, M. & Sherman, K. D. (2015). Q: Skills for Success: Listening & Speaking (2nd ed.). Oxford.
3. Long, E. C. (2009). Resources for Writers with Readings: from Paragraph to Essay (3rd ed.). Pearson Longman.
4. Meyers, A. (2005). Gateaways to Academic Writing. Longman.
5. Savage, A. & Mayer, P. (2012). Effective Academic Writing (2nd ed.). Oxford.

Course Code: UHL1432
Course: ENGLISH FOR OCCUPATIONAL COMMUNICATION
Pre-requisite: UHL1422 English for Academic Skills

Synopsis

This course primarily aims to develop students' English language skills for employability. Students are exposed to the principles of writing and reading pre-formatted job application documents. Students participate in the job application process by writing a cover letter and resume, recording a video resume and attending a mock job interview. Review on practical aspects of oral presentation skills are also conducted. In addition, students also participate in a group discussion project where they discuss workplace issues.

Course Outcomes

CO1 Apply appropriate and accurate language in written and/or spoken communication.
CO2 Use appropriate and accurate content in written and/or spoken communication.
CO3 Demonstrate effective delivery strategies in spoken communication.

References

1. Dwyer, J. (2015). The Business Communication Handbook. Cengage Learning Australia.
2. Sharma, R. C, & Mohan, K. (2010). Business Correspondence and Report Writing. McGraw Hill Education Pvt. Ltd.
3. George, J. S. (2017). Workplace Communication: The Basic. Pearson Education Inc.
4. https://www.monster.com.my/career-advice/
5. https://www.jobstreet.com.my/career-resources/#.XqjnLXYzbIU

Degree Courses

Course Code: UHL2400
Course: FUNDAMENTALS OF ENGLISH LANGUAGE
Pre-requisite: None
Synopsis

The course is designed to develop skills in using English language effectively. The four language skills; listening, speaking, reading, and writing are integrated to strengthen students' basic comprehension, vocabulary and grammar skills. This course also emphasizes on improving reading and writing by applying effective strategies which include elements of contextual grammar, active vocabulary building, sentence and paragraph writing. These are the fundamentals in providing essential English language skills that are needed in an academic environment.

Course Outcomes

CO1 Apply appropriate and accurate language in written and/or spoken discourse.
CO2 Use effective and appropriate content in written and/or spoken discourse.
CO3 Apply reading skills and strategies to comprehend various texts.
CO4 Demonstrate effective oral communication skills.

References

1. Bland, S.K. (2012). Grammar sense 3. Oxford: Oxford University Press.
2. Cole, V. (2012). IELTS introduction: Study skills pack. London: Macmillan Education.
3. Craven, M. & Donalley-Sherman, K. (2015). Q skills for success: Listening and speaking 3. Oxford: Oxford University Press.
4. Soars, L. & Soars, J. (2015). Academic skills: Reading, writing, and study skills. Oxford: Oxford University Press.
5. https://learnenglish.britishcouncil.org
6. https://www.bbc.co.uk/learningenglish/
7. https://www.time4writing.com/
8. https://patternbasedwriting.com/
9. https://www.cambridgeenglish.org/exams-and-tests/cefr/
10. https://www.englishprofile.org/thecefr

Course Code: UHL2412
Course: ENGLISH FOR ACADEMIC COMMUNICATION
Pre-requisite: UHL 2400 Fundamentals of English Language

Synopsis

The course aims to equip students with the four language skills (i.e. listening, reading, speaking and writing) and study skills for academic success. The course requires students to read various texts of general topics by incorporating essential reading skills. Study skills such as note-taking and note making techniques, and active listening

skills are emphasised. Students are exposed to thesis-support essays and writing styles and organisation appropriate for their level. Additionally, students are exposed to presentation skills and e-learning platforms are introduced as part of the course.
Course Outcomes

CO1 Apply reading skills to extract and transfer specific information from general texts.
CO2 Evaluate important information from different sources.
CO3 Apply appropriate and accurate language in written and/or spoken discourse.
CO4 Demonstrate effective presentation skills using appropriate non-verbal cues.

References

1. Asiah Kassim et al. (2013). English for Academic Communication UHL2412. UMP
2. Savage, A. Shafiei, M. et al. (2012). Effective Academic Writing. Oxford: Oxford University Press
3. Dale, P. & Wolf, J.C. (2006). Speech Communication Made Simple. New York: Pearson Longman
4. Hafizoah Kassim et al. (2014). No Plagiarism!. UMP Press

Course Code: UHL2422
Course: ENGLISH FOR TECHNICAL COMMUNICATION
Pre-requisite: UHL2412 English for Academic Communication

Synopsis

The course is designed for technical communication relevant to academic and professional purposes. It provides opportunities for students to learn and employ language skills and strategies appropriate to written and spoken technical communication for professional audiences. In the course, students are required to listen to, evaluate, organize, present and write technical information. The contents of this course consist of, but not limited to, technical descriptions, technical processes and procedures, and recommendation reports. Additionally, students have the advantage to collaborate in teams while performing activities assigned to them. Students are encouraged to benefit in language learning when they engage in self-access activities.

Course Outcomes

CO1 Determine salient information from listening tasks related to technical communication.
CO2 Demonstrate presentation skills using appropriate delivery strategies.
CO3 Transfer salient information from technical reading materials and documents into appropriate format.
CO4 Apply appropriate and accurate language in written and/or spoken discourse.

References

1. Gurak, L. & Hocks, M. (2009). The technical communication handbook. New York: Pearson Longman.
2. Anderson, P.V. & Surman, K. (2007). Technical communication: A reader-centered approach. Toronto: Thompson Canada.
3. Collier, J.H. & Toomey, D.M. (2013). Scientific and technical communication: Theory, practice and policy (Digital Edition). Retrieved from http://www.collier.sts.vt.edu/stc/
4. Lannon, J.M. (2006). Technical communication (10th ed.). New York: Pearson Longman.
5. Nation, I.S.P. (2009). Teaching ESL/EFL reading and writing. New York: Routledge.
6. Willis, D. & Willis, J. (2007). Doing task-based teaching. Oxford: Oxford University Press.

Course Code: UHL2432
Course: ENGLISH FOR PROFESSIONAL COMMUNICATION
Pre-requisite: UHL2422 English for Technical Communication

Synopsis

The course is designed to develop students' spoken and written communication skills effectively. This is vital in helping them to enter the job market and preparing them for the workplace. Students enhance their language skills via learning activities that incorporate communication strategies, interactions and feedback. The learning activities include, but not limited to, carrying out presentations, attending mock-job interviews and conducting meetings.

Course Outcomes

CO1 Apply appropriate and accurate language in written and/or spoken communication.
CO2 Deliver relevant information in written and/or spoken communication.
CO3 Demonstrate effective delivery skills in presenting information.

References

1. Barnard, R., & Meehan, A. (2005). Communicating in Business English. New York: Oxford University Press.
2. Bovee, C., & Thill, J. (2010). Business Communication Essentials (4thed.) NJ: Pearson Education.
3. Corfield, R. (2009). Preparing the Perfect Job Application: Application Forms and Letters Made Easy (5th ed.). London: Kogan Page.
4. Dignen, B. (2003). Communicating in Business English. New York: Compass Publishing Inc.
5. Kalpana, S., Noreha, T. , Bhajan Kaur, S.S., & Rajendra, S. (2006). A practical Guide to

Business Meetings. Shah Alam: Mc Graw Hill.
6. Kolin, P. C. (2012). Successful Writing at Work (10th ed.). Boston: Cengage Learning.
7. Renganathan, S., Abu Bakar, Z. et.al. (2011). Introducing Professional Communication Skills for Undergraduates. Shah Alam: Oxford Fajar Sdn Bhd.
8. Taylor, S. (2012). Model business letters, emails and other business documents (7th ed.). UK: Pearson Education Ltd.

DEPARTMENT OF FOREIGN LANGUAGES

*Offered to degree students only

*Students select one foreign language and complete two levels of the selected language.

Beginners Level

Course Code: UHF1111
Course: MANDARIN FOR BEGINNERS
Pre-requisite: none

Synopsis

The course aims to enable students to speak simple Mandarin in their daily life. Students learn Chinese Phonetics (Hanyu Pinyin System) and about 150 vocabularies based on the Level One Chinese Proficiency Test (Hanyu Shuiping Kaoshi HSK). Students are exposed to simple phrases and basic sentence structures. Classroom activities include listening, speaking, reading and writing. Practices based on Level One HSK grammar points are also introduced. Students are evaluated based on the four language skills; listening, speaking, reading and writing.

Course Outcomes

CO1 Distinguish the pronunciation of Chinese syllables, words, phrases and sentences.
CO2 Speak using Chinese sentences according to the given topics.
CO3 Identify the usage of Chinese vocabulary, phrases and sentences.
CO4 Rephrase phrases and basic sentences in Hanyu Pinyin.

References

1. Yong Ying Mei & Cheng Ching Yee (2018), Mandarin for All: Book 1 (Second edition).Penerbit UMP, Pahang, Malaysia
2. Jiang Li Ping (2014), Standard Course HSK 1: Text Book. Beijing Languages & Culture University, Beijing, China
3. Jiang Li Ping (2014), Standard Course HSK 1: Work Book. Beijing Languages & Culture University, Beijing, China
4. Wang Xun (2015), HSK 1 Course Book. Sinolingua Press, China

Course Code: UHF1121
Course: GERMAN FOR BEGINNERS
Pre-requisite: none

Synopsis

This course is designed to give students an exposure to German language and the culture in German-speaking countries. The course covers basic language skills; listening, reading, speaking and writing. Lessons are composed of individual and group work, role-play and simulation.

Course Outcomes

CO1 Extract information from media, audio, dialogue and video clips given.
CO2 Understand information from simple sentences and short paragraphs.
CO3 Write a paragraph of 10 to 12 sentences with a topic sentence.
CO4 Speak using simple words, phrases and sentences.

References

1. Daniela Niebisch, Slyvette Penning-Hiemstra, Franz Specht, Monika Bovermann and Monika Reimann, **Schritte international 1 (Kursbuch + Arbeitsbuch)** (2013), Hueber Verlag, Ismaning, Germany. ISBN 978-3-19-001851-2
2. Yanti Salina Shaari, **Deutsch für Anfänger - German for Beginners** (2012), Penerbit UMP, Kuantan, Pahang. ISBN 978-967-0120-52-2.
3. Monika Reimann, **Grundstufen-Grammatik für Deutsch als Fremdsprache : Erklärungen und Übungen** (2010), Hueber Verlag, Ismaning, Germany. ISBN 978-3-19-161575-8

Course Code: UHF1131
Course: JAPANESE FOR BEGINNERS
Pre-requisite: none

Synopsis

As the main aim of this course is basic communicative competence, classroom learning is based on language tasks which students are likely to perform in real life, either in their native country or in Japan. Students are equipped with basic communicative competence in the aspects of self-development, knowledge acquisition and social interaction.

Course Outcomes

CO1 Recognise Japanese syllables and pronunciations.
CO2 Communicate in simple sentences.
CO3 Read selected short texts.
CO4 Write simple sentences with words given.

References

1. Mohd Iszuani bin Mohd Hassan, (2008). KihonTeki Na Nihongo 1: UMP
2. Shin Nihongo No Kiso, (1977). Japanese Kana Workbook. The Association For Overseas Technical Scholarship (AOTS)
3. Shin Nihongo Kiso 1, (1990). English Translation, The Association For Overseas Technical Scholarship (AOTS)

4. www.learn-hiragana-katakana.com
5. genkijapan.net

Course Code: UHF1141
Course: ARABIC FOR BEGINNERS
Pre-requisite: none

Synopsis

This course focuses on basic Arabic communicative skills. Classroom learning is based on language tasks that students can use in real life, including greetings, introducing oneself, reporting time etc. Students are equipped with basic Arabic communicative skills such as speaking, listening and reading. They also learn how to write simple sentences in Arabic.

Course Outcomes

CO1 Identify Arabic syllables, words and phrases.
CO2 Describe in basic Arabic sentences or phrases.
CO3 Read selected short texts.
CO4 Construct basic sentences with words given.

References

1. Mardhiyyah Zamani,Rosjuliana Hidayu Rosli,Mohammad Baihaqi bin Hasni. Arabic for Beginners. ,Penerbitan UMP, Kuantan, Pahang, 2012
2. Bahasa Arab untuk Semua, Asar Abdul Karim, Penerbitan UMP, Kuantan, Pahang, 2008

Course Code: UHF1151
Course: SPANISH FOR BEGINNERS
Pre-requisite: none
Synopsis

The main aim of this course is to introduce students to the Spanish language. Students learn Spanish alphabets and basic sentence structures. They are expected to be able to speak simple Spanish in selected situations and also read and write in Spanish. Classroom activities include listening and speaking skill practices as well as reading and writing skills to enhance the oral skills. Practices on certain basic grammar are also introduced. Students are evaluated on all four language skills; listening, speaking, reading and writing.

Course Outcomes

CO1 Match the Spanish syllables with the correct pronunciation.
CO2 Read and understand short texts.
CO3 Speak Spanish using basic words, phrases and sentences.
CO4 Write basic sentences using guided words.

References

1. Azlina Mohd Ariffin (2017) Estudiar Español Conmigo (nivel 1) : UMP
2. Azlina Mohd Ariffin,(2012). Spanish For Beginners :UMP
3. Christopher Kendris,(2009). Spanish Verb : Barron's Educational

4. Gilda Missenberg (2011). Complete Spanish Grammar: Mc Graw Hill Company
5. www.123teachme.com

Course Code: UHF1271
Course: TURKISH 1
Pre-requisite: none
***Not offered**

Synopsis

This course aims to enable students to speak simple Turkish in their daily life. Classroom activities include listening and speaking skill practices. Reading and writing activities are also included to enhance the spoken skills, and practices on certain basic grammar are also introduced. Students are evaluated on all four language skills – listening, speaking, reading and writing. The course also covers constructing basic Turkish phrases and sentences.
Course Outcomes

CO1 Communicate in basic sentences.
CO2 Read selected short texts.
CO3 Listen accurately to the pronunciation of Turkish syllables, words and phrases.
CO4 Write simple sentences and short paragraphs in Turkish.

References

1. Tuncay Ozturk & Committee. (2010). Acilim Turkce Ders Kitabi 1 (Turkish Language Textbook 1). Turkey: Caglayan Publication.
2. Tuncay Ozturk & Committee. (2010). Acilim Turkce Calisma Kitabi 1 (Turkish Language Workbook 1). Turkey: Caglayan Publication.
3. Pollard, A.C. & Pollard, D. (2010). *Teach Yourself Complete Turkish.* London: Hodder Headlines.
4. Göksel, A. & Kerslake, C. (2010). *Turkish: An Essential Grammar*. London: Routledge.
5. Kurklu, A. (2008). *Turkish Phrasebook.* Australia: Lonely Planet Publication.
6. Öztopçu, K. (2009). *Elementary Turkish. A Complete Course for Beginners.* Turkey: Sanat Kitabevi.
7. Csato, J & Johanson, L. (2007). *The Turkic Languages.* London: Routledge.
8. Lewis V. Thomas. (2012). *Elementary Turkish.* New York: Dover Publication.
9. Yasar Kuzucu. (2014). *The Delights of Learning Turkish: A self-study course book for learners of Turkish.* Germany: Create Space Independent Publishing Platform.
10. Anonymous. (2008). *Turkish Phrase Book and Dictionary*. London: Berlitz Publishing.
11. http://www.digitaldialects.com/Turkish.htm
12. http://www.hello-world.com/languages.php/?language=Turkish/
13. https://turkce.yee.org.tr/
14. http://www.turkishclass.com/

Intermediate Level

Course Code: UHF2111
Course: MANDARIN FOR INTERMEDIATE
Pre-requisite: UHF1111 Mandarin for Beginners

Synopsis

The course aims to expose students to spoken Mandarin in selected complex situations, including asking for directions, travelling, foods etc. Students continue to practice the use of Chinese Phonetics (Hanyu Pinyin System). They also learn around 300 vocabulary and are expected to use suggested simple Chinese phrases and sentences based on the Level Two Chinese Proficiency Test (Hanyu Shuiping Kaoshi HSK). Classroom activities focus on language skills practices; listening, speaking, reading and writing. Practices that are based on HSK Level Two grammar are also introduced. Students are evaluated based on the four language skills namely; listening, speaking, reading and writing.

Course Outcomes

CO1 Identify pronunciation of simple Chinese phrases, sentences and dialogues.
CO2 Speak using simple Chinese sentences and dialogues.
CO3 Read and understand simple Chinese phrases, sentences and dialogues for selected topics.
CO4 Construct simple sentences for selected topics.

References

1. Yong Ying Mei & Kang Mei Feng (2018), Mandarin for All: Book 2 (Second edition).Penerbit UMP, Pahang, Malaysia
2. Jiang Li Ping (2014), Standard Course HSK 2: Text Book. Beijing Languages & Culture University, Beijing, China
3. Jiang Li Ping (2014), Standard Course HSK 2: Work Book. Beijing Languages & Culture University, Beijing, China
4. Wang Xun (2015), HSK 2 Course Book. Sinolingua Press, China
5. http://digitaldialects.com

Course Code: UHF2121
Course: GERMAN FOR INTERMEDIATE
Pre-requisite: UHF1121 German for Beginners
Synopsis

German for Intermediate is a continuation course and is intended for students who have successfully completed German for Beginners (UHF1121). This course is designed to reinforce and expand their command over grammatical structures, sharpen reading, writing, speaking, and listening skills, and gain a better understanding of the cultures of the German-speaking world.

Course Outcomes

CO1 Understand information in a variety of basic conversations and texts

related to everyday situations.

CO2 Describe simple, familiar topics and activities spontaneously and precisely.

CO3 Write simple phrases and sentences using guided vocabulary related to particular situations.

References

1. Daniela Niebisch, Slyvette Penning-Hiemstra, Franz Specht, Monika Bovermann and Monika Reimann, **Schritte international 1 (Kursbuch + Arbeitsbuch)** (2013), Hueber Verlag, Ismaning, Germany. ISBN 978-3-19-001851-2
2. Daniela Niebisch et.2010. Schritte international 2 (Kursbuch + Arbeitsbuch), Hueber Verlag, Germany.
3. Monika Reimann.2003. Essential Grammar of German, Max Hueber Verlag, Germany.
4. http://www.hueber.de/schritte-international/
5.http://www.education.vic.gov.au/languagesonline/german/german.htm
6. http://www.dict.cc/

Course Code: UHF2131
Course: JAPANESE FOR INTERMEDIATE
Pre-requisite: UHF1131 Japanese for Beginners

Synopsis

The course aims to expose students to spoken Japanese in selected situations, including asking for directions, travelling, food etc. Students continue to practice the use of Japanese phonetics. They also learn additional selected words, common verbs and are expected to write simple sentences. Classroom activities focus on language skills practices; listening, speaking, reading and writing. Students will be evaluated on the four language skills namely; listening, speaking, reading and writing.

Course Outcomes

CO1 Identify pronunciation of Japanese phrases, sentences and dialogues.

CO2 Practice Japanese sentences and dialogues provided in the syllabus.

CO3 Use Japanese phrases, sentences and dialogue for selected topics.

CO4 Construct appropriate sentences for selected topics.

References

1. Syahrina Binti Ahmad, (2018). Rina Jap. Let's Practice Japanese!: UMP
2. Syahrina Binti Ahmad & Mohd Iszuani Bin Mohd Hassan, (2012). Yasashi Nihongo 2: UMP
3. Mohd Iszuani Bin Mohd Hassan, (2011). Yasashi Nihongo 1: UMP
4. Minna No Nihongo Elementary 1-1, (2010). Asian Edition, The Association For Overseas Technical Scholarship (AOTS)
5. Shin Nihongo No Kiso, (2009). Japanese Kana Workbook.

The Association for Overseas Technical Scholarship (AOTS)

Course Code: UHF2141
Course: ARABIC FOR INTERMEDIATE
Pre-requisite: UHF1141 Arabic for Beginners

Synopsis

The main aim of this course is to enhance students' knowledge in the language. Students learn to speak the language in selected situations such as at the hospital, at the workplace etc., read short passages, and write simple Arabic Language with correct grammar. Classroom activities focus on the four main skills; listening, speaking, reading and writing. Practices on certain basic grammar are also introduced. Extensive written exercises give students ample opportunity to put into practice the skills they have learned, enabling them to build confidence in reading and writing vocalized Arabic texts.

Course Outcomes

CO1 Identify accurately Arabic phrases, sentences and short passages.
CO2 Practice selected Arabic sentences and dialogue
CO3 Determine the usage of Arabic phrases, sentences and dialogue for selected topics.
CO4 Produce simple, connected text on topics that are familiar or of personal interest.

References

1. Asar Abdul Karim. Bahasa Arab Untuk Semua, Penerbitan UMP, Kuantan, Pahang, 2008
2. Ahmad Muhammad Mutawalli, Prof. Dr. Ali Ahmad Thalib,Prof. Muhammad Khalaf Yusuf. Taisir Nahu dan Sorf, 2008

Course Code: UHF2151
Course: SPANISH FOR INTERMEDIATE
Pre-requisite: UHF1151 Spanish for Beginners

Synopsis

Spanish for Intermediate is a continuation course for students who have successfully completed Spanish for Beginners (UHF1151). This course is designed to reinforce and expand their command over grammatical structures, improve reading, writing, speaking and listening skills. The students develop intermediate competence in oral and written comprehension as well as expressions in Spanish.

Course Outcomes

CO1 Recognise Spanish syllables and pronunciations.
CO2 Read and understand selected short texts.
CO3 Speak using simple sentences.
CO4 Write short passages using guided words and phrases.

References

1. Azlina Mohd Ariffin, (2015) Estudiar Español Conmigo (nivel 2) :UMP
2. Azlina Mohd Ariffin,(2012) Spanish For Intermediate :UMP
3. Gilda Missenberg, (2011). Complete Spansih Grammar : Mc Graw Hill Company
4. Dorothy Richmand,(2009) .Basic Spanish: Mc Graw Hill Company
5. www.amautaspanish.com

Course Code: UHF2271 (not offred)
Course: TURKISH 2
Pre-requisite: UHF1271 Turkish 1

Synopsis

This course covers exercises to develop and expand more complex vocabulary, word classes and sentence construction together with listening, speaking, reading and writing skills in Turkish. In addition, students write short compositions and develop speech skills in conversation. The course enables them to communicate effectively in various situations and contexts using interactive tasks and activities related to real life.

Course Outcomes

CO1 Accurately use common phrases in Turkish.
CO2 Read and understand selected texts.
CO3 Develop and ask questions appropriate to a given listening context.
CO4 Write and explain short compositions in Turkish.

References

1. Tuncay Ozturk & Committee. (2010). Acilim Turkce Ders Kitabi 2 (Turkish Language Textbook 2). Turkey: Caglayan Publication.
2. Tuncay Ozturk & Committee. (2010). Acilim Turkce Calisma Kitabi 2 (Turkish Language Workbook 2). Turkey: Caglayan Publication.
3. Pollard, A.C. & Pollard, D. (2010). *Teach Yourself Complete Turkish.* London: Hodder Headlines.
4. Göksel, A. & Kerslake, C. (2010). *Turkish: An Essential Grammar*. London: Routledge.
5. Kurklu, A. (2008). *Turkish Phrasebook.* Australia: Lonely Planet Publication.
6. Öztopçu, K. (2009). *Elementary Turkish. A Complete Course for Beginners.* Turkey: Sanat Kitabevi.
7. Csato, J & Johanson, L. (2007). *The Turkic Languages.* London: Routledge.
8. Lewis V. Thomas. (2012). *Elementary Turkish.* New York: Dover Publication.
9. Yasar Kuzucu. (2014). *The Delights of Learning Turkish: A self-study course book for learners of Turkish.* Germany: Create Space Independent Publishing Platform.
10. Anonymous. (2008). *Turkish Phrase Book and Dictionary.* London: Berlitz Publishing.
11. http://www.digitaldialects.com/Turkish.htm

12.http://www.hello-world.com/languages.php/?language=Turkish/
13. https://turkce.yee.org.tr/
14. http://www.turkishclass.com/

Course Code: UHF2192
Course: BAHASA MELAYU KOMUNIKASI
Pre-requisite: none

Synopsis

This course trains students to communicate in Malay on basic daily life situations. Students are introduced to spoken and written Malay. Teaching and learning is implemented in the form of lectures, tutorials, assignments and student learning experiences inside and outside of the classroom. At the end of the course, students are expected to be able to communicate and write using simple Malay sentences effectively.

Course Outcomes

CO1 Understand the sound of phrases, words and simple sentences.
CO2 Read and explain given Malay texts fully.
CO3 Speak in a variety of situations using simple and layered sentences.
CO4 Write ideas creatively and systematically in short essays.

References

1. Juwairiah Osman & Jamilah Bebe Mohamad. (2018). Modul "Malay for Beginners." Penerbit: Universiti Malaysia Pahang, Kuantan.2. Jamilah Bebe Mohamad. (2016). Modul "Malay for Intermediate".
3. Zarina Othman, Roosfa Hashim dan Rusdi Abdullah. (2016). Modul Komunikasi Bahasa Melayu Antarabangsa. Penerbit: Universiti Kebangsaan Malaysia.
4. Nor Hashimah Jalaluddin, Mardian Shah Omar dan Noor Zilawati Jais. (2007). Bahasa Melayu untuk Penutur Asing. Penerbit: Dewan Bahasa dan Pustaka.

Double Degree Programme

Faculty of Industrial Management (FIM)

Course Code: UHG1002
Course: DEUTSCH 1
Pre-requisite: none

Synopsis

This course enables students to understand and use familiar everyday expressions and very basic German phrases aimed at the satisfaction of needs of a concrete type. Students are able to introduce themselves and others and can ask and answer questions about personal details such as where they live, people they know and things they have. Students can produce simple interactions provided the other person talks slowly and clearly and is prepared to help.

Course Outcomes

CO1 Visually recognise familiar names, words and very

basic phrases in simple notices in most common everyday situations.

CO2 Interact in a simple way if the interlocutor is speaking slowly and clearly and is prepared to help. Students can ask and answer simple questions.

CO3 Listen and recognise simple sentences, familiar words that refer to themselves, their family or concrete things when people speak slowly and clearly.

CO4 Write a short and simple postcard and fill in a hotel registration form.

References

1. Kalender, Susanne et al.: Schritte Übungsgrammatik, Hueber, München 2010.
2. Dreyer, Schmitt: Lehr-und Übungsbuch der deutschen Grammatik – aktuell, Hueber, München 2009.
3. Gaidosch, Ulrike: Zur Orientierung, Basiswissen Deutschland, 4th Edition, Hueber, München 2010.

Course Code: UHG1012
Course: DEUTSCH 2
Pre-requisite: UHG1002 Deutsch 1

Synopsis

This course enables students to understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography and employment). The students can communicate simple and routine tasks that require simple and direct exchange of information on familiar and routine matters. They can describe in simple terms aspects of their background, immediate environment and matters in areas of immediate need.

Course Outcomes

CO1 Listen and recognize sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography and employment).

CO2 Write a series of simple phrases and sentences about family, living conditions, educational background, present or most recent job, as well as short, simple formulaic notes and messages relating to matters in areas of immediate need.

CO3 Describe in simple terms aspects of his/her background, immediate environment and matters in areas of immediate need. Produce simple, connected texts on topics that are familiar or of personal interest.

CO4 Find specific, predictable information in simple everyday material such as advertisements, prospectuses, menus, reference lists and timetables.

References

1. Kalender, Susanne et al.: Schritte Übungsgrammatik, Hueber, München 2010.
2. Dreyer, Schmitt: Lehr-und Übungsbuch der deutschen Grammatik – aktuell, Hueber, München 2009.
3. Gaidosch, Ulrike: Zur Orientierung, Basiswissen Deutschland, 4th Edition, Hueber, München 2010.

Course Code: UHG2002
Course: DEUTSCH 3
Pre-requisite: UHG1012 Deutsch 2

Synopsis

This course enables students to understand a wide range of demanding, longer texts, and recognise implicit meaning. They can express themselves fluently and spontaneously without much obvious searching for expressions. Students are able to use language flexibly and effectively for social, academic and professional purposes. Furthermore they will be skilful enough to produce clear, well-structured, detailed texts on complex subjects and show controlled use of organizational patterns, connectors and cohesive devices.

Course Outcomes

CO1 Conduct grammatical transformation extensively.
CO2 Understand scientific German language spoken at natural pace.
CO3 Extract key information from a text and paraphrase with correct grammar and appropriate lexical items.
CO4 Produce clear, detailed personal texts and clarify a position towards a topic.

References

1. Kalender, Susanne et al.: Schritte Übungsgrammatik, Hueber, München 2010.
2. Dreyer, Schmitt: Lehr-und Übungsbuch der deutschen Grammatik – aktuell, Hueber, München 2009
3. Gaidosch, Ulrike: Zur Orientierung, Basiswissen Deutschland, 4th Edition, Hueber, München 2010

Course Code: UHG2012
Course: DEUTSCH 4
Pre-requisite: UHG2002 Deutsch 3

Synopsis

This course enables students to understand main ideas of complex texts on both concrete and abstract topics, including technical discussions in their field of specialization. They can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. The students can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue by giving the advantages and disadvantages of various options.

Course Outcomes

CO1 Write at length about topical issues, even though complex concepts may be oversimplified. Write clear, detailed descriptions on a variety of subjects, write a paper giving reasons in support of or against a particular point of view and explain the advantages and disadvantages of various options. Express news, views and feelings in correspondence as well as respond to the other person. Write standard formal letters requesting or communicating relevant information following a template.

CO2 Give clear, detailed descriptions on a wide range of subjects related to fields of interest, develop a clear argument, linking the ideas logically, and expanding and supporting points with appropriate examples. Present a topical issue in a critical manner and weigh up the advantages and disadvantages of various options, summarized information and arguments from a number of sources.

References

1. Kalender, Susanne et al.: Schritte Übungsgrammatik, Hueber, München 2010.
2. Dreyer, Schmitt: Lehr-und Übungsbuch der deutschen Grammatik – aktuell, Hueber, München 2009.
3. Gaidosch, Ulrike: Zur Orientierung, Basiswissen Deutschland, 4th Edition, Hueber, München 2010.

Faculty of Manufacturing & Mechatronic Engineering Technology and Faculty of Mechanical & Automotive Engineering Technology

Course Code: UHG1003
Course: GERMAN 1
Pre-requisite: None

Synopsis

This course enables students to understand sentences and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type. Students can introduce themselves and others and can ask and answer questions about personal details such as where they live, people they know and things they have. They can interact in a simple way provided the other person talks slowly and clearly and is prepared to help.

Course Outcomes

CO1 Visually recognise familiar names, words and very basic phrases in simple notices in the most common everyday situations.

CO2 Interact in a simple way if the interlocutor is speaking slowly and clearly and is prepared to help. Can ask and answer simple questions.

CO3 Listen and recognize simple sentences, familiar words that refer to her/himself, his/her own family or concrete things around when people speak slowly and clearly.

CO4 Write a short, simple postcard and fill in a hotel registration form.

References

1. Evans, Puda, Specht Menschen A1 Kursbuch Hueber ISBN-10: 3191019014.
2. Peters, Pude, Reinmann Menschen A1 Arbeitsbuch Hueber ISBN-10: 3191119019.
3. Reinmann Grundstufen-Grammatik für DaF Hueber ISBN-10: 319161575X.
4. Lemcke, Rohrmann Grammatik Intensiver A1 Langenscheidt ISBN-10: 3126063594.
5. hueber www.hueber.de/menschen/hueber Hueber.
6. Stefanie Dengler, Paul Rusch et. al. Netzwerk A1 Kursbuch Klett 978-3-12-606128-5.
5. Stefanie Dengler, Paul Rusch et. al. Netzwerk A1 Arbeitsbuch Klett 978-3-12-606130-8.

Course Code: UHG1013
Course: GERMAN 2
Pre-requisite: UHG1003 German 1

Synopsis

This course enables students to understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography and employment). Students can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. They can describe in simple terms aspects of their background, immediate environment and matters in areas of immediate need.

Course Outcomes

CO1 Listen and recognize sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography and employment).

CO2 Write a series of simple phrases and sentences about family, living conditions, educational background, present or most recent job, and short, simple formulaic notes and messages relating to matters in areas of immediate need.

CO3 Describe in simple terms aspects of his/her background, immediate environment and matters in areas of immediate need. Produce simple connected text on topics that are familiar or of personal interest.

CO4 Find specific, predictable information in simple

everyday material such as advertisements, prospectuses, menus, reference lists and timetables.

References

1. Dengler, S. et al. Netzwerk A2 Kursbuch Langenscheidt/ Klett ISBN 978-3-12-606998-4.
2. Dengler, S. et al. Netzwerk A2 Arbeitsbuch Langenscheidt/ Klett ISBN 978-3-12-606999-1.
3. Buscha, A., Szita, S. Begegnungen Deutsch als Fremdsprache A2+: Integriertes Kurs- und Arbeitsbuch.

Course Code: UHG1016
Course: INTENSIVE GERMAN 1
Pre-requisite: UHG1003 German 1 & UHG1013 German 2

Synopsis

This course is designed as a platform for students to enable them to sit for the TELC B1 test. Students are exposed to various situations where they have to understand the main points of clear and standard input on familiar matters regularly encountered at work, school, leisure etc. They also need to learn how to deal with common situations likely to arise while travelling in areas where the language is spoken. The students are guided to produce simple connected text on topics which are familiar or of personal interest, and describe experiences and events, dreams, hopes and ambitions and briefly give reasons and explanations for opinions and plans. At the end of semester, the students should be able to understand, produce and describe their ideas, hopes, explanations as in the B1 level of language competencies.

Course Outcomes

CO1 Read and understand articles and advertisements in every day newspaper.
CO2 Listen and understand every day level radio interviews and shows.
CO3 Write personal and official letters and emails of up to 150 words.
CO4 Discuss personal opinions and plan a task such as a trip.

References

1. Aspekte neu B1 plus: Mittelstufe Deutsch. Lehr-und Arbeitsbush mit Audio-CD, Teil 1 (Aspekte neu / Mittelstufe Deutsch)
2. Prüfungstraining DaF: B1 - Zertifikat Deutsch / telc Deutsch B1: Übungsbuch mit CD und CD-ROM Taschenbuch – 1. August 2013
3. Schritte plus Neu 5: Deutsch als Zweitsprache für Alltag und Beruf / Kursbuch + Arbeitsbuch + CD zum Arbeitsbuch Sondereinband – 1. August 2017

Course Code: UHG2003
Course: GERMAN 3
Pre-requisite: UHG1013 German 2

Synopsis

This course enables students to understand a wide range of demanding, longer texts, and recognize implicit meaning. They can express themselves fluently and spontaneously without much obvious searching for expressions. Students are able to use language flexibly and effectively for social, academic and professional purposes. Furthermore they will be skilful enough to produce clear, well-structured, detailed text on complex subjects, showing controlled use of organizational patterns, connectors and cohesive devices, equal to a B2.1 level.

Course Outcomes

CO1 Conduct grammatical transformation extensively.
CO2 Produce clear detailed personal texts and clarify a position towards a topic.
CO3 Understand scientific German language spoken at natural pace.
CO4 Extract key information from a text and paraphrase it grammatically and with appropriate lexical items.

References

1. Hueber Verlag www.hueber.de Hueber
2. Klett Verlag www.klett.de Klett
3. Ute Koithan, u. a Aspekte neu B2 Teil 1 Klett ISBN 13: 978-3468474873
4. Schubert Verlag http://www.schubert-verlag.de/aufgaben
5. Schubert Verlag http://www.schubert-verlag.de/aufgaben/index.htam Schubert

Course Code: UHG2013
Course: GERMAN 4
Pre-requisite: UHG2003 German 3

Synopsis

This course enables students to understand the main ideas of complex texts on both concrete and abstract topics, including technical discussions in their field of specialization. They can express with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. The students can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options, equal to a B2.1 level.

Course Outcomes

CO1 Understand scientific German language spoken at natural pace.

CO2 Understand main ideas of complex text on both concrete and abstract topics including technical topics.
CO3 Present a topical issue in a critical manner and weigh up the advantages and disadvantages of various options, summarized information and arguments from a number of sources.
CO4 Produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue by giving the advantages and disadvantages of various topics. Write at length about topical issues, even though complex concepts may be oversimplified. Write clear, detailed descriptions on a variety of subjects.

References

1. Ute Koithan, u. a Aspekte neu B2 Teil 2 Klett ISBN-13: 978-3126050289
2. Hueber Verlag www.hueber.de Hueber
3. Klett Verlag www.klett.de Klett
4. Schubert Verlag http://www.schubert-verlag.de/aufgaben
5. Schubert Verlag http://www.schubert-verlag.de/aufgaben/index.htam Schubert

Course Code: UHG2016
Course: INTENSIVE GERMAN 2

Pre-requisite: UHG2003 German 3 & UHG2013 German 4

Synopsis

At the end of the semester, students can comprehend main ideas of complex texts, both on concrete and abstract topics, including basic technical discussion in their field of specialization. They can communicate fluently and spontaneously and is able to interact with the native speaker without major difficulties. They can produce a detailed, well-structured text on a wide range of topics. They can explain their point of view and give advantages and disadvantages of various objects. This course is designed as a platform for the students to enable them to sit for the TELC B2 test.

Course Outcomes

CO1 Read and understand articles, reports and contemporary literature.
CO2 Listen and understand lengthy statements and reports, as well as most themes and TV programs when the topics are somewhat familiar.
CO3 Produce detailed texts, such as essays, reports and letters, and present arguments effectively.

CO4 Relay ideas fluently, spontaneously and actively. Participate in discussions.

References

1. Erkundungen Deutsch als Fremdsprache B2: Integriertes Kurs- und Arbeitsbuch Taschenbuch – 1. Oktober 2008.
2. Mit Erfolg zu telc Deutsch B2: Zertifikat Deutsch Plus. Testbuch + Audio-CD Taschenbuch – 13. September 2010.

ELECTIVE COURSES

Course Code: UHE3022
Course: CRITICALTHINKING THROUGH LITERATURE
Pre-requisite: none

Synopsis

This course aims to use literature as a subject matter that is explored through the use of various activities which engages students' critical thinking skills. It introduces representative literary genres: poetry, short story, popular culture, drama and play. This course is suitable for students who are interested in literature and in developing strong critical thinking skills as it guides students toward a greater understanding and appreciation of literature in connection with their own lives.

Course Outcomes

CO1 Interpret a poem critically using relevant content and appropriate language.
CO2 Write a short story incorporating critical understanding of literary elements.
CO3 Present a critical analysis of the history of music.
CO4 Produce a short video incorporating critical understanding of literary elements.

References

1.Collins, N.D (1993) Teaching Critical Reading through Literature Eric Digest
2. Laraze,D (1987)Critical Thinking in College English Studies Eric Digest
3. Kelly J. Mays The Norton Introduction to Literature
4. University Of North Carolina (2008) Introduction to Literature
5. Yesil, N (2004) Critical Thinkers in the Language classroom: Are We Cryint for the Moon?
6. Rowan University (2008) Introduction to Critical Thinking
7. Kelly J. Mays (2016) The Norton Introduction to Literature W.W Norton & Company 978-0-393-6
8. Fisher, Alec (2011) Critical Thinking: An Introduction Cambridge University Press

Course Code: UHE3082
Code: CREATIVE WRITING
Pre-requisite: none

Synopsis

This course aims to foster a better understanding of the craft of writing and to instil an appreciation towards what goes into producing

readable, publishable and engrossing fiction. It encourages the integral first steps towards writing creatively by tapping students' writing potentials to write clearly with imagination. It also exposes students to the beauty of written language and the mechanics of descriptive writing using figurative language and critical thinking skills. Students explore the creative process through writing, expand and refine vocabulary and style resources, analyse a piece of writing, reinforce process writing, delve into screenplay writing and make a short film.

Course Outcomes

CO1 Compose a weekly journal on their personal blogs using accurate language and appropriate content.
CO2 Analyse and construct a creative piece of writing based on a picture/situation using accurate language and appropriate content.
CO3 Create an original short story using accurate figurative language and appropriate content.
CO4 Produce a storyboard with scripts and a short film for public viewing.

References

1. Tanner, C. (2012). Blog & The Journal - Writing About You -: RUKSAK Books.
2. Goodman,R. (2009) The Soul of Creative Writing:Transaction Publishers.
3. Bond, S.(2015) Your Personal Fiction Writing Coach: 365 Days of Motivation & Tips to Write a Great Book :NeedtoRead Books.
4. Thurlow, M. and Thurlow, C.(2005) Making Short Films: The Complete Guide from Script to Screen :Bloomsbury.
5. Anderson, L. (2013)Creative Writing: A Workbook with Readings: Routledge

Course Code: UHE3092
Course: ENGLISH MECHANICS
Pre-requisite: none

Synopsis

The course primarily aims to develop a greater understanding towards English mechanics, which includes grammar, sentence structure, word formation and order, spelling, capitalisation and punctuation. Students are exposed to these aspects in written language to strengthen their communication skills.

Course Outcomes

CO1 Identify elements of English mechanics according to a selected writing convention.
CO2 Identify and analyse the use of mechanics in English language at sentence and paragraph levels.
C03 Write an essay using correct mechanics in English language according to the selected writing conventions.

References

1.Burton-Roberts, N. (2016). Analysing sentences: an

introduction to English syntax. London: Routledge.
2. Gaudart, H., Hughes, R., & Michael, J. (2007). Towards better English grammar. Shah Alam: Oxford Fajar.
3. Kolln, M., Gray, L. S., & Salvatore, J. (2011). Understanding English grammar. Boston: Pearson.
4. Panda, M. (2006). Words and their usages: a useful guide to the appropriate use of words and phrases. Petaling Jaya, Selangor: Unipress Publication
5. Zemach, D. E. (2011). Writing sentences: the basics of writing. Oxford: Macmillan Education.

Course Code: UHE3132
Course: PUBLIC SPEAKING
Pre-requisite: none

Synopsis

The course aims to introduce students to the speech planning process. Students are exposed to three types of public speaking, namely informative, persuasive and impromptu speeches. Students learn how to select a topic, gather materials and supporting points, organise the body of the speech, prepare an outline and deliver the speech. Videos on speeches are used to provide samples on effective delivery skills. Students are also exposed to the use of relevant technology in preparing and delivering their speeches creatively and effectively.

Course Outcomes

CO1 Produce a video presentation to introduce themselves by using effective delivery strategies and appropriate language style.
CO2 Demonstrate understanding of the fundamentals of public speaking.
CO3 Write original informative and persuasive speech outlines using appropriate language, correct format and relevant content.
CO4 Present different types of speeches by using effective delivery strategies, appropriate language and relevant content.

References

1. Carnegie, D. (2017). How to develop self-confidence and influence people by public speaking. New York: Simon and Schuster.
2. Fujishin, R. (2016). The natural speaker. Boston: Routledge.
3. Sprague, J., Stuart, D., & Bodary, D. (2015). The Speaker's Handbook, Spiral bound Version. London: Cengage Learning.
4. Donovan, J., John, R. S., & Sinek, S. (2014). How to deliver a TED talk. London: McGraw Hill.
5. Carnegie, D., & North, W. (2013). The art of public speaking. New York: Wyatt North Publishing, LLC.

Course Code: UHE3142
Course: PROJECT BASED PROPOSAL WRITING
Pre-requisite: none

Synopsis

The course is designed to develop students' ability in writing a project-based proposal with regard to their final year engineering undergraduate research project (URP) or Projek Sarjana Muda (PSM). Students are introduced to proposal writing in which emphasis is placed on academic writing conventions in writing Introduction, Literature Review and Methodology chapters. Grammar is implicitly embedded into the teaching and learning process. In addition, students are also exposed to elements of citation techniques and referencing in order to avoid plagiarism.

Course Outcomes

CO1 Present an outline of a proposal on an engineering-related project.
CO2 Organise references and in-text citations according to correct referencing style.
CO3 Write a proposal on a chosen engineering-related topic using appropriate language, correct organisation and referencing style.
CO4 Demonstrate presentation skills using appropriate language and delivery styles.

References

1. Azar,B.S. (1999) Understanding and Using English Grammar (3rd Edition) New York:Longman
2. Curtin University. (2013). APA 6th Referencing. Retrieved from http://libguides.library.curtin.edu.au/content.php?pid=141214&sid=133539
3. Denicolo, P., & Becker, L. (2012). Developing research proposals. London: Sage
4. Ridley, D. (2012). The literature review: A step-by-step guide for students (2nd. ed.). London: Sage.
5. Rizvi, M.A. (2010). Effective Technical Communication. New Delhi: Tata McGraw-Hill Publishing Company Limited.

Course Code: UHE3152
Course: INTERPERSONAL EFFECTIVENESS
Pre-requisite: none

Synopsis

This course is specifically designed for students who wish to improve their ability to interact with others in their personal and professional lives. The course begins with a focus on preliminary topics such as basics of interpersonal communication and relationships and models of interpersonal effectiveness. The second part of the course includes intrapersonal topics such as self-awareness, self-disclosure and trust, and self-management. The final part of the course covers

interpersonal topics such as perception, diversity, active listening and feedback, and apprehension and assertiveness. The teaching and learning approach used in this course includes interactive lectures, small group activities, video analysis, and role play.

Course Outcomes

CO1 Demonstrate knowledge and understanding of the fundamental principles of intrapersonal and interpersonal themes.

CO2 Demonstrate the application of a self-reflection plan based on six stimulus questions given.

CO3 Evaluate four key points on selected interpersonal topics using appropriate delivery strategies.

CO4 Develop a 15-minute role play, incorporating a minimum of three aspects of intrapersonal and interpersonal themes learnt throughout the semester.

References

1. Beebe, S. A., Beebe, S. J. and Ivy, D. K. (2016). Communication Principles for a Lifetime (6th ed.) Pearson Education.
2. DeVito, J. A. (2016). The Interpersonal Communication Book (14th ed.) Pearson Education Limited.
3. Gamble, T. K., Gamble, M. (2013). Communication Works (11th ed.). McGraw-Hill.
4. Verderber, K. S., Verderber R. F. & Sellnow D. D. (2010). Communicate! (13th ed.). Wadsworth Cengage Learning.

STUDENTS AFFAIRS AND ALUMNI DEPARTMENT

STUDENTS AFFAIRS AND ALUMNI DEPARTMENT

INTRODUCTION

Student Affairs and Alumni Department (SAffAD), Universiti Malaysia Pahang (UMP) was established in 2002. SAffAD is responsible for managing the welfare and development of students in supporting the vision, mission, philosophy and core values of the university.

SERVICES OFFERED

WELFARE & STUDENT FINANCE

Students are eligible to apply for scholarship/education loans offered by any agencies such as:

- **Biasiswa Universiti Malaysia Pahang**
- **Perbadanan Tabung Pendidikan Tinggi Nasional (PTPTN)**
- **Jabatan Perkhidmatan Awam (JPA)**
- **Yayasan Pahang**
- **Yayasan Tunku Abdul Rahman**
- **Gamuda Berhad**
- **Biasiswa Sony**
- **Biasiswa Maybank**
- **Pinjaman Pelajaran MARA**
- **Other education loan from SUK / State Foundation / Yayasan Negeri**

Students are covered under Skim Perlindungan Takaful Berkelompok which seeks to:

- Provides basic protection scheme in the form of compensation in the event of accidents or things that are not desired during the study.
- Alleviate the financial burden on students and their beneficiaries.

It is a 24-hour protection benefits. A claim can be made if admitted for treatment / medical examination, an accident, total permanent disability due to accident, death or claim expenses of hospital bills not covered by UMP Health Centre.

Students with financial problems during their studies can apply for financial assistance provided such as:

- Subsistence Assistance For Non Muslim
- Zakat Assistance For Muslim
- Tuition Fees Assistance
- Disabled Student Assistance
- Student Work Scheme

The information provided by Student Affairs & Alumni Department are based on University's Regulation and endorsement until 12 December 2018

- Disaster Assistance

STUDENT COUNSELING SERVICES

- Individual counseling
- Group counseling
- Psychology inventory and career
- Preventive programmes, development, rehabilitation, crisis and intervention

Facilities provided:

- Therapy room
- Reading materials
- Psychological inventory

ACCOMODATION

- Five colleges are provided in the campus. Four colleges at Gambang Campus and one college at Pekan Campus. Both campuses can accommodate up to 8,000 students. It is compulsory for the first year students to stay in the campus.
- Accommodation for second year student and above is assessed through merit and demerit system.
- Active students, students with health problems and students with disabilities are given priority to occupy the residential colleges.
- Air-conditioned rooms are also provided with the appropriate rate.
- Facilities provided at the residential campuses are:
    - Student Park
    - Cafeteria
    - Student Lounges
    - Gymnasium
    - Mini Shops

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CO-CURICULUM CENTRE

CO-CURICULUM CENTRE

Introduction

Co-curiculum Centre, Uuniversiti Malaysia Pahang was established on January 16, 2009 to create balanced human aspects of academic and soft skills. It also acts as a catalyst in producing students who have a sense of identity, innovative, resilient and has high soft skills through extra-curricular activities. This centre play significant of student bodies and the implementation and expansion of student activities.

Objectives

- Strengthen and enhance co-curricular courses, supervision of student organization and activities though a systematic palnning and management.
- Provide encouragement to the graduates to choose programs / clubs / activities based on interests and their capabilities.
- To produce graduates who have high self-esteem, knowledge, integrity, creativity and innovation in line with the needs of the University and Industry.
- Plan and supervise ectra-curricular activities and give recognition through Learning Outcomes (LO) and soft skills (KI) and the Merit System in accordance with the soft skills modules from Ministry of Higher Education in order to produce graduates who are holistic.

Functions

A.Coordinating Co-curricular Courses

- Offering Co-curricular Courses
- Developing and diversifying the new Co-curriculum Courses
- Appoint a qualified coach for each Co-curriculum Courses
- Supervise and manage the implementation of Co-curriculum Courses in terms of logistics and financial

B.Supervise and assist the implementation of club activities / student associations

- Supervise the activities organized or participated in by students
- To assist the implementation of the activities in the financial and logistical aspects
- Provide recognition in the form of merit and a certificate to every student involvement

SYNOPSIS OF CREDITED CO-CURRICULUM COURSES

All undergraduate students must take two credit hours as their co-curriculum courses throughout their studies. The courses offered are divided into two parts. The first part is either Uniform Body or Briged Siswa. Any students who enrolled in Uniform Bodies such as KOR SUKSIS, KOR SISPA, PALAPES (Army/Airforce/Navy), they need to go through this course until six semesters in order to complete the course and entitled for graduation. Meanwhile for those who registered for Briges Siswa, they have to register another subject in the second part of the co-curriculum subjects in order to graduate. In second part of co-curriculum subjects, students can choose any other courses offered under seven soft skills element such as Leadership, Communication, Innovation, Cultural, Volunteerism, Sport and Community Service, with minimum number of one subject. As for Diploma students, they only need to register for Briged Siswa throughout their studies for graduation. Other than credited courses, students may involve or organize any activities by participating in students' club or society which is already approved by co-curriculum centre.

CO-CURICULUM COURSES FOR CO-CURICULUM CENTRE

KOKURIKULUM I

NO.	CODE	COURSE	CREDIT HOUR	TERAS
1	UQB1011	BRIGED SISWA (KOKURIKULUM I)	1	**KEPIMPINAN**
TOTAL MINIMUM CREDITS OF CO-CURICULUM I COURSES FOR GRADUATION			**1**	

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KOKURIKULUM II

NO.	CODE	COURSE	CREDIT HOUR	TERAS
1	UQD2011	ROBOCON	1	DAYA USAHA & INOVASI
2	UQD2021	CREATIVE ART	1	
3	UQD2031	FERTIGASI**	1	
4	UQD2041	ASAS KECANTIKAN & SOLEKAN**	1	
5	UQD2051	PERUBATAN ISLAM**	1	
6	UQD2061	BEKAM SUNNAH **	1	
7	UQD2071	PEMPROSESAN MAKANAN HALAL**	1	
8	UQD2081	FRAGMENT IKAN HIASAN & TERUMBU KARANG**	1	
9	UQD2091	ASAS FOTOGRAFI**	1	
10	UQD2111	HEALTH LIFE STYLE**	1	
11	UQN2011	MUZIK KOMPANG	1	KEBUDAYAAN
12	UQN2021	NASYEED	1	
13	UQN2031	ANYAMAN	1	
14	UQP2021	IQRA	1	
15	UQN2041	PENULISAN KREATIF **	1	
16	UQP2071	PENGURUSAN MAJLIS	1	KEPIMPINAN
17	UQP2081	PENGURUSAN BENCANA	1	
18	UQP2011	KAUNSELOR SISWA	1	
19	UQP2061	KEPIMPINAN	1	
20	UQP2091	WATANIAH**	1	
21	UQP2111	LIFE SAVER**	1	
22	UQP2121	BASIC FIRST AID**	1	
23	UQP2131	PENGURUSAN ACARA**	1	
24	UQP2031	DEBATE (BM)	1	PENGUCAPAN AWAM
25	UQP2011	BAHASA JEPUN**	1	
26	UQK2011	INDUSTRIAL VOLUNTARY WORK**	1	KHIDMAT KOMUNITI
27	UQK2021	CREATING SHARE VALUE**	1	
28	UQS2011	KAYAK	1	KESUKANAN
29	UQS2021	TREKKING	1	
30	UQS2031	SILAT OLAHRAGA	1	
31	UQS2041	BOLA SEPAK	1	
32	UQS2051	HOKI	1	
33	UQS2061	BOLA BALING	1	
34	UQS2081	ARCHERY	1	
35	UQS2091	FITNESS	1	
36	UQS2121	PAINTBALL	1	
37	UQS2151	GOLF	1	
38	UQS2161	FUTSAL	1	

39	UQS2171	SCUBA	1	
40	UQS2181	SENAMROBIK**	1	
41	UQS2191	ASAS RENANG**	1	
42	UQS2111	CATUR**	1	
TOTAL MINIMUM CREDITS OF COCURICULUM II COURSES FOR GRADUATION			**1**	

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***** Adalah kursus baharu yang akan ditawarkan bermula sesi 2020/2021.***

BADAN BERUNIFROM

NO.	CODE	COURSE	CREDIT HOUR	TERAS
1	UQB1021	KOR SUKSIS 1	1	KEPIMPINAN
2	UQB2021	KOR SUKSIS 2	1	
3	UQB3021	KOR SUKSIS 3	1	
4	UQB4021	KOR SUKSIS 4	1	
5	UQB5021	KOR SUKSIS 5	1	
6	UQB6021	KOR SUKSIS 6	1	
7	UQB1071	KOR SISPA 1	1	
8	UQB2071	KOR SISPA 2	1	
9	UQB3071	KOR SISPA 3	1	
10	UQB4071	KOR SISPA 4	1	
11	UQB1041	PALAPES LAUT 1	1	
12	UQB2041	PALAPES LAUT 2	1	
13	UQB3041	PALAPES LAUT 3	1	
14	UQB4041	PALAPES LAUT 4	1	
15	UQB5041	PALAPES LAUT 5	1	
16	UQB6041	PALAPES LAUT 6	1	
17	UQB1051	PALAPES UDARA 1	1	
18	UQB2051	PALAPES UDARA 2	1	
19	UQB3051	PALAPES UDARA 3	1	
20	UQB4051	PALAPES UDARA 4	1	
21	UQB5051	PALAPES UDARA 5	1	
22	UQB6051	PALAPES UDARA 6	1	
23	UQB1061	PALAPES DARAT 1	1	
24	UQB2061	PALAPES DARAT 2	1	
25	UQB3061	PALAPES DARAT 3	1	
26	UQB4061	PALAPES DARAT 4	1	
27	UQB5061	PALAPES DARAT 5	1	
28	UQB6061	PALAPES DARAT 6	1	
TOTAL MINIMUM CREDITS OF COCURICULUM COURSES (BADAN BERUNIFROM) FOR GRADUATION			**6**	

The information provided by Co-curiculum Centre are based on University's Regulation and endorsement until 12 March 2020

ENTRY REQUIREMENT

COLLEGE OF ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DEPARTMENT OF CHEMICAL ENGINEERING		
1.	B.Eng (Hons.) Chemical Engineering **JK03 / UJ6524001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blinds and not pyhsically handicapped that can impair practical work.

DIPLOMA HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF CHEMICAL ENGINEERING		
1.	B.Eng (Hons.) Chemical Engineering **JK03 / UJ6524001** 8 Semesters	**Fulfill University General Requirement** **and** **PROGRAMME REQUIREMENT** Obtained a relevant Diploma from Public University (UA) with at least **CGPA ≥ 2.50** **Or** Obtained a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.00** **Or** Applications not obtained **CGPA** mentioned above, but with at least **CGPA ≥ 2.30** and 2 years work experience in related fields can be consider. **And** Candidates must not be colour blinds and not physically handicapped which will complicate practical works **Note;** Duration of study subjected to the credit exemption approval by faculty.

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.70;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
DEPARTMENT OF CHEMICAL ENGINEERING		
1.	B.Eng (Hons.) Chemical Engineering **JK03 / UJ6524001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics • Chemistry • Physics / Biology **And** Obtain at least C Grade in subject at SPM Level • Additional Mathematics / • Physics / Chemistry Candidates without Physics subject in Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates are not colour blinds and not physically handicapped that can impair practical work.

INTERNATIONAL BACCAULAREATE (IB)

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DEPARTMENT OF CHEMICAL ENGINEERING		
1.	B.Eng (Hons.) Chemical Engineering **JK03 / UJ6524001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics • Chemistry • Physics / Biology **And** Candidates without Physics subject in IB level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be colour blinds and not physically handicapped which will complicate practical works.

MATRICULATION / FOUNDATION

NO	(i) Programme Name (ii) Code (iii) Duration of Study	KPM Matriculation/Foundation Studies Minimum Requirements
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation/UM Science Foundation/UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.70**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF CHEMICAL ENGINEERING		
1.	B.Eng (Hons.) Chemical Engineering **JK03 / UJ6524001** 8 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C(2.00)** in Matriculation / Foundation level in the following subjects; • Mathematics / Engineering Mathematics • Chemistry / Engineering Chemistry • Physics / Engineering Physics / Biology and Candidates without Physics subject in Matriculation / Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be colour blinds and not physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at Matriculation/Foundation level need to take Basic Physics subject at University.**

STPM HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum STPM Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM) / Equivalent with Credit in Bahasa Melayu / Bahasa Malaysia or Credit in Bahasa Melayu / Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least **CGPA 2.70** and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF CHEMICAL ENGINEERING		
1.	B.Eng (Hons.) Chemical Engineering **JK03 / UJ6524001** 8 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; ; • Chemistry • Physics / Biology And Candidates without Physics subject in STPM level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be colour blinds and not physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**

DIPLOMA PROGRAM

CERTIFICATE HOLDER

No.	Program and Study Duration	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAM) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **CREDIT (C GRADE)** in Bahasa Melayu. 2. **Passed** at least **(Grade E)** in Sejarah .
1.	**FACULTY OF CHEMICAL & NATURAL RESOURCES ENGINEERING** Diploma in Chemical Engineering (5 Semester + 1 Short Semester)	**J2441**	**PROGRAM SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 3. Pass with Certificate or equivalent in related field from the Institution acknowledged by the University Senate with at least **CGPA 3.00** 4. Candidates are not colour blind and physically handicapped that can impair practical work.

SPM HOLDER

No.	Program and Study Duration	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAM) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu. 2. Pass at least (Grade E) in Sejarah.
1.	**FACULTY OF CHEMICAL & NATURAL RESOURCES ENGINEERING** Diploma in Chemical Engineering (5 Semester + 1 Short Semester)	**J2441**	**PROGRAM SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. At least **credit (C Grade)** in the following subjects : • Mathematics, • Additional Mathematics, • Physics/Chemistry. 3. At least **ONE (1) credit (Grade C)** in the following subjects:- • Information Technology • Physics • Chemistry • Invention • Biology • EngineeringTechnology • Mechanical Engineering Study • Electric & Electronic Engineering Study • Technical Drawing 4. At least **Pass (Grade E)** in English 5. Candidates are not colour blind and physically handicapped that can impair practical work.

DEPARTMENT OF CIVIL ENGINEERING

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DEPARTMENT OF CIVIL ENGINEERING		
1.	B.Eng (Hons.) Civil Engineering **JK01 / UJ6526001** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not pyhsically handicapped that can impair practical work.

DIPLOMA HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF CIVIL ENGINEERING		
1.	B.Eng (Hons.) Civil Engineering **JK01 / UJ6526001** 8 semesters	**Fulfill University General Requirement** **and** **PROGRAMME REQUIREMENT** Obtained a relevant Diploma from Public University (UA) with at least **CGPA ≥ 2.50** **Or** Obtained a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.00** **Or** Applications not obtained **CGPA** mentioned above, but with at least **CGPA ≥ 2.30** and 2 years work experience in related fields can be consider. **And** Candidates must not be physically handicapped which will complicate practical works **Note;** Duration of study subjected to the credit exemption approval by faculty.

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
DEPARTMENT OF CIVIL ENGINEERING		
1.	B.Eng (Hons.) Civil Engineering **JK01 / UJ6526001** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics **and** Obtained at least **Grade C (2.00)** in Foundation level in any two(2) of the following subjects; • Chemistry • Physics • Biology **And** Obtain at least C Grade in subject at SPM Level • Additional Mathematics / • Physics / Chemistry Candidates without Physics subject in Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates are not physically handicapped that can impair practical work.

INTERNATIONAL BACCAULAREATE (IB)

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DEPARTMENT OF CIVIL ENGINEERING		
1.	B.Eng (Hons.) Civil Engineering **JK01 / UJ6526001** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics **and** Obtained at least **Grade C (3 Marks)** in IB level in any two(2) of the following subjects; • Chemistry • Physics • Biology **And** Candidates without Physics subject in IB level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be physically handicapped which will complicate practical works.

MATRICULATION / FOUNDATION

NO	(i) Programme Name (ii) Code (iii) Duration of Study	KPM Matriculation/Foundation Studies Minimum Requirements
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation/UM Science Foundation/UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF CIVIL ENGINEERING		
1.	B.Eng (Hons.) Civil Engineering **JK01 / UJ6526001** 8 semester	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C(2.00)** in Matriculation / Foundation level in the following subjects; • Mathematics / Engineering Mathematics **and** Obtained at least **Grade C (2.00)** in Matriculation / Foundation level in any two(2) of the following subjects; • Chemistry / Engineering Chemistry • Physics / Engineering Physics • Biology Candidates without Physics subject in Matriculation / Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at Matriculation/Foundation level need to take Basic Physics subject at University.**

STPM HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum STPM Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM) / Equivalent with Credit in Bahasa Melayu / Bahasa Malaysia or Credit in Bahasa Melayu / Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 2.00 and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF CIVIL ENGINEERING		
1.	B.Eng (Hons.) Civil Engineering **JK01 / UJ6526001** 8 semester	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; **and** Obtained at least **Grade C (CGPA 2.00)** in STPM level for any two (2) of the following subjects ; • Chemistry • Physics • Biology And Candidates without Physics subject in STPM level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**

DEPARTMENT OF ELECTRICAL ENGINEERING

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DEPARTMENT OF ELECTRICAL ENGINEERING		
1.	B.Eng (Hons.) Electrical Engineering (Electronics) **JK02 / UJ6523001** 8 Semester	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blinds and not pyhsically handicapped that can impair practical work.
2.	B.Eng (Hons.) Electrical Engineering (Power System) **JK21 / UJ6522001** 8 semester	

DIPLOMA HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF MECHANICAL ENGINEERING		
1.	B.Eng (Hons.) Mechanical Engineering **JK08 / UJ6521001** 8 semesters	**Fulfill University General Requirement** **and** **PROGRAMME REQUIREMENT** Obtained a relevant Diploma from Public University (UA) with at least **CGPA ≥ 2.50** **Or** Obtained a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.00** **Or** Applications not obtained **CGPA** mentioned above, but with at least **CGPA ≥ 2.30** and 2 years work experience in related fields can be consider. **And** Candidates are not physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	B.Eng (Hons.) Mechanical Engineering (Automotive) **JK40 / UJ6525001** 8 semesters	

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
DEPARTMENT OF ELECTRICAL ENGINEERING		
1.	B.Eng (Hons.) Electrical Engineering (Electronics) **JK02 / UJ6523001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics **and** Obtained at least **Grade C (2.00)** in Foundation level in any two(2) of the following subjects; • Chemistry • Physics • Biology **And** Obtain at least C Grade in subject at SPM Level • Additional Mathematics / • Physics / Chemistry Candidates without Physics subject in Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates are not colour blind and not physically handicapped that can impair practical work.
2.	B.Eng (Hons.) Electrical Engineering (Power System) **JK21 / UJ6522001** 8 semesters	

INTERNATIONAL BACCAULAREATE (IB)

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DEPARTMENT OF ELECTRICAL ENGINEERING		
1.	B.Eng (Hons.) Electrical Engineering (Electronics) **JK02 / UJ6523001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics **and** Obtained at least **Grade C (3 Marks)** in IB level in any two(2) of the following subjects; • Chemistry • Physics • Biology **And** Candidates without Physics subject in IB level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be colour blinds and not physically handicapped which will complicate practical works.
2.	B.Eng (Hons.) Electrical Engineering (Power System) **JK21 / UJ6522001** 8 semesters	

MATRICULATION / FOUNDATION

NO	(i) Programme Name (ii) Code (iii) Duration of Study	KPM Matriculation/Foundation Studies Minimum Requirements
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation/UM Science Foundation/UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF ELECTRICAL ENGINEERING		
1.	B.Eng (Hons.) Electrical Engineering (Electronics) **JK02 / UJ6523001** 8 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C(2.00)** in Matriculation / Foundation level in the following subjects; • Mathematics / Engineering Mathematics **and** Obtained at least **Grade C (2.00)** in Matriculation / Foundation level in any two(2) of the following subjects; • Chemistry / Engineering Chemistry • Physics / Engineering Physics • Biology Candidates without Physics subject in Matriculation / Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be colour blinds and not physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at Matriculation/Foundation level need to take Basic Physics subject at University.**
2.	B.Eng (Hons.) Electrical Engineering (Power System) **JK21 / UJ6522001** 8 semesters	

STPM HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum STPM Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM) / Equivalent with Credit in Bahasa Melayu / Bahasa Malaysia or Credit in Bahasa Melayu / Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 2.00 and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF ELECTRICAL ENGINEERING		
1.	B.Eng (Hons.) Electrical Engineering (Electronics) **JK02 / UJ6523001** 8 Semester	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; **and** Obtained at least **Grade C (CGPA 2.00)** in STPM level for any two (2) of the following subjects ; • Chemistry • Physics • Biology And Candidates without Physics subject in STPM level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be colour blinds and not physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**
2.	B.Eng (Hons.) Electrical Engineering (Power System) **JK21 / UJ6522001** 8 semester	

DEPARTMENT OF MECHANICAL ENGINEERING

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DEPARTMENT OF MECHANICAL ENGINEERING		
1.	B.Eng (Hons.) Mechanical Engineering **JK08 / UJ6521001** 8 semester	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not pyhsically handicapped that can impair practical work.
2.	B.Eng (Hons.) Mechanical Engineering (Automotive) **JK40 / UJ6525001** 8 semester	

DIPLOMA HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF MECHANICAL ENGINEERING		
1.	B.Eng (Hons.) Mechanical Engineering **JK08 / UJ6521001** 8 semester	**Fulfill University General Requirement** **and** **PROGRAMME REQUIREMENT** Obtained a relevant Diploma from Public University (UA) with at least **CGPA ≥ 2.50** **Or** Obtained a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.00** **Or** Applications not obtained **CGPA** mentioned above, but with at least **CGPA ≥ 2.30** and 2 years work experience in related fields can be consider. **And** Candidates are not physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	B.Eng (Hons.) Mechanical Engineering (Automotive) **JK40 / UJ6525001** 8 semester	

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
DEPARTMENT OF MECHANICAL ENGINEERING		
1.	B.Eng (Hons.) Mechanical Engineering **JK08 / UJ6521001** 8 semester	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics **and** Obtained at least **Grade C (2.00)** in Foundation level in any two(2) of the following subjects; • Chemistry • Physics • Biology **And** Obtain at least C Grade in subject at SPM Level • Additional Mathematics / • Physics / Chemistry Candidates without Physics subject in Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates are not physically handicapped that can impair practical work.
2.	B.Eng (Hons.) Mechanical Engineering (Automotive) **JK40 / UJ6525001** 8 semester	

INTERNATIONAL BACCAULAREATE (IB)

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DEPARTMENT OF MECHANICAL ENGINEERING		
1.	B.Eng (Hons.) Mechanical Engineering **JK08 / UJ6521001** 8 semester	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics **and** Obtained at least **Grade C (3 Marks)** in IB level in any two(2) of the following subjects; • Chemistry • Physics • Biology **And** Candidates without Physics subject in IB level need to have at least credit in Physics subject in SPM level. **and** Candidates should and not physically handicapped which will complicate practical works.
2.	B.Eng (Hons.) Mechanical Engineering (Automotive) **JK40 / UJ6525001** 8 semester	

MATRICULATION / FOUNDATION

NO	(i) Programme Name (ii) Code (iii) Duration of Study	KPM Matriculation/Foundation Studies Minimum Requirements
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation/UM Science Foundation/UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF MECHANICAL ENGINEERING		
1.	B.Eng (Hons.) Mechanical Engineering **JK08 / UJ6521001** 8 semester	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C(2.00)** in Matriculation / Foundation level in the following subjects; • Mathematics / Engineering Mathematics **and** Obtained at least **Grade C (2.00)** in Matriculation / Foundation level in any two(2) of the following subjects; • Chemistry / Engineering Chemistry • Physics / Engineering Physics • Biology Candidates without Physics subject in Matriculation / Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at Matriculation/Foundation level need to take Basic Physics subject at University.**
2.	B.Eng (Hons.) Mechanical Engineering (Automotive) **JK40 / UJ6525001** 8 semester	

STPM HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum STPM Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM) / Equivalent with Credit in Bahasa Melayu / Bahasa Malaysia or Credit in Bahasa Melayu / Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 2.00 and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
DEPARTMENT OF MECHANICAL ENGINEERING		
1.	B.Eng (Hons.) Mechanical Engineering **JK08 / UJ6521001** 8 semester	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; **and** Obtained at least **Grade C (CGPA 2.00)** in STPM level for any two (2) of the following subjects ; • Chemistry • Physics • Biology And Candidates without Physics subject in STPM level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be colour blinds and not physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**
2.	B.Eng (Hons.) Mechanical Engineering (Automotive) **JK40 / UJ6525001** 8 semester	

DIPLOMA PROGRAM

CERTIFICATE HOLDER

No.	Programme and Duration of Study	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAM) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **CREDIT (C GRADE)** in Bahasa Melayu. 2. Pass at least Grade E in subject Sejarah
1. .	**FACULTY OF MECHANICAL ENGINEERING** Diploma in Mechanical Engineering (5 Semester + 1 Short Semester)	**J2430**	**PROGRAM SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 3. Pass with Certificate or equivalent in related field from the Institution acknowledged by the University Senate with at least **CGPA 3.00** 4. Candidates should not be physically handicapped which will complicate practical works

SPM HOLDER

No.	Programme and Duration of Study	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAM) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu. 2. Pass at least (Grade E) in Sejarah.
1.	**FACULTY OF MECHANICAL ENGINEERING** Diploma in Mechanical Engineering (5 Semester + 1 Short Semester)	**J2430**	**PROGRAMME REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. At least **credit (Grade C)** in the following subjects : • Mathematics, • Additional Mathematics, • Physics/Chemistry. 3. At least **ONE (1) credit (Grade C)** in the following subjects:- • Computer Science • Physics • Chemistry • Invention • Biology • EngineeringTechnology • Machine/Mechanical Engineering Study • Civil Engineering Study • Electric & Electronic Engineering Study • Technical Drawing / Technical Graphic Communication 4. At least **Pass (GRADE D)** in English. 5. Candidates should not be physically handicapped which will complicate practical works.

FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY		
1.	Bachelor of Chemical Engineering Technology with Honours **JY03 / UJ6524002** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blind and pyhsically handicapped that can impair practical work.
2.	Bachelor of Mechanical Engineering Technology (Petroleum) with Honours **JY65 / UJ6524006** 8 semesters	
3.	Bachelor of Manufacturing Engineering Technology (Pharmaceutical) with Honours **JY70 / UJ6524003** 8 Semesters	

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY		
1.	Bachelor of Chemical Engineering Technology with Honours **JY03 / UJ6524002** 8 semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma from Public University (UA) / Private University (IPTS) / Polytechnics with at least **CGPA ≥ 2.00** **And** Candidates are not colour blinds and physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	Bachelor of Mechanical Engineering Technology (Petroleum) with Honours **JY65 / UJ6524006** 8 semesters	
3.	Bachelor of Manufacturing Engineering Technology (Pharmaceutical) with Honours **JY70 / UJ6524003** 8 Semesters	

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY		
1.	Bachelor of Chemical Engineering Technology with Honours **JY03 / UJ6524002** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics • Chemistry • Physics / Biology And Obtain at least C Grade in subject at SPM Level • Additional Mathematics • Physics / Chemistry **And** Candidates without Physics subject in Matriculation/Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Mechanical Engineering Technology (Petroleum) with Honours **JY65 / UJ6524006** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics • Chemistry / Physics / Biology And Obtain at least C Grade in subject at SPM Level • Additional Mathematics • Physics / Chemistry **And** Candidates without Physics subject in Matriculation/Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates are not colour blind and physically handicapped that can impair practical work.
3.	Bachelor of Manufacturing Engineering Technology (Pharmaceutical) with Honours **JY70 / UJ6524003** 8 Semesters	

INTERNATIONAL BACCAULAREATE (IB) CERTIFICATE

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY		
1.	Bachelor of Chemical Engineering Technology with Honours **JY03 / UJ6524002** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics • Chemistry / Physics / Biology **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Mechanical Engineering Technology (Petroleum) with Honours **JY65 / UJ6524006** 8 semesters	
3.	Bachelor of Manufacturing Engineering Technology (Pharmaceutical) with Honours **JY70 / UJ6524003** 8 Semesters	

KPM MATRICULATION/FOUNDATION STUDENT

NO	(i) Programme Name (ii) Code (iii) Duration of Study	KPM Matriculation/Foundation Studies Minimum Requirements
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation / UM Science Foundation / UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY		
1.	Bachelor of Chemical Engineering Technology with Honours **JY03 / UJ6524002** 8 semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C(2.00)** in Matriculation/Foundation level in the following subjects; • Mathematics / Engineering Mathematics **and** Obtained at least **Grade C (2.00)** in Matriculation/Foundation level in any One (1) of the following subjects; • Chemistry / Engineering Chemistry • Physics / Engineering Physics • Biology • Basics Engineering • Mechanical Engineering Studies • Civil Engineering Studies • Electrical & Electronics Engineering Studies and Candidates without Physics subject in Matriculation/Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be colour blinds and physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at Matriculation/Foundation level need to take Basic Physics subject at University.**
2.	Bachelor of Mechanical Engineering Technology (Petroleum) with Honours **JY65 / UJ6524006** 8 semesters	
3.	Bachelor of Manufacturing Engineering Technology (Pharmaceutical) with Honours **JY70 / UJ6524003** 8 Semesters	

STPM HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum STPM Qualification
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 2.00 and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY		
1.	Bachelor of Chemical Engineering Technology with Honours **JY03 / UJ6524002** 8 semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; • Chemistry • Physics / Biology Candidates without Physics subject in STPM level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be not colour blinds and physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**
2.	Bachelor of Mechanical Engineering Technology (Petroleum) with Honours **JY65 / UJ6524006** 8 semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; • Chemistry / Physics / Biology And Candidates without Physics subject in STPM level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be not colour blinds and physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**
3.	Bachelor of Manufacturing Engineering Technology (Pharmaceutical) with Honours **JY70 / UJ6524003** 8 Semesters	

TVET_TECHNOLOGY

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement **Diploma Kemahiran** or **other qualification** equivalently from Public / Privates Skill Institusi acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 1** in **Malaysian University English Test (MUET).**
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY		
1.	Bachelor of Technology in Oil & Gas Facilities Maintenance with Honours **JY89 / UJ6524004** 7 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma Kemahiran Malaysia (DKM/DLKM) with at least **CGPA ≥ 2.00 or 80%.** **And** Candidates are not colour blinds and physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.

DIPLOMA HOLDERS - DVM

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement **Diploma** Vocational / Diploma Technology or **other qualification** equivalently from College Vocational (KV) acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 1** in **Malaysian University English Test (MUET).**
FACULTY OF CHEMICAL AND PROCESS ENGINEERING TECHNOLOGY		
1.	Bachelor of Technology in Oil & Gas Facilities Maintenance with Honours **JY89 / UJ6524004** 7 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma Vokasional Malaysia (DVM) with at least **CGPA ≥ 2.00** **And** Candidates are not colour blind and physically handicapped that can impair practical work.

DIPLOMA PROGRAM

CERTIFICATE HOLDER

No.	Program and Study Duration	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu; 2. Pass at least (Grade E) in Sejarah Subject.
1.	**FACULTY OF CHEMICAL & NATURAL RESOURCES ENGINEERING** Diploma in Chemical Engineering (5 Semester + 1 Short Semester)	**J2441** **UJ4524001**	**PROGRAM SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 3. Pass with Certificate or equivalent in related field from the Institution acknowledged by the University Senate with at least **CGPA 3.00** 4. Candidates are not colour blind and physically handicapped that can impair practical work.

SPM HOLDER

No.	Programme and Duration of Study	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu; 2. Pass at least (Grade E) in Sejarah Subject.
1.	**FACULTY OF CHEMICAL ENGINEERING TECHNOLOGY AND PROCESS** Diploma in Chemical Engineering (5 Semester + 1 Short Semester)	**J2441** **UJ4524001**	**PROGRAMME SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. At least **credit (C Grade)** in the following subjects : • Mathematics, • Additional Mathematics, • Physics/Chemistry. 3. At least **ONE (1) credit (C Grade)** in the following subjects:- • Computer Sciece • Physics • Chemistry • Invention • Biology • EngineeringTechnology • Machine/Mechanical Engineering Study • Civil Engineering Study • Electric & Electronic Engineering Study • Technical Drawing / Technical Graphic Communication 4. At least **Passed (E Grade)** in English. 5. Candidates should not be colour blind and physically handicapped which will complicate practical works.

FACULTY OF CIVIL ENGINEERING TECHNOLOGY

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF CIVIL ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Energy & Environmental) with Honours **JY56 / UJ6522002** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not pyhsically handicapped that can impair practical work.
2.	Bachelor of Engineering Technology (Infrastructure Management) with Honours **JY60 / UJ6526002** 8 Semesters	

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF CIVIL ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Energy & Environmental) with Honours **JY56 / UJ6522002** 8 semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma from Public University (UA) / Private University (IPTS) / Polytechnics with at least **CGPA ≥ 2.00** **And** Candidates are not physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	Bachelor of Engineering Technology (Infrastructure Management) with Honours **JY60 / UJ6526002** 8 Semesters	

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF CIVIL ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Energy & Environmental) with Honours **JY56 / UJ6522002** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics • Chemistry / Physics / Biology And Obtain at least C Grade in subject at SPM Level • Additional Mathematics • Physics / Chemistry **And** Candidates without Physics subject in Matriculation/Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Engineering Technology (Infrastructure Management) with Honours **JY60 / UJ6526002** 8 Semesters	

INTERNATIONAL BACCAULAREATE (IB) CERTIFICATE

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF CIVIL ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Energy & Environmental) with Honours **JY56 / UJ6522002** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics • Chemistry / Physics / Biology **and** Candidates are not pyhsically handicapped that can impair practical work.
2.	Bachelor of Engineering Technology (Infrastructure Management) with Honours **JY60 / UJ6526002** 8 Semesters	

KPM MATRICULATION/FOUNDATION STUDENT

NO	(i) Programme Name (ii) Code (iii) Duration of Study	KPM Matriculation/Foundation Studies Minimum Requirements
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation / UM Science Foundation / UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF CIVIL ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Energy & Environmental) with Honours **JY56 / UJ6522002** 8 semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C(2.00)** in Matriculation/Foundation level in the following subjects; • Mathematics / Engineering Mathematics **and** Obtained at least **Grade C (2.00)** in Matriculation/Foundation level in any One (1) of the following subjects; • Chemistry / Engineering Chemistry • Physics / Engineering Physics • Biology • Basics Engineering • Mechanical Engineering Studies • Civil Engineering Studies • Electrical & Electronics Engineering Studies and Candidates without Physics subject in Matriculation/Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at Matriculation/Foundation level need to take Basic Physics subject at University.**
2.	Bachelor of Engineering Technology (Infrastructure Management) with Honours **JY60 / UJ6526002** 8 Semesters	

STPM HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum STPM Qualification
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 2.00 and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF CIVIL ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Energy & Environmental) with Honours **JY56 / UJ6522002** 8 semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; • Chemistry / Physics / Biology And Candidates without Physics subject in STPM level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**
2.	Bachelor of Engineering Technology (Infrastructure Management) with Honours **JY60 / UJ6526002** 8 Semesters	

DIPLOMA PROGRAM

CERTIFICATE HOLDER

No.	Programme and Duration of Study	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAMME) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu; 2. Pass at least (Grade E) in Sejarah Subject.
1.	**FACULTY OF CIVIL ENGINEERING TECHNOLOGY** Diploma in Civil Engineering (5 Semester + 1 Short Semester)	**J2410** **UJ4526001**	**PROGRAMME SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 3. Pass with Certificate or equivalent in related field from the Institution acknowledged by the University Senate with at least **CGPA 3.00** 4. Candidates should not be physically handicapped which will complicate practical works

SPM HOLDER

No.	Programme and Duration of Study	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAMME) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu; 2. Pass at least (Grade E) in Sejarah Subject.
1.	**FACULTY OF CIVIL ENGINEERING TECHNOLOGY** Diploma in Civil Engineering (5 Semester + 1 Short Semester)	**J2410** **UJ4526001**	**PROGRAMME SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. At least **credit (C Grade)** in the following subjects : • Mathematics, • Additional Mathematics, • Physics/Chemistry. 3. At least **ONE (1) credit (C Grade)** in the following subjects:- • Computer Sciece • Physics • Chemistry • Invention • Biology • EngineeringTechnology • Machine/Mechanical Engineering Study • Civil Engineering Study • Electric & Electronic Engineering Study • Technical Drawing / Technical Graphic Communication 4. At least **Passed (E Grade)** in English. 5. Candidates should not be physically handicapped which will complicate practical works.

FACULTY OF COMPUTING

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF COMPUTING		
1.	Bachelor of Computer Science (Software Engineering) with Honours **JC10 / UJ6481002** 8 semester	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain at least **C Grade (2.00)** in Additional Mathematics at SPM level; Or Obtain at least **A- Grade (2.00)** in Mathematics AND at least C Grade any one (1) subject Sciences/ Engineering / Technology at SPM level; **and** Candidates should not be colour blind and not physicall handicapped which will complicate practical works. (Colour Blind condition is only applicable for Program JC24)
2.	Bachelor of Computer Science (Computer Systems & Networking) with Honours **JC11 / UJ6481001** 8 semester	
3.	Bachelor of Computer Science (Graphics & Multimedia Technology) with Honours **JC24 / UJ6481003** 8 semester	

DIPLOMA HOLDER

NO	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF COMPUTING		
1.	Bachelor of Computer Science (Software Engineering) with Honours **JC10 / UJ6481002** 8 semester	**Fulfill University General Requirement** **and** **PROGRAMME REQUIREMENT** Obtained a relevant Diploma (Computer Sciences / Software engineering / IT / Sciences & Technology / equivalent from Public University (UA) with at least **CGPA ≥ 2.50** **Or** Obtained a relevant Diploma (Computer Sciences / Software engineering / IT / Sciences & Technology / equivalent from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.00** **Or** Applications not obtained **CGPA** mentioned above, but with at least **CGPA ≥ 2.30** and 2 years work experience in related fields can be consider. **And** Candidates must not be physically handicapped which will complicate practical works **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	Bachelor of Computer Science (Computer Systems & Networking) with Honours **JC11 / UJ6481001** 8 semester	
3.	Bachelor of Computer Science (Graphics & Multimedia Technology) with Honours **JC24 / UJ6481003** 8 semester	

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF COMPUTING		
1.	Bachelor of Computer Science (Software Engineering) with Honours **JC10 / UJ6481002** 8 semester	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain at least **C Grade (2.00)** in Additional Mathematics at SPM level; Or Obtain at least **A- Grade (2.00)** in Mathematics AND at least C Grade any one (1) subject Sciences/ Engineering / Technology at SPM level; **and** Candidates should not be colour blind and not physicall handicapped which will complicate practical works. (Colour Blind condition is only applicable for Program JC24) **and** Candidates are not physically handicapped that can impair practical work.
2.	Bachelor of Computer Science (Computer Systems & Networking) with Honours **JC11 / UJ6481001** 8 semester	
3.	Bachelor of Computer Science (Graphics & Multimedia Technology) with Honours **JC24 / UJ6481003** 8 semester	

INTERNATIONAL BACCAULAREATE (IB)

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF COMPUTING		
1.	Bachelor of Computer Science (Software Engineering) with Honours **JC10 / UJ6481002** 8 semester	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain at least **C Grade (2.00)** in Additional Mathematics at SPM level; Or Obtain at least **A- Grade (2.00)** in Mathematics AND at least C Grade any one (1) subject Sciences/ Engineering / Technology at SPM level; **and** Candidates should not be colour blind and not physicall handicapped which will complicate practical works. (Colour Blind condition is only applicable for Program JC24) **and** Candidates are not physically handicapped that can impair practical work.
2.	Bachelor of Computer Science (Computer Systems & Networking) with Honours **JC11 / UJ6481001** 8 semester	
3.	Bachelor of Computer Science (Graphics & Multimedia Technology) with Honours **JC24 / UJ6481003** 8 semester	

MATRICULATION CERTIFICATE

NO	(i) Study Program (ii) Code (iii) Study Duration	Minimum MOE Matriculation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation/UM Science Foundation/UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF COMPUTING		
1.	Bachelor of Computer Science (Software Engineering) with Honours **JC10 / UJ6481002** 8 semester	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain at least **C Grade (2.00)** in Additional Mathematics at SPM level; Or Obtain at least **A- Grade (2.00)** in Mathematics AND at least C Grade any one (1) subject Sciences/ Engineering / Technology at SPM level; **and** Candidates should not be colour blind and not physicall handicapped which will complicate practical works. (Colour Blind condition is only applicable for Program JC24)
2.	Bachelor of Computer Science (Computer Systems & Networking) with Honours **JC11 / UJ6481001** 8 semester	
3.	Bachelor of Computer Science (Graphics & Multimedia Technology) with Honours **JC24 / UJ6481003** 8 semester	

STPM HOLDER

NO	(i) Study Program (ii) Code (iii) Study Duration	Minimum STPM Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 2.00 and: • Grade C (NGMP 2.00) for General Studies subject; **and** • Grade C (NGMP 2.00) in two (2) other subjects. **and** At least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF COMPUTING		
1.	Bachelor of Computer Science (Software Engineering) with Honours **JC10 / UJ6481002** 8 semester	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain at least **C Grade (NGMP 2.00)** in at STPM leve in following subejetsl; • Mathematics T / Mathematics M • Any one (1) subjects Sciences / ICT or Obtain at least **C Grade (2.00)** in Additional Mathematics at SPM level; Or Obtain at least **A- Grade (2.00)** in Mathematics AND at least C Grade any one (1) subject Sciences/ Engineering / Technology at SPM level; **and** Candidates should not be colour blind and not physicall handicapped which will complicate practical works. (Colour Blind condition is only applicable for Program JC24)
2.	Bachelor of Computer Science (Computer Systems & Networking) with Honours **JC11 / UJ6481001** 8 semester	
3.	Bachelor of Computer Science (Graphics & Multimedia Technology) with Honours **JC24 / UJ6481003** 8 semester	

DIPLOMA PROGRAM

CERTIFICATE HOLDER

No.	Program and Study Duration	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAM) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **CREDIT (C GRADE)** in Bahasa Melayu. 2. Passed at least (E Grade) in Sejarah subject at SPM Level.
1.	**FACULTY OF COMPUTING** Diploma in Computer Science (5 Semester + 1 Short Semester)	**J2810** UJ4481001	**PROGRAM REQUIREMENTS** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. Pass with Certificate or equivalent in related field from the Institution acknowledged by the University Senate with at least **CGPA 3.00** 3. At least **Credit (C Grade)** in English. 4. At least passed (E Grade) in Additional Mathematics at SPM Level 5. Candidates must not be physically handicapped which will complicate practical works

SPM HOLDER

No.	Program and Study Duration	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAM) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu. 2. Pass at least (E Grade) in Sejarah.
1.	**FACULTY OF COMPUTING** Diploma in Computer Science (5 Semester + 1 Short Semester)	**J2810** **UJ4481001**	**PROGRAM REQUIREMENTS** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. At least **credit (Grade C)** in following subjects: • Mathematics; • English; AND • **Credit (C Grade)** in any two (2) subject; 3. At Least passed (E Gred) in Additional Mathematic subject; 4. Candidates should not be physically handicapped which will complicate practical works.

FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Electrical) with Honours **JY30 / UJ6522004** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blind and pyhsically handicapped that can impair practical work.
2.	Bachelor of Electrical Engineering Technology (Power & Machine) with Honours **JY35 / UJ6522005** 8 Semesters	
3.	Bachelor of Electronics Engineering Technology (Computer System) with Honours **JY46 / UJ6523006**	

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Electrical) with Honours **JY30 / UJ6522004** 8 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma from Public University (UA) / Private University (IPTS) / Polytechnics with at least **CGPA ≥ 2.00** **And** Candidates are not colour blind and physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	Bachelor of Electrical Engineering Technology (Power & Machine) with Honours **JY35 / UJ6522005** 8 Semesters	
3.	Bachelor of Electronics Engineering Technology (Computer System) with Honours **JY46 / UJ6523006**	

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Electrical) with Honours **JY30 / UJ6522004** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics • Chemistry / Physics / Biology And Obtain at least C Grade in subject at SPM Level • Additional Mathematics • Physics / Chemistry **And** Candidates without Physics subject in Matriculation/Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Electrical Engineering Technology (Power & Machine) with Honours **JY35 / UJ6522005** 8 Semesters	
3.	Bachelor of Electronics Engineering Technology (Computer System) with Honours **JY46 / UJ6523006**	

INTERNATIONAL BACCAULAREATE (IB) CERTIFICATE

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Electrical) with Honours **JY30 / UJ6522004** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics • Chemistry / Physics / Biology **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Electrical Engineering Technology (Power & Machine) with Honours **JY35 / UJ6522005** 8 Semesters	
3.	Bachelor of Electronics Engineering Technology (Computer System) with Honours **JY46 / UJ6523006**	

KPM MATRICULATION/FOUNDATION STUDENT

NO	(i) Programme Name (ii) Code (iii) Duration of Study	KPM Matriculation/Foundation Studies Minimum Requirements
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation / UM Science Foundation / UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Electrical) with Honours **JY30 / UJ6522004** 8 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C(2.00)** in Matriculation/Foundation level in the following subjects; • Mathematics / Engineering Mathematics **and** Obtained at least **Grade C (2.00)** in Matriculation/Foundation level in any ONE (1) of the following subjects; • Chemistry / Engineering Chemistry • Physics / Engineering Physics • Biology • Basics Engineering • Mechanical Engineering Studies • Civil Engineering Studies • Electrical & Electronics Engineering Studies and Candidates without Physics subject in Matriculation/Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be colour blinds and physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at Matriculation/Foundation level need to take Basic Physics subject at University.**
2.	Bachelor of Electrical Engineering Technology (Power & Machine) with Honours **JY35 / UJ6522005** 8 Semesters	
3.	Bachelor of Electronics Engineering Technology (Computer System) with Honours **JY46 / UJ6523006**	

STPM HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum STPM Qualification
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 2.00 and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Electrical) with Honours **JY30 / UJ6522004** 8 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; • Chemistry / Physics / Biology And Candidates without Physics subject in STPM level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be not colour blinds and physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**
2.	Bachelor of Electrical Engineering Technology (Power & Machine) with Honours **JY35 / UJ6522005** 8 Semesters	
3.	Bachelor of Electronics Engineering Technology (Computer System) with Honours **JY46 / UJ6523006**	

TVET

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement **Diploma Kemahiran** or **other qualification** equivalently from Public / Privates Skill Institusi acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 1** in **Malaysian University English Test (MUET).**
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Technology in Industrial Electronics Automation with Honours **JY87 / UJ6523005** 7 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma Kemahiran Malaysia (DKM/DLKM) with at least **CGPA ≥ 2.00 or 80%.** **And** Candidates are not colour blinds and physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	Bachelor of Technology in Electrical System Maintenance with Honours **JY88 / UJ6522003** 7 Semesters	

DIPLOMA HOLDERS - DVM

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement **Diploma** Vocational / Diploma Technology or **other qualification** equivalently from College Vocational (KV) acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 1** in **Malaysian University English Test (MUET).**
FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Technology in Industrial Electronics Automation with Honours **JY87 / UJ6523005** 7 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma Vokasional Malaysia (DVM) with at least **CGPA ≥ 2.00** **And** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Technology in Electrical System Maintenance with Honours **JY88 / UJ6522003** 7 Semesters	

DIPLOMA PROGRAM

CERTIFICATE HOLDER

No.	Programme and Duration of Study	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu; 2. Pass at least (Grade E) in Sejarah Subject.
1.	**FACULTY OF ELECTRICAL & ELECTRONICS ENGINEERING TECHNOLOGY** Diploma in Civil Engineering (5 Semester + 1 Short Semester)	**J2410** **UJ4526001**	**PROGRAMME SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 3. Pass with Certificate or equivalent in related field from the Institution acknowledged by the University Senate with at least **CGPA 3.00** 4. Candidates should not be physically handicapped which will complicate practical works

SPM HOLDER

No.	Programme and Duration of Study	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu; 2. Pass at least (Grade E) in Sejarah Subject.
1.	**FACULTY OF ELECTRICAL & ELECTRONICS ENGINEERING TECHNOLOGY** Diploma in Electrical Engineering (Industrial Electronics) (5 Semester + 1 Short Semester)	**J2425** **UJ4523001**	**PROGRAMME SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. At least **credit (C Grade)** in the following subjects : • Mathematics, • Physics/Chemistry. 3. At least **ONE (1) credit (C Grade)** in the following subjects:- • Computer Sciece • Physics • Chemistry • Invention • Biology • EngineeringTechnology • Machine/Mechanical Engineering Study • Civil Engineering Study • Electric & Electronic Engineering Study • Technical Drawing / Technical Graphic Communication 4. At least **ONE (1) credit (C Grade)** in any subjects. 5. At least Credit (D Grade) in Additional Mathematics Subjects 6. At least **Passed (E Grade)** in English. 7. Candidates should not be colour blind and physically handicapped which will complicate practical works.

FACULTY OF INDUSTRIAL MANAGEMENT

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF INDUSTRIAL MANAGEMENT		
1.	Bachelor of Project Management with Honours **JP45 / UJ6345001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least credit (C Grade) in Mathematics at SPM level; **And** Passed (E Gred) in English Language at SPM level; **And** Candidates are not physically handicapped that can impair practical work.
2.	Bachelor of Industrial Technology Management with Honours **JP47 / UJ6345002** 8 Semesters	
3.	Bachelor Of Business Engineering With Honours (A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not pyhsically handicapped that can impair practical work.

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF INDUSTRIAL MANAGEMENT		
1.	Bachelor of Project Management with Honours **JP45 / UJ6345001** 8 Semesters	**Fulfill University General Requirement** **and** **PROGRAMME REQUIREMENT** Obtained a relevant Diploma from Public University (UA) with at least **CGPA ≥ 2.50** **Or** Obtained a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.00** **Or** Applications not obtained **CGPA** mentioned above, but with at least **CGPA ≥ 2.30** and 2 years work experience in related fields can be consider. **And** Candidates must not be physically handicapped which will complicate practical works **Note;** Duration of study subjected to the credit exemption approval by faculty. .
2.	Bachelor of Industrial Technology Management with Honours **JP47 / UJ6345002** 8 Semesters	
3.	Bachelor Of Business Engineering With Honours (A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	Obtain a relevant Diploma from Public University (UA) with at least **CGPA ≥ 3.00** **Or** Obtained a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.40** **And** Candidates are not colour blind and physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF INDUSTRIAL MANAGEMENT		
1.	Bachelor of Project Management with Honours **JP45 / UJ6345001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least credit (C Grade) in Mathematics at SPM level; **And** Passed (E Gred) in English Language at SPM level; **And** Candidates are not physically handicapped that can impair practical work.
2.	Bachelor of Industrial Technology Management with Honours **JP47 / UJ6345002** 8 Semesters	
3.	Bachelor Of Business Engineering With Honours (A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Matriculation/ Foundation level in the following subjects; • Mathematics **And** • Obtain at least C Grade in Mathematics subject at SPM Level And Candidates are not colour blind and physically handicapped that can impair practical work.

INTERNATIONAL BACCAULAREATE (IB)

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF INDUSTRIAL MANAGEMENT		
1.	Bachelor of Project Management with Honours **JP45 / UJ6345001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least credit (C Grade) in Mathematics at SPM level; **And** Passed (E Gred) in English Language at SPM level; **And** Candidates are not physically handicapped that can impair practical work.
2.	Bachelor of Industrial Technology Management with Honours **JP47 / UJ6345002** 8 Semesters	
3.	Bachelor Of Business Engineering With Honours (A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics Candidates are not colour blind and pyhsically handicapped that can impair practical work

MATRICULATION CERTIFICATE

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum MOE Matriculation/ Asasi Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation/UM Science Foundation/UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF INDUSTRIAL MANAGEMENT		
1.	Bachelor of Project Management with Honours **JP45 / UJ6345001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least credit (C Grade) in Mathematics at SPM level; **And** Passed (E Gred) in English Language at SPM level; **And** Candidates are not physically handicapped that can impair practical work.
2.	Bachelor of Industrial Technology Management with Honours **JP47 / UJ6345002** 8 Semesters	
3.	Bachelor Of Business Engineering With Honours (A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**General University Requirements** Pass the Sijil Pelajaran Malaysia (SPM)/ Equivalent with credit in Bahasa Melayu/ Bahasa Malaysia or credit in Bahasa Melayu/ Bahasa Malaysia July Paper; **and** Pass MOE Matriculation/ UM Asasi Science/ Asasi UiTM / MARA Foundation / KTYS with at least a **CPA of 3.00;** **and** Obtain at least Band 2 in the Malaysian University English Test (MUET).
		Fulfil General University Requirements **and** **PROGRAM REQUIREMENTS** Obtain at least **C Grade (2.00)** at Matriculation/ Asasi level in the following subjects; • Mathematics; and • At Least Grade C in subject Mathematics at SPM Level **And** Candidates are not colour blind and physically handicapped that can impair practical work.

STAM CERTIFICATE

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum STAM Qualification
		General University Requirements Pass the Sijil Pelajaran Malaysia (SPM)/ Equivalent with **credit in Bahasa Melayu/ Bahasa Malaysia or credit in Bahasa Melayu/ Bahasa Malaysia July Paper;** **and** Obtain at least the **rank of Jayyid in the Malaysian Higher Religious Certificate (STAM);** **and** **Obtain at least Band 2** in the **Malaysian University English Test (MUET).**
FACULTY OF INDUSTRIAL MANAGEMENT		
1.	Bachelor of Project Management with Honours **JP45 / UJ6345001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Own the Malaysian Higher Religious Certicifate (STAM) with at least the rank of Jayyid. **and** At least credit (C Grade) in Mathematics at SPM level **And** Passed (E Grade) in English Language at SPM level **And** Candidates are not physically handicapped that can impair practical work.
2.	Bachelor of Industrial Technology Management with Honours **JP47 / UJ6345002** 8 Semesters	

STPM HOLDER

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum STPM Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM) / Equivalent with Credit in Bahasa Melayu / Bahasa Malaysia or Credit in Bahasa Melayu / Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 2.00 and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET)**
FACULTY OF INDUSTRIAL MANAGEMENT		
1.	Bachelor of Project Management with Honours **JP45 / UJ6345001** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least credit (C GRADE) in Mathematics at SPM level **And** Passed (E GRADE) in English Language at SPM level **And** Candidates are not physically handicapped that can impair practical work.
2.	Bachelor of Industrial Technology Management with Honours **JP47 / UJ6345002** 8 Semesters	
3.	Bachelor Of Business Engineering With Honours (A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Passed the Malaysian Higher School Certificate (STPM) with at least a **CGPA 3.00** and at least **C Grade (NGMP 2.00)** at STPM level in the following subjects : • Mathematics T; • Pass at least Grade C in Mathematics and pass at least Grade E in English at SPM level. **and** Candidates are not colour blind and physically handicapped that can impair practical work.

FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY

DEGREE PROGRAM

A-LEVEL

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed A-Level Qualification with at least a 9 point**;** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY		
1. .	Bachelor of Applied Science (Hons) Industrial Biotechnology **JG44 (UJ6545002)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade (2.00)** at A-Level in the following subjects : • Mathematics; • Biology OR obtained at least subject Biology B Grade at SPM Level; • Physics / Chemistry; OR obtain at least a **B Grade** in Physics / Chemistry at SPM level **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Applied Science (Hons) Industrial Chemistry **JG04 (UJ6545001)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade** at A-Level any two (2) in the following subjects: • Mathematics / Further Mathematics • Biology • Physics • Chemistry **and** Candidates are not colour blind and physically handicapped that can impair practical work.
3.	Bachelor of Applied Science (Hons) Materials Technology **JG47 (UJ6545003)** 8 Semester	

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/ Equivalent Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY		
1. .	Bachelor of Applied Science (Hons) Industrial Biotechnology **JG44 (UJ6545002)** 8 Semester	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtained a relevant Diploma from Public University (UA) with at least **CGPA ≥ 2.00** **Or** Obtained a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 2.50** **Or** Applications not obtained **CGPA** mentioned above, but with at least **CGPA ≥ 2.00** and 2 years work experience in related fields can be consider. **And** Candidates must not be colour blind and not physically handicapped which will complicate practical works **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	Bachelor of Applied Science (Hons) Industrial Chemistry **JG04 (UJ6545001)** 8 Semester	
3.	Bachelor of Applied Science (Hons) Materials Technology **JG47 (UJ6545003)** 8 Semester	

DIPLOMA HOLDERS - DKM

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/ Equivalent Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTYOF INDUSTRIAL SCIENCES AND TECHNOLOGY		
1. .	Bachelor of Applied Science (Hons) Industrial Biotechnology **JG44 (UJ6545002)** 8 Semester	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtained a relevant Diploma Kemahiran Malaysia (DKM/DLKM) with at least **CGPA ≥ 2.50 or 80%.** **And** At least **Passed (E Grade) in SPM Level in the following subject:** • **English** • **Mathematics** • **Physics / Science / Additional Science / Biology / Chemistry / science** **Or** Applications not obtained **CGPA** mentioned above, but with at least **CGPA ≥ 2.30** and 2 years work experience in related fields can be consider. **And** Candidates are not colour blind and not physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	Bachelor of Applied Science (Hons) Industrial Chemistry **JG04 (UJ6545001)** 8 Semester	
3.	Bachelor of Applied Science (Hons) Materials Technology **JG47 (UJ6545003)** 8 Semester	

FOUNDATION (UTP/MMU/UNITEN/UNIKL)

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed in Foundation (UNITEN/MMU/UTP/UNIKL) with at least a a **CPA of 2.00;** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY INDUSTRIAL SCIENCES AND TECHNOLOGY		
1. .	Bachelor of Applied Science (Hons) Industrial Biotechnology **JG44 (UJ6545002)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade (2.00)** at Foundation in the following subjects : • Mathematics; • Biology OR obtained at least subject Biology B Grade at SPM Level; • Physics / Chemistry; OR obtain at least a **B Grade** in Physics / Chemistry at SPM level **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Applied Science (Hons) Industrial Chemistry **JG04 (UJ6545001)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade** at Foundation any two (2) in the following subjects: • Mathematics • Biology • Physics • Chemistry • Computer Science **and** Candidates are not colour blind and physically handicapped that can impair practical work. blind and physically handicapped that can impair practical work.
3.	Bachelor of Applied Science (Hons) Materials Technology **JG47 (UJ6545003)** 8 Semester	

INTERNATIONAL BACCALAUREATE (IB)

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed International Baccalaureate (IB) with at least a 30 point and obtained at least **Grade C in five (5) Subject;** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY		
2.	Bachelor of Applied Science (Hons) Industrial Biotechnology **JG44 (UJ6545002)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade (2.00)** at A-Level in the following subjects : • Mathematics; • Biology OR obtained at least subject Biology B Grade at SPM Level; • Physics / Chemistry; OR obtain at least a **B Grade** in Physics / Chemistry at SPM level **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Applied Science (Hons) Industrial Chemistry **JG04 (UJ6545001)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade** at IB any two (2) in the following subjects: • Mathematics / Further Mathematics • Biology • Physics • Chemistry **and** Candidates are not colour blind and physically handicapped that can impair practical work.
3.	Bachelor of Applied Science (Hons) Materials Technology **JG47 (UJ6545003)** 8 Semester	

MATRICULATION/FOUNDATION

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum MOE Matriculation/ Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed MOE Matriculation/ Foundation Science UM / Foundation UiTM / MARA Foundation / KTYS with at least a a **CPA of 2.00;** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY		
1. .	Bachelor of Applied Science (Hons) Industrial Biotechnology **JG44 (UJ6545002)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade (2.00)** at Matriculation / Foundation in the following subjects : • Mathematics; • Biology OR obtained at least subject Biology B Grade at SPM Level; • Physics / Chemistry; OR obtain at least a **B Grade** in Physics / Chemistry at SPM level **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Applied Science (Hons) Industrial Chemistry **JG04 (UJ6545001)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade** at Matriculation / Foundation any two (2) in the following subjects: • Mathematics / Engineering Mathematics • Biology • Physics / Engineering Physics • Chemistry / Engineering Chemistry • Computer Science • Basic Engineering **and** Candidates are not colour blind and physically handicapped that can impair practical work. blind and physically handicapped that can impair practical work.

MATRICULATION/FOUNDATION

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum MOE Matriculation/ Foundation Qualification
3.	Bachelor of Applied Science (Hons) Materials Technology **JG47 (UJ6545003)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade** at Matriculation / Foundation any two (2) in the following subjects: • Mathematics / Engineering Mathematics • Biology • Physics / Engineering Physics • Chemistry / Engineering Chemistry • Computer Science • Basic Engineering • Engineering Studies OR Obtained at least **C Grade** at Matriculation / Foundation any two (2) in the following subjects: • Mathematics • Ekonomi • Perakaunan • Pengajian Perniagaan **DAN** Obtained at least **B Grade** at SPM Level any two (2) in the following subjects: • Chemistry • Physics • Biology • Science • Additional Science **and** Candidates are not colour blind and physically handicapped that can impair practical work. blind and physically handicapped that can impair practical work.

STPM HOLDER

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum STPM Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the Malaysian Higher School Certificate (STPM) with at least a **CPA of 2.00** and with at least: • **Grade C (NGMP 2.00)** in General Studies; **and** • **Grade C (NGMP 2.00)** in two (2) other subjects. **and** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY		
1.	Bachelor of Applied Science (Hons) Industrial Biotechnology **JG44 (UJ6545002)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade (2.00)** at STPM Level in the following subjects : • Mathematics; • Biology OR obtained at least subject Biology B Grade at SPM Level; • Physics / Chemistry; OR obtain at least a **B Grade** in Physics / Chemistry at SPM level **and** Candidates are not colour blind and physically handicapped that can impair practical work.
	Bachelor of Applied Science (Hons) Industrial Chemistry **JG04 (UJ6545001)** 8 Semester	**Fulfill General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **C Grade** at STPM Level any two (2) in the following subjects: • Mathematics T • Biology • Physics • Chemistry **and** Candidates are not colour blind and physically handicapped that can impair practical work.
3.	Bachelor of Applied Science (Hons) Materials Technology	**Fulfill General University Requirements** **and**

STPM HOLDER

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum STPM Qualification
	JG47 (UJ6545003) 8 Semester	**PROGRAM REQUIREMENTS** Obtained at least **C Grade** at STPM Level any two (2) in the following subjects: • Mathematics T • Biology • Physics • Chemistry **Or** Obtained at least **C Grade** at STPM Level any two (2) in the following subjects: • Mathematics M • Ekonomi • Perakaunan • Pengajian Perniagaan **And** Obtained at least **B Grade** at SPM Level any two (2) in the following subjects: • Chemistry • Physics • Biology • Science • Additional Science **and** Candidates are not colour blind and physically handicapped that can impair practical work. blind and physically handicapped that can impair practical work.

SAFETY

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass Grade E subject Sejarah; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF ENGINEERING TECHNOLOGY		
1.	Bachelor of Occupational Safety and Health with Honours **JP46** 8 semesters	**General University Requirement** Obtain a relevant Diploma from Intitusi Pengajian Tinggi Awam (IPTA) with at least **CGPA ≥ 2.50** And Obtain a relevant Diploma from from Intitusi Pengajian Tinggi Swasta (IPTS) / Politeknik with at least **CGPA ≥ 3.00** **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**

STPM HOLDER

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum STPM Qualification
		General University Requirements Pass the Malaysian Education Certificate (SPM)/ Equivalent with credit in Bahasa Melayu/ Bahasa Malaysia or credit in Bahasa Melayu/ Bahasa Malaysia July Paper and at least pass subject Sejarah; **and** Pass the Malaysian Higher School Certificate (STPM) with at least a **CPA of 2.00** and with at least: • **Grade C (NGMP 2.00)** in General Studies; **and** • **Grade C (NGMP 2.00)** in two (2) other subjects. **and** Obtain at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF ENGINEERING TECHNOLOGY		
1.	Bachelor of Occupational Safety and Health with Honours **JP46** 8 semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtain at least **Grade C (2.00)** at Matriculation/ Asasi level in the following subjects; • Mathematics T; • Chemistry /Physics /Biology. **and** Obtain at least **credit (Grade C)** at SPM level in the following subjects. • Physics; **and** • Chemistry / Biology **and** Candidates are not colour blind and physically handicapped that can impair practical work.

DIPLOMA PROGRAM

CERTIFICATE HOLDER

No.	Program and Study Duration	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAM) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **CREDIT (C GRADE)** in Bahasa Melayu. 2. Passed at least (E Grade) in Sejarah subject at SPM Level.
1.	**FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY** Diploma in Industrial Sciences (5 Semester + 1 Short Semester)		**PROGRAM REQUIREMENTS** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. Pass with Certificate or equivalent in related field from the Institution acknowledged by the University Senate with at least **CGPA 2.50** 3. Candidates must not be physically handicapped which will complicate practical works

SPM HOLDER

No.	Program and Study Duration	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAM) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu. 2. Pass at least (Grade E) in Sejarah.
FACULTY OF INDUSTRIAL SCIENCES AND TECHNOLOGY			
1.	Diploma in Safety and Occupational and Health (5 Semester + 1 Short Semester)	**UJ4862001**	**PROGRAM REQUIREMENTS** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. At least **Credit (C Grade)** in following subjects: • Mathematics; • English; • Any one (1) Sciences following subjects; • Physics • Biology • Chemistry • Additional Science • Science 3. At Least Credit (C Grade) in any one (1) subject 4. Candidates should not be colour blinds and not physically handicapped which will complicate practical works.
2.	**Diploma in Industrial Sciences**		**PROGRAM REQUIREMENTS** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. Obtained at least Credit (C Grade) in Mathematics subject: and 3. At least **credit (C Grade) any two (2)** in following subjects: • Biology • Chemistry • Physics • Science • Addtional Science • Agricultural Science • Pengajian Kejuruteraan Mekanikal • Pengajian Kejuruteraan Elektrik & Elektronik • Pengajian Kejuruteraan Awam 4. At Least Credit (C Grade) in any other one (1) subject ; 5. Passed at least (E Grade) in English 6. Candidates should not be colour blinds and not physically handicapped which will complicate practical works.

FACULTY OF MANUFACTURING AND MECHATRONIC ENGINEERING TECHNOLOGY

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF MANUFACTURING AND MECHATRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Manufacturing) with Honours **JY90 / UJ6521005** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blind and pyhsically handicapped that can impair practical work.
2.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF MANUFACTURING AND MECHATRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Manufacturing) with Honours **JY90 / UJ6521005** 8 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma from Public University (UA) / Private University (IPTS) / Polytechnics with at least **CGPA ≥ 2.00** **And** Candidates are not colour blind and physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma from Public University (UA) with at least **CGPA ≥ 3.30;** **OR** Obtain a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.40** **And** Candidates are not color blind and not physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 2.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF MANUFACTURING AND MECHATRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Manufacturing) with Honours **JY90 / UJ6521005** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics • Chemistry / Physics / Biology And Obtain at least C Grade in subject at SPM Level • Additional Mathematics • Physics / Chemistry **And** Candidates without Physics subject in Matriculation/Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 3.00 AND** obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics • Chemistry • Physics And Obtain at least C Grade in subject at SPM Level • Additional Mathematics • Physics / Chemistry **and** Candidates are not colour blind and physically handicapped that can impair practical work.

INTERNATIONAL BACCAULAREATE (IB) CERTIFICATE

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF MANUFACTURING AND MECHATRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Manufacturing) with Honours **JY90 / UJ6521005** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics • Chemistry / Physics / Biology **and** Candidates are not pyhsically handicapped that can impair practical work.
2.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blinds and not pyhsically handicapped that can impair practical work.

KPM MATRICULATION/FOUNDATION STUDENT

NO	(i) Programme Name (ii) Code (iii) Duration of Study	KPM Matriculation/Foundation Studies Minimum Requirements
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation / UM Science Foundation / UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 2.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF MANUFACTURING AND MECHATRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Manufacturing) with Honours **JY90 / UJ6521005** 8 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C(2.00)** in Matriculation/Foundation level in the following subjects; • Mathematics / Engineering Mathematics **and** Obtained at least **Grade C (2.00)** in Matriculation/Foundation level in any One (1) of the following subjects; • Chemistry / Engineering Chemistry • Physics / Engineering Physics • Biology • Basics Engineering • Mechanical Engineering Studies • Civil Engineering Studies • Electrical & Electronics Engineering Studies and Candidates without Physics subject in Matriculation/Foundation level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at Matriculation/Foundation level need to take Basic Physics subject at University.**
2.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Passed KPM Matriculation / UM Science Foundation / UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 3.00** AND Obtained at least **Grade C(2.00)** in Matriculation/Foundation level in the following subjects; • Mathematics / Engineering Mathematics • Chemistry / Engineering Chemistry • Physics / Engineering Physics **and** Candidates should not be physically handicapped which will complicate practical works.

STPM HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum STPM Qualification
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 2.00 and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF MANUFACTURING AND MECHATRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Engineering Technology (Manufacturing) with Honours **JY90 / UJ6521005** 8 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; • Chemistry / Physics / Biology **and** Candidates without Physics subject in STPM level need to have at least credit in Physics subject in SPM level. **and** Candidates should not be physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**
2.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** **Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 3.00** AND obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; • Chemistry • Physics **and** Candidates are not colour blind and physically handicapped that can impair practical work **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**

TVET

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement **Diploma Kemahiran** or **other qualification** equivalently from Public / Privates Skill Institusi acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 1** in **Malaysian University English Test (MUET).**
FACULTY OF MANUFACTURING AND MECHATRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Technology in Industrial Machining with Honours **JY96 / UJ6521002** 7 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma Kemahiran Malaysia (DKM/DLKM) with at least **CGPA ≥ 2.00 or 80%.** **And** Candidates are not colour blinds and physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.

DIPLOMA HOLDERS - DVM

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement **Diploma** Vocational / Diploma Technology or **other qualification** equivalently from College Vocational (KV) acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 1** in **Malaysian University English Test (MUET).**
FACULTY OF MANUFACTURING AND MECHATRONICS ENGINEERING TECHNOLOGY		
1.	Bachelor of Technology in Industrial Machining with Honours **JY96 / UJ6521002** 7 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma Vokasional Malaysia (DVM) with at least **CGPA ≥ 2.00** **And** Candidates are not colour blind and physically handicapped that can impair practical work.

FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY

DEGREE PROGRAM

A-LEVEL

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY		
1.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blind and pyhsically handicapped that can impair practical work.

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY		
1.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma from Public University (UA) with at least **CGPA ≥ 3.30** **Or** Obtain a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.40** **And** Candidates are not physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 3.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY		
1.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics • Chemistry • Physics And Obtain at least C Grade in subject at SPM Level • Additional Mathematics **And** Candidates are not physically handicapped that can impair practical work.

INTERNATIONAL BACCAULAREATE (IB) CERTIFICATE

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 30 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY		
1.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blind and physically handicapped that can impair practical work.

KPM MATRICULATION/FOUNDATION STUDENT

NO	(i) Programme Name (ii) Code (iii) Duration of Study	KPM Matriculation/Foundation Studies Minimum Requirements
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed KPM Matriculation / UM Science Foundation / UiTM Foundation / MARA Foundation / KTYS with at least a **CGPA of 3.00**; **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY		
1.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C(2.00)** in Matriculation/Foundation level in the following subjects; • Mathematics / Engineering Mathematics • Chemistry / Engineering Chemistry • Physics / Engineering Physics **and** Candidates should not be physically handicapped which will complicate practical works.

STPM HOLDER

NO	(i) Programme Name (ii) Code (iii) Duration of Study	Minimum STPM Qualification
		General University Requirement Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Sijil Tinggi Persekolahan Malaysia (STPM) with at least CGPA 3.00 and: • Grade C (CGPA 2.00) for General Studies subject; **and** • Grade C (CGPA 2.00) in two (2) other subjects. **and** Obtained at least **Band 2** in **Malaysian University English Test (MUET).**
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY		
1.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	**Fulfill General University Requirement** **and** **PROGRAMME REQUIREMENT** Obtained at least **Grade C (CGPA 2.00)** in STPM level for the following subjects: • Mathematics T; • Chemistry • Physics **and** Candidates should not be not physically handicapped which will complicate practical works. **Note:** **Candidates from Life Science Stream who do not take Physics at STPM level need to take Basic Physics subject at University.**

TVET

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement **Diploma Kemahiran** or **other qualification** equivalently from Public / Privates Skill Institusi acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 1** in **Malaysian University English Test (MUET).**
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY		
1.	Bachelor of Technology in Automotive with Honours **JY99 / UJ6525003** 7 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma Kemahiran Malaysia (DKM/DLKM) with at least **CGPA ≥ 2.00 or 80%.** **And** Candidates are not physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	Bachelor of Technology in Welding with Honours **JY97 / UJ6521003** 7 Semesters	

DIPLOMA HOLDERS - DVM

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement **Diploma** Vocational / Diploma Technology or **other qualification** equivalently from College Vocational (KV) acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 1** in **Malaysian University English Test (MUET).**
FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY		
1.	Bachelor of Technology in Automotive with Honours **JY99 / UJ6525003** 7 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma Vokasional Malaysia (DVM) with at least **CGPA ≥ 2.00** **And** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	Bachelor of Technology in Welding with Honours **JY97 / UJ6521003** 7 Semesters	

DIPLOMA PROGRAM

CERTIFICATE HOLDER

No.	Programme and Duration of Study	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAM) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu; 2. Pass at least (Grade E) in Sejarah Subject.
1. .	**FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY** Diploma in Mechanical Engineering (5 Semester + 1 Short Semester)	**J2430**	**PROGRAM SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 3. Pass with Certificate or equivalent in related field from the Institution acknowledged by the University Senate with at least **CGPA 3.00** 4. Candidates should not be physically handicapped which will complicate practical works

SPM HOLDER

No.	Programme and Duration of Study	Code	Minimum Requirement
			GENERAL UNIVERSITY REQUIREMENT (FOR ALL PROGRAMME) 1. Pass in Sijil Pelajaran Malaysia or equivalent with at least **FIVE (5) CREDIT (C GRADE)** including Bahasa Melayu; 2. Pass at least (Grade E) in Sejarah Subject.
1.	**FACULTY OF MECHANICAL AND AUTOMOTIVE ENGINEERING TECHNOLOGY** Diploma in Mechanical Engineering (5 Semester + 1 Short Semester)	**J2430** **UJ4521001**	**PROGRAMME SPECIAL REQUIREMENT** 1. Fulfill **GENERAL UNIVERSITY REQUIREMENT.** 2. At least **credit (C Grade)** in the following subjects : • Mathematics, • Additional Mathematics, • Physics/Chemistry. 3. At least **ONE (1) credit (C Grade)** in the following subjects:- • Computer Sciece • Physics • Chemistry • Invention • Biology • EngineeringTechnology • Machine/Mechanical Engineering Study • Civil Engineering Study • Electric & Electronic Engineering Study • Technical Drawing / Technical Graphic Communication 4. At least **Passed (D Grade)** in English. 5. Candidates should not be physically handicapped which will complicate practical works.

COLLABORATION PROGRAMMES

A-LEVEL HOLDER

NO	(i) Program (ii) Code (iii) Study Duration	Minimum A-Level Holder Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the A-Level examination with at least a level 9 **and** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DUAL DEGREE PROGRAMS		
1.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blind and pyhsically handicapped that can impair practical work.
2.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	
3.	Bachelor Of Business Engineering With Honours ((A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** in A-Levels in the following subjects : • Mathematics; And Candidates are not colour blind and pyhsically handicapped that can impair practical work.

DIPLOMA HOLDERS

NO.	(i) Study Program (ii) Code (iii) Study Duration	Minimum Diploma/Equivalent Qualification
		General University Requirement Pass Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** **Diploma** or **other qualification** equivalently acknowledged by Malaysian Government and approved by University Senate; **and** At least **Band 2** in **Malaysian University English Test (MUET).**
DUAL DEGREE PROGRAMS		
1.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma from Public University (UA) with at least **CGPA ≥ 3.30;** **OR** Obtain a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.40** **And** Candidates are not color blind and not physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.
2.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	
3.	Bachelor Of Business Engineering With Honours ((A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfill University General Requirement** **and** **PROGRAM REQUIREMENTS** Obtain a relevant Diploma from Public University (UA) with at least **CGPA ≥ 3.00;** **OR** Obtain a relevant Diploma from Private University (IPTS) / Polytechnics with at least **CGPA ≥ 3.40** **And** Candidates are not color blind and not physically handicapped that can impair practical work. **Note;** Duration of study subjected to the credit exemption approval by faculty.

IPTS FOUNDATION CERTIFICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed Foundation (MMU / UNIKL / UTP / UNITEN) with at least a **CPA of 3.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
DUAL DEGREE PROGRAMS		
1.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Foundation level in the following subjects; • Mathematics • Chemistry • Physics **And** Obtain at least C Grade in subject at SPM Level • Additional Mathematics **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	
3.	Bachelor Of Business Engineering With Honours ((A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Matriculation/ Foundation level in the following subjects; • Mathematics **And** • Obtain at least C Grade in Mathematics subject at SPM Level And Candidates are not colour blind and physically handicapped that can impair practical work.

INTERNATIONAL BACCAULAREATE (IB)

NO	(i) Program (ii) Code (iii) Study Duration	Minimum IB Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the International Baccalaureate (IB) examination with at least 32 Mark and obtain at least: • **Grade C (5 Mark) in five (5) subject.** **and** Obtained at least Band 2 in the Malaysian University English Test (MUET) or the equivalent.
DUAL DEGREE PROGRAMS		
1.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics • Chemistry • Physics **and** Candidates are not colour blind and pyhsically handicapped that can impair practical work.
2.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	
3.	Bachelor Of Business Engineering With Honours ((A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAM REQUIREMENTS** Obtained at least **Grade C (3 Marks)** at IB Level in the following subjects : • Mathematics Candidates are not colour blind and pyhsically handicapped that can impair practical work

MATRICULATION /FOUNDATION CERTIFAICATION

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum MOE Matriculation/ Foundation Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed MOE Matriculation/ UM Foundation Science/ Foundation UiTM / MARA Foundation / KTYS with at least a **CPA of 3.00;** **And** Obtained at least Band 2 in the Malaysian University English Test (MUET).
DUAL DEGREE PROGRAMS		
1.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Matriculation/ Foundation level in the following subjects; • Mathematics / Engineering Mathematics • Chemistry / Engineering Chemistry • Physics / Engineering Physics **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	
3.	Bachelor Of Business Engineering With Honours ((A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtain at least **Grade C (2.00)** at Matriculation/ Foundation level in the following subjects; • Mathematics / Engineering Mathematics **And** • Obtain at least C Grade in Mathematics subject at SPM Level And Candidates are not colour blind and physically handicapped that can impair practical work.

STPM HOLDERS

NO	(i) Programme Name (ii) Code (iii) Study Duration	Minimum STPM Qualification
		General University Requirements Passed Sijil Pelajaran Malaysia (SPM)/Equivalent with Credit in Bahasa Melayu/Bahasa Malaysia or Credit in Bahasa Melayu/Bahasa Malaysia July Paper and at least pass E Grades in Sejarah subject; **and** Passed the Malaysian Higher School Certificate (STPM) with at least a **CPA of 3.00** and with at least: • **Grade C (CGPA 2.00)** in General Studies; **and** • **Grade C (CGPA 2.00)** in two (2) other subjects. **and** Obtained at least Band 2 in the Malaysian University English Test (MUET).
1.	B.Eng (Hons.) Mechatronic Engineering - (Collaboration Program of UMP with HsKA University, Germany) **JK25 / UJ6523003** 9 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtained at least **Grade C (CGPA 2.00)** at STPM level in the following subjects : • Mathematics T / Further Mathematics T; • Chemistry • Physics **and** Candidates are not colour blind and physically handicapped that can impair practical work.
2.	B.Eng (Hons.) Automotive Engineering (Collaboration Program of UMP with HsKA University, Germany) **JK71 / UJ6525002** 9 Semesters	
3.	Bachelor Of Business Engineering With Honours ((A Collaboration Program of UMP with Reutlingen University, Germany) **JP52 / UJ6345003** 8 Semesters	**Fulfil General University Requirements** **and** **PROGRAMME REQUIREMENTS** Obtained at least **Grade C (CGPA 2.00)** at STPM level in the following subjects : • Mathematics T / Mathematics M; **and** • Obtain at least C Grade in Mathematics subject at SPM Level And Candidates are not colour blind and physically handicapped that can impair practical work.