



STUDENT HANDBOOK

CEEM243

Bachelor of Manufacturing Engineering Technology With Honours

SCHOOL OF MECHANICAL ENGINEERING, COLLEGE OF ENGINEERING,
UNIVERSITI TEKNOLOGI MARA CAWANGAN PULAU PINANG.

CEEM 243

STUDENT HANDBOOK

The information provided in this student handbook are correct at the time of publication. Most of the content are adapted from the “Student Handbook” published by the School of Mechanical Engineering, College of Engineering, Universiti Teknologi MARA Cawangan Pulau Pinang.
<https://penang.uitm.edu.my/>

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LIST OF ABBREVIATIONS

Abbreviations

OBE	Outcome Based Education
PEO	Program Education Outcome
PO	Program Outcome

HEAD, CENTER OF STUDIES' FOREWORD

Welcome to the School of Mechanical Engineering, UiTM Penang

Greetings from us at the School of Mechanical Engineering, College of Engineering, University Teknologi MARA Cawangan Pulau Pinang (UiTM CPP). UiTM CPP is located within an idyllic environment and township area. With a strong lineup of academic and technical staff, we are committed to training future leaders with high-quality engineering education.

Our mission is to equip the graduates with strong mechanical engineering knowledge, analytical skills, leadership skills, competitiveness, creativity, innovativeness, and professionalism. In our curriculum, we strive to assimilate the latest developments in mechanics, dynamics, thermo-fluid, energy, and manufacturing.

Currently, we offer a Bachelor of Manufacturing Engineering Technology with Honours, Bachelor of Mechanical Engineering (Manufacturing) with Honours, and Diploma in Mechanical Engineering. Our graduates work in almost every technology-based industry: semiconductor, automotive, power generation, oil and gas, steel and materials, robotics, and manufacturing.

We strive to ensure that all our undergraduate students have excellent teamwork attributes and leadership skills, active involvement in student activities, and great practical experience through an internship. We believe that emphasizing these areas will ensure our students have great qualifications to carry leadership roles in the future.

With this, we welcome you all to School of Mechanical Engineering, UiTM CPP.

Dr. Mohamad Irwan Bin Yahaya

Head, Center of Studies

School of Mechanical Engineering, College of Engineering,

Universiti Teknologi MARA Cawangan Pulau Pinang,

Kampus Permatang Pauh.

INTRODUCTION

UNIVERSITY MISSION, VISION, AND PHILOSOPHY

Motto

“Endeavour, Religious, Dignified”

Vision

To establish UiTM as a Globally Renowned University of Science, Technology, Humanities, and Entrepreneurship.

Mission

To lead the development of agile, professional bumiputeras through state-of-the-art curricula and impactful research.

Philosophy

Every individual has the ability to attain excellence through the transfer of knowledge and assimilation of moral values so as to become professional graduates capable of developing knowledge, self, society, and nation.

Objectives

- To expedite accessibility to higher education
- To provide world-class education
- To offer competitive academic programmes that fulfil market needs, spearhead national development, and promote global prosperity
- To produce well-balanced, entrepreneurial graduates who are globally competent
- To strengthen the internationalisation of values via enhancement programmes
- To sustain organisational excellence through effective and efficient governance
- To champion impactful research through stronger research ecosystem
- To strengthen strategic alliance with alumni and industries
- To provide cutting edge ecosystem conducive for academic advancements
- To regulate cost-effective financial practices towards organisational sustainability.

BACKGROUND OF FACULTY

HISTORY

The College of Engineering was officially established on the 29th of March, 2021. The College's establishment resulted from the UiTM 2025 Strategic Plan, which saw the restructuring of 26 academic entities comprising Faculties and Centres of Studies into ten Colleges. In its present form, the College of Engineering houses the four engineering schools, namely, School of Chemical Engineering, School of Civil Engineering, School of Electrical Engineering, and School of Mechanical Engineering. In addition to the four schools located in the UiTM, Shah Alam, Selangor Campus, the College of Engineering is equally responsible for running all engineering programs in the UiTM Branch campuses in Pulau Pinang, Pahang, Terengganu, Johor, and Sarawak.

Universiti Teknologi MARA Cawangan Pulau Pinang (UiTM CPP), the 11th branch campuses of UiTM established in 16th June 1996 and temporarily located at Permatang Pasir, Seberang Perai. The first batch of student enrolment was in May 1999 with 230 students pursuing Diploma in Electrical Engineering, Diploma in Mechanical Engineering, and Diploma in Civil Engineering. The campus moved to its permanent premise at Permatang Pauh in August 2003 which is strategically located in close vicinity to Bukit Mertajam and Butterworth township as well as Perai Industrial area.

Starting from a modest facility and academic staff, the School of Mechanical Engineering UiTM CPP continues its' tradition of excellence by offering a Bachelor of Manufacturing Engineering Technology with Honours (CEEM243). This program prepares the students to be engineering technologists that aligned with the current demand in manufacturing industries. The students of this program are trained to be competent and master the foundation skills and knowledge that essential in manufacturing technology. The graduates shall demonstrate a good interpersonal development with eminent professional, ethics, management skill and globally competitive in multinational/international engineering organization. This program has received approval from the Ministry of Higher Education (MOHE) in December 2020 to begin offering the program in September 2021. The program also has received a

Provisional Accreditation from the Engineering Technology Accreditation Council (ETAC) by Board of Engineers Malaysia (BEM) in June 2020.

The school has currently three (3) Special Interest groups (SIG) to spearhead research activities. The Creative and Innovation Research Group in Automotive and Aviation (CIRAA) was established to provide facilities for research and testing new product development in automotive engineering. The Intelligent and Sustainable Manufacturing Center (ISMaC) and Advanced Mechanics Special Interest Group (Admech) focuses on the research and development in manufacturing, product development, CAD/CAM/CAE, nanotechnology, FEA/FEM simulation, and composite materials.

The faculty has currently established international collaborations with the Universitas Pertamina and Universitas Sumatera Utara, Indonesia. Outbound and inbound academic exchange are among the activities that benefitted from this collaboration.

FACULTY'S INFORMATION

Vision

A leader in the mechanical engineering discipline towards global excellence through world class education and research.

Mission

To produce graduates with strong mechanical engineering fundamentals, analytical and leadership skills, competitive, reactive, innovative, and professional.

Quality Policy

The School of Mechanical Engineering UiTM CPP is committed to provide a learning programme and an excellent research environment with efficient professional services based on established quality culture to fulfill customer satisfactions by continuous quality improvement.

Student's Quality Objectives

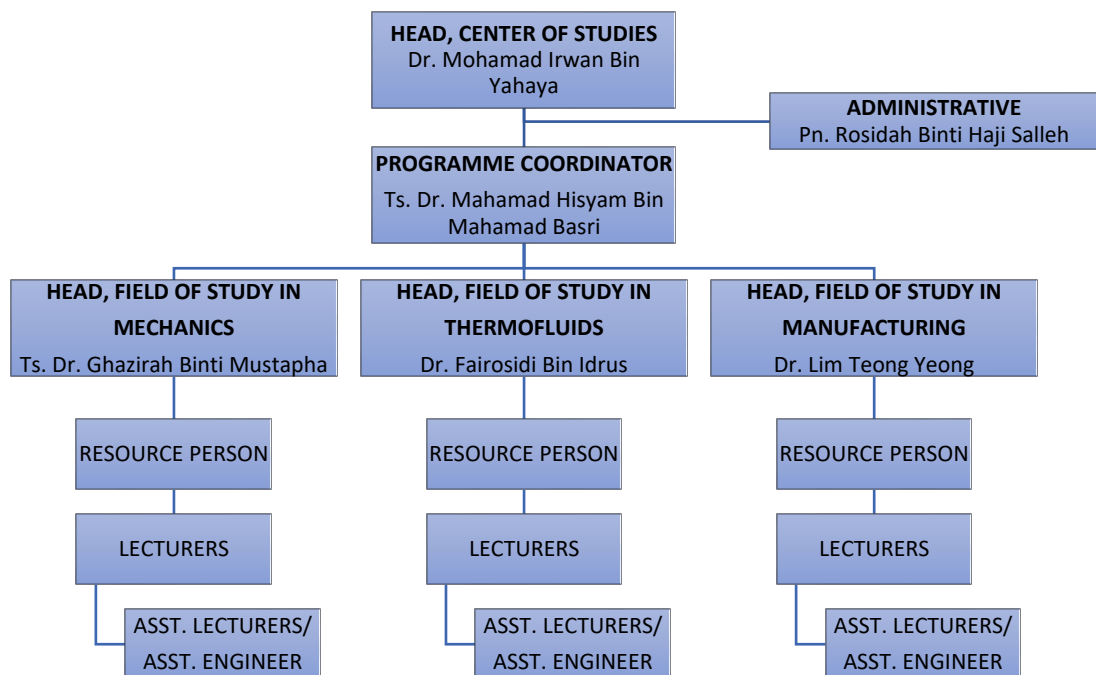
- To attain 90% of the full-time diploma and bachelor's degree students graduating on time (GOT) with CGPA above 3.00.
- To attain 2% of the graduating student awarded with the “*Anugerah Naib Canselor*” annually
- To attain 10% of the full-time student obtaining the dean list awards annually.
- To attain 60% student satisfaction towards campus facilities and welfares annually

Customer Satisfaction Pledge

- To provide a conducive environment for effective teaching and learning.
- To produce quality graduates who are capable of meeting the global market needs.
- To ensure that the curriculum is continuously improving and to incorporate current technology practice.
- To maintain the relationship and networking with alumni, industries, and other higher learning institutions within the country and overseas.
- To deliver efficient and friendly services.

CEEM243 MANAGEMENT TEAM

The management team will ensure that the CEEM243 programme is run without hindrance and that courses are taught and presented according to the stipulated quality standard.



TEACHING STAFF/LECTURERS

The faculty currently has 69 lecturers, 11 assistant lecturers, and 15 technical staff. Lecturers are required to upgrade their knowledge and skills by carrying out research and consultancy work. They could undertake short-term or long-term research projects and other relevant consultancy works. Besides teaching, lecturers are also encouraged to engage in industrial training to obtain a professional engineer status (PE).

Academic Staff for CEEM243

No	Name	Academic Qualifications	Specialization
1	Ts. Dr. Mahamad Hisyam Bin Mahamad Basri	Dip. Mechanical Eng (UiTM), B.Eng (Hons) Mechanical Eng (UiTM), M.Sc. Automotive Eng (IIUM), Ph.D. Mechanical Eng (UiTM)	Engineering Design and Optimization, Automotive Design and Safety, CAD&CAE
2	Ts. Dr. Noor Iswadi Ismail	B.Eng (Hons) (USM), M.Sc (Aerodynamics) (USM), Ph.D. (Aerodynamics) (UiTM)	Micro Air Vehicle, CFD, Aerodynamics, Aircraft Design
3	Ts. Dr. Abdul Rahman Bin Hemdi	BSc. Mechanical Engineering (UNITEN), M.Eng. Mechanical-Advanced Manufacturing Tech. (UTM), Ph.D. Mechanical Engineering (UTM)	Manufacturing
4	Ts. Dr. Rozaini Bin Othman	B.Eng Mechanic (Hons) (UKM), M.Sc (Mechanical Engineering) (USM), Doctor of Engineering, Ehime University, Japan	Finite Element Analysis, Composite Materials, Impact Engineering
5	Ts. Dr. Ghazirah Binti Mustapha	B.Eng (Hons) (USM), M.Sc (Aerodynamics) (USM), Ph.D. (Biomechanics) (UiTM)	Aerodynamics, Biomechanics

6	Dr. Lim Teong Yeong	B.Tech (Hons) (USM), M.Sc (Mechanical) (USM), Ph.D. (Advanced Manufacturing) (USM)	Advanced Manufacturing, Machine Vision
7	Dr. Fairosidi bin Idrus	Dip. Mechanical Eng (UiTM), B.Eng (Hons) Mechanical Eng (Cov, UK), M.Sc Mechanical Eng (USM), Ph.D. Mechanical Eng (UiTM)	Heat Transfer, Thermal Fluid Systems, Renewable and Sustainable Energy
8	Dr. Sharzali Bin Che Mat	Dip. Mechanical Eng (UiTM), B.Eng (Hons) Mechanical Eng (UiTM), M.Sc. (Automotive Eng) (IIUM), Ph.D. Mechanical Eng (USM)	Internal combustion engine, Alternative fuel
9	Aziurah binti Mohd Shah	B.Eng (Hons) (USM), M.Sc (Material Engineering) (USM),	Advance composite material
10	Rosniza binti Rabilah	Dip. Mechanical Eng (UiTM), B.Eng (Hons) Mechanical Eng (UiTM), M.Sc. Mechanical Eng (UiTM)	Ergonomics, Advanced Manufacturing
11	Siti Mardini binti Hashim	B. Eng (Hons) Manufacturing Engineering (UNIMaP), M.Sc Engineering Management (UPM)	Industrial Management
12	Muhammad Faris bin Abd Manap	BSc Mechanical Engineering (Korea University), M.Sc Mechanical Engineering (UiTM)	Biomechanics & Biomaterials
13	Mahfuzah binti Zainudin	B.Eng (Hons) Mechanical Engineering (UiTM), M.Sc Mechanical Engineering (UiTM)	Biomechanics & Biomaterials

Technical Staff for CEEM243

Name	Position
Mohamad Sopi bin Salleh	Penolong Jurutera Kanan
Sazali bin Ahmad Jumli	Penolong Jurutera
Rozi bin Ali	Penolong Jurutera
Muhamad Naser bin Omar	Penolong Jurutera
Wan Zubaidah binti Wan Karma	Penolong Jurutera
Zool Helmy bin Ismail	Penolong Jurutera
Mat Rasid bin Abas	Penolong Jurutera Kanan
Abdul Halim bin Saad	Penolong Jurutera
Amir Shahril bin Ishak	Penolong Jurutera
Mohd Noor bin Mohamud	Penolong Jurutera
Mohd Ridzuan bin Ramli	Penolong Jurutera
Nurbaidura binti Mohamad Nayan	Penolong Jurutera
Shahrizam bin Johar	Penolong Jurutera
Tunku Noor Ikmal bin Tunku Ishak	Penolong Jurutera
Amir Shahrul bin Ishak	Penolong Jurutera

PROGRAMME INFORMATION

The Faculty of Mechanical Engineering UiTM CPP offers programmes leading to the following academic qualifications, with possible opportunity of alleviation to higher levels.

- i. **Bachelor of Manufacturing Engineering Technology with Honours - CEEM243** : A 4-year programme (entry from diploma, UiTM Foundation of Engineering, science matriculation, A-Level, and STPM) designed to comply with the guidelines of the Board of Engineer Malaysia (BEM) and the essential requirement for a professional engineer. This programme is fully accredited by the Engineering Technology Accreditation Council (ETAC).
- ii. **Bachelor of Mechanical Engineering (Manufacturing) with Honours - CEEM245** : A 4-year programme (entry from diploma, UiTM Foundation of Engineering, science matriculation, A-Level and STPM) designed to comply with the guidelines of the Board of Engineer Malaysia (BEM) and the essential requirement for a professional engineer. This programme is fully accredited by the Engineering Accreditation Council (EAC).
- iii. **Diploma in Mechanical Engineering – CEEM110** : A 3-year programme tailored to meet the industry requirements for assistant engineer and engineering technicians, with the opportunity to continue to B.Eng (Hons.) programme upon successful completion. In the final year, students are given the optional module to specialize in their area of interest. Among the choices are pure mechanical, manufacturing, automotive, and aerospace engineering modules.

Graduate Program: The Faculty of Mechanical Engineering UiTM CPP in association with The Faculty of Mechanical Engineering UiTM Shah Alam and the Graduate Centre, UiTM Shah Alam offer Master and Doctor of Philosophy by research programmes.

PROGRAMME PROFILE

CEEM243 Bachelor of Manufacturing Engineering Technology with Honours

The Bachelor of Manufacturing Engineering Technology with Honours program is offered in Universiti Teknologi MARA, Penang Branch Campus. This program prepares the students to be engineering technologists that aligned with the current demand in manufacturing industries. The students of this program are trained to be competent and master the foundation skills and knowledge that essential in manufacturing technology. The graduates shall demonstrate good interpersonal development with eminent professional, ethics, management skill and be globally competitive in multinational/international engineering organization. This program has received approval from the Ministry of Higher Education (MOHE) in December 2020 to begin offering the program in September 2021. The program also has received a Provisional Accreditation from the Engineering Technology Accreditation Council (ETAC) by the Board of Engineers Malaysia (BEM) in June 2020.

ADMISSION REQUIREMENT

The intake process is carried out twice a year (in September and March). The application for the September intake is normally through the UPU, Ministry of Higher Education (MOHE).

i. Entry Requirements

FAKULTI KEJURUTERAAN MEKANIKAL Memenuhi Syarat Am Universiti Serta Syarat Khas Program			
Bil	Nama Program Kod UiTM/Kod UPU Tempoh Pengajian Syarat Am Universiti	Lepasan	
		Min CGPA/ PNGK/ MUET	Syarat Khas Program
	<p>Sarjana Muda Teknologi Kejuruteraan Pembuatan dengan Kepujian EM243/ (4 Tahun/8 Semester)</p> <p>Terbuka kepada keturunan Melayu, Anak Negeri Sabah, Anak Negeri Sarawak dan Orang Asli sahaja</p> <p>Syarat Am Universiti</p> <ul style="list-style-type: none"> • Lulus SPM/ SVM/ setaraf dengan baik. • Lulus Sejarah (Mula diguna pakai SPM 2013). • Lulus Sejarah Kod 1251 di peringkat SVM bagi Kohort 2013-2017. • Kepujian dalam Bahasa Melayu/ Malaysia di peringkat SPM/ setaraf. • Kepujian dalam Bahasa Melayu SVM Kod 1104. • Lulus STPM dengan mendapat sekurang-kurangnya Gred C (NGMP 2.00) dalam tiga (3) mata pelajaran termasuk Pengajian Am dan sekurang-kurangnya PNGK 2.00. • Lulus Matrikulasi KPM/Asasi Sains UM/Asasi UiTM dengan mendapat sekurang-kurangnya PNGK 2.00. • Lulus Diploma dari IPT yang diiktiraf oleh Kerajaan Malaysia. 	LEPASAN DIPLOMA UiTM	
		2.00/ Band 2	<p>Diploma Kejuruteraan Mekanikal</p> <p>DAN</p> <p>Calon tidak mempunyai ketidakupayaan anggota yang menyukarkan kerja amali</p>
		2.50/ Band 2	<p>Diploma Sains/bidang Kejuruteraan yang berkaitan</p> <p>DAN</p> <p>Calon tidak mempunyai ketidakupayaan anggota yang menyukarkan kerja amali</p>
		LEPASAN DIPLOMA INSTITUSI PENGAJIAN TINGGI YANG DIKTIRAF OLEH KERAJAAN MALAYSIA	
2.00/ Band 2	<p>Lepasan Diploma IPT dalam bidang kejuruteraan atau teknologi kejuruteraan</p> <p>DAN</p> <p>Lulus SPM/Setaraf dengan lima (5) kepujian termasuk:</p> <ul style="list-style-type: none"> • Matematik/Matematik Tambahan • Sains/Fizik <p>Dan lulus Bahasa Inggeris</p>		

<ul style="list-style-type: none"> • Malaysian University English Test (MUET) sekurang-kurangnya Tahap 1(Band 1) 	<p>DAN</p> <p>Calon tidak mempunyai ketidakupayaan anggota yang menyukarkan kerja amali</p>	
	<p>LEPASAN DIPLOMA VOKASIONAL MALAYSIA (DVM)</p>	
	<p>2.50/ Band 2</p>	<p>Memiliki Diploma Vokasional Malaysia (DVM) dengan mendapat sekurang-kurangnya PNGK Keseluruhan 2.50</p> <p>DAN</p> <p>Lulus SVM dengan PNGK Akademik sama atau lebih daripada 2.50; PNGK Vokasional sama atau lebih daripada 2.67</p> <p>Dan kompeten semua modul vokasional</p> <p>DAN</p> <p>Calon tidak mempunyai ketidakupayaan anggota yang menyukarkan kerja amali</p>
	<p>LEPASAN DIPLOMA KEMAHIRAN MALAYSIA (DKM) / DIPLOMA LANJUTAN KEMAHIRAN MALAYSIA (DLKM)</p>	
	<p>2.50/ Band 2</p>	<p>Memiliki Diploma Kemahiran Malaysia (DKM) /Diploma Lanjutan Kemahiran Malaysia (DLKM) dalam bidang Kejuruteraan Teknologi yang berkaitan dari Institusi Latihan Awam (ILA) atau kelulusan yang diiktiraf setaraf dengannya oleh Kerajaan Malaysia dan diluluskan oleh Senat Universiti dengan mendapat minimum Purata Matanilai Himpunan (CPA/PNGK) 2.50/Gred B/Markah 80% ke atas</p> <p>DAN</p> <p>Calon tidak mempunyai ketidakupayaan anggota yang menyukarkan kerja amali</p>
<p>LEPASAN ASASI UiTM/ ASASI UM/ MATRIKULASI KPM</p>		
<p>2.00/ Band 2</p>	<p>Gred C (2.00) dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> • Mathematics dan • Physics <p>ATAU</p> <p>Gred C (2.00) dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> • Mathematics dan • Chemistry/Biology dan mendapat sekurang-kurangnya Gred C dalam mata pelajaran Physics di peringkat SPM 	

		<p>ATAU Gred C (2.00) dalam mata pelajaran berikut</p> <ul style="list-style-type: none"> • Mathematics dan • Engineering Physics/Engineering Chemistry/ Mechanical engineering studies/ Electrical engineering studies/ Basic Engineering <p>DAN</p> <p>Calon tidak mempunyai ketidakupayaan anggota yang menyukarkan kerja amali</p>
LEPASAN STPM/SETARAF		
		<p>2.00/ Band 2</p> <p>Gred C (NGMP 2.00) dalam mata pelajaran Mathematics T/ Further Mathematics dan Gred C (NGMP 2.00) dari satu (1) mata pelajaran berikut :</p> <ul style="list-style-type: none"> • Physics • Chemistry/Biology dan mendapat sekurang-kurangnya Gred C dalam mata pelajaran Physics di peringkat SPM <p>DAN</p> <p>Lulus SPM/Setaraf dan lulus Bahasa Inggeris</p> <p>DAN</p> <p>Calon tidak mempunyai ketidakupayaan anggota yang menyukarkan kerja amali</p>
LEPASAN APEL (ACCREDITATION OF PRIOR EXPERIENTIAL LEARNING)		
		<p>Band 2</p> <ul style="list-style-type: none"> • Memiliki sijil perakuan APEL MQA dengan mendapat Tahap 6 MQF <p>DAN</p> <p>Calon tidak mempunyai ketidakupayaan anggota yang menyukarkan kerja amali</p>

ii. Student Entry Standard

Candidates with a Diploma in Mechanical Engineering from UiTM will be enrolled in the third semester with a maximum credit exemption of 34 credit hours from the total credit hours offered. The exemption of the courses is given for courses offered in semesters one and two.

Candidates with a diploma from other recognized institutions will be enrolled with some credit exemptions approved by the faculty. Candidates from the matriculation program and STPM will be enrolled in the first semester.

iii. Student Entry Regulations

Students are not allowed to register for more than one programme at any one time. The entry requirement and qualifications of the students will be approved by the faculty based on the approved guidelines set by the Senate of UiTM. The selection of students for the programme is done by the Admissions Office. Failed and dismissed students are not allowed to re-apply to the same programme. Students that fall under this category can apply to another programme after one semester.

iv. Credit Transfer

Students who have applied for credit transfer to any equivalent courses from other recognized institutions shall follow all the regulations specified by UiTM. The total credits that can be transferred from other recognized institutions must not be more than 30% of the total credits units of the programme.

v. Credit Exemption

Students can apply for exemption of courses according to the regulation as specified by the UiTM.

CURRICULUM STRUCTURE

	PLAN ID #7624
SCHOOL	MECHANICAL ENGINEERING
PROGRAMME NAME :	BACHELOR OF MANUFACTURING ENGINEERING TECHNOLOGY WITH HONOURS SARJANA MUDA TEKNOLOGI KEJURUTERAAN PEMBUATAN DENGAN KEPUJIAN
PROGRAMME CODE	CEEM243
START	20214 - SESSION 1 2021/2022

SEMESTER 1		Contacts Hours				
Course Code	Course Name	L	T	P	Credit Hours	Pre-Req/CO-Req
XYZ111	CO-CURRICULUM I (HEP List of Elective)	0	0	2	1	-
MAT435	CALCULUS FOR ENGINEERS	3	1	0	3	-
MEQ441	ENGINEERING MECHANICS	3	1	0	3	-
MEQ444	WORKSHOP PRACTICE	1	0	3	2	-
MEQ431	MATERIAL SCIENCE	3	1	0	3	-
MEQ401	INTRODUCTION TO ENGINEERING TECHNOLOGY AND PROFESSIONALISM	2	0	2	3	-
MEQ421	ENGINEERING DRAWING	1	0	4	3	-
EET699	ENGLISH EXIT TEST	0	0	0	0	-
TOTAL					18	

SEMESTER 2		Contacts Hours				
Course Code	Course Name	L	T	P	Credit Hours	Pre-Req/CO-Req
XYZ121	CO-CURRICULUM II (HEP List of Elective)	0	0	2	1	XYZ111
MEQ452	STRENGTH OF MATERIALS	3	1	0	3	-
MEQ460	MANUFACTURING PROCESSES AND TECHNOLOGY	2	0	2	3	-
MEQ451	THERMOFLUIDS	3	1	0	3	-
MEQ494	THERMOFLUIDS LAB	0	0	2	1	/MEQ451
CSC430	COMPUTER PROGRAMMING AND APPLICATIONS	2	0	2	3	-
MEQ491	MECHANICS AND MATERIALS LAB	0	0	2	1	-
TOTAL					15	

SEMESTER 3		Contacts Hours			Credit Hours	Pre-Req/ CO-Req
Course Code	Course Name	L	T	P		
XYZ131	CO-CURRICULUM III (HEP List of Elective)	0	0	2	1	XYZ121
CTU552	FALSAFAH DAN ISU SEMASA	2	0	0	2	-
MEQ521	MACHINE ELEMENT DESIGN	3	1	0	3	-
MEQ531	METROLOGY	2	0	2	3	-
MEQ541	CADCAM	2	0	2	3	-
MEQ542	COMPUTER AIDED INDUSTRIAL DESIGN	2	0	2	3	-
MEQ545	ENGINEERING ECONOMICS	3	1	0	3	-
TOTAL					18	

SEMESTER 4		Contacts Hours			Credit Hours	Pre-Req/ CO-Req
Course Code	Course Name	L	T	P		
ELC501	ENGLISH FOR CRITICAL ACADEMIC READING	2	0	0	2	-
BXY401	THIRD LANGUAGE 1 (APB List of Elective)	2	0	0	2	-
EPE491	ELECTRICAL POWER AND MACHINES	3	1	0	3	-
MAT455	FURTHER CALCULUS FOR ENGINEERS	3	1	0	3	MAT435
MEQ564	MANUFACTURING LAB	0	0	4	2	-
MEQ555	CONTROL SYSTEM	2	0	2	3	-
MEQ575	COMPUTATIONAL FLUID DYNAMICS FOR TECHNOLOGIST	2	0	2	3	-
TOTAL					18	

SEMESTER 5		Contacts Hours			Credit Hours	Pre-Req/ CO-Req
Course Code	Course Name	L	T	P		
MEQ635	FINITE ELEMENT ANALYSIS FOR TECHNOLOGIST	2	0	2	3	-
STA408	STATISTICS FOR SCIENCE AND ENGINEERING	3	1	0	3	-
BXY451	THIRD LANGUAGE 2 (APB List of Elective)	2	0	0	2	BXY401
CTU554	PENGHAYATAN ETIKA DAN PERADABAN 2	2	0	0	2	-
EWC661	ENGLISH FOR REPORT WRITING	2	0	0	2	-
MEQ611	INDUSTRIAL DESIGN PROJECT	1	0	2	3	MEQ542, MEQ541, MEQ460
MEQ6XX	SPECIAL TOPIC 1	2	0	2	3	-
TOTAL					18	

SEMESTER 6		Contacts Hours				
Course Code	Course Name	L	T	P	Credit Hours	Pre-Req/ CO-Req
BXY501	THIRD LANGUAGE 3 (APB List of Elective)	2	0	0	2	BXY451
ENT600	TECHNOLOGY ENTREPRENEURSHIP	3	0	0	3	-
MEQ667	QUALITY AND RELIABILITY	2	0	2	3	-
MEQ651	FINAL YEAR PROJECT I	0	1	5	3	-
MEQ6XX	SPECIAL TOPIC 2	2	0	2	3	-
MEQ6XX	SPECIAL TOPIC 3	2	0	2	3	-
TOTAL					17	

SEMESTER 7		Contacts Hours				
Course Code	Course Name	L	T	P	Credit Hours	Pre-Req/ CO-Req
MEQ652	FINAL YEAR PROJECT II	0	2	1 4	8	MEQ651
MEQ688	OCCUPATIONAL SAFETY AND HEALTH	4	0	0	5	-
MEQ689	QUALITY IMPROVEMENT	4	0	0	5	-
TOTAL					18	

SEMESTER 8		Contacts Hours				
Course Code	Course Name	L	T	P	Credit Hours	Pre-Req/ CO-Req
MEQ699	INDUSTRIAL TRAINING	0	0	2 4	12	-
MEQ695	INDUSTRIAL MANAGEMENT	2	0	0	6	-
TOTAL					18	
TOTAL CREDIT HOURS					140	

LIST OF ELECTIVES - SPECIAL TOPIC 1		Contacts Hours				
Course Code	Course Name	L	T	P	Credit Hours	Pre-Req/ CO-Req
MEQ691	MOTORSPORT TECHNOLOGY	2	0	2	3	-
MEQ681	DRONE TECHNOLOGY	2	0	2	3	-
MEQ661	DESIGN FOR MANUFACTURE	2	0	2	3	MEQ460, MEQ542

LIST OF ELECTIVES - SPECIAL TOPIC 2		Contacts Hours				
Course Code	Course Name	L	T	P	Credit Hours	Pre-Req/ CO-Req
MEQ692	ELECTRIC VEHICLE TECHNOLOGY	2	0	2	3	-
MEQ682	AVIATION TECHNOLOGY	2	0	2	3	-
MEQ662	ERGONOMICS DESIGN	2	0	2	3	MEQ421

LIST OF ELECTIVES - SPECIAL TOPIC 3		Contacts Hours				
Course Code	Course Name	L	T	P	Credit Hours	Pre-Req/ CO-Req
MEQ693	AUTOMOTIVE VEHICLE DESIGN	2	0	2	3	-
MEQ683	AERODYNAMICS DESIGN	2	0	2	3	-
MEQ663	SUSTAINABLE MANUFACTURING	2	0	2	3	MEQ460

COURSE SYNOPSIS

SEMESTER 1		
Course Code	Course Name	Course Description
XYZ111	CO-CURRICULUM I (HEP List of Elective)	These courses will produce students who have personalities perfectly in line with the demands of religion, race, and nation. In addition, for have to strengthen the foundation of soft skills in leadership, charisma, and skills in social affairs and also has its own identity and spirit of the fighting spirit and heroism as well as sensitive to development efforts and well-being of their race, religion, and country. Students are also able to practice the skills needed by all the time
MAT435	CALCULUS FOR ENGINEERS	This course consists of four chapters: methods of integration, indeterminate form, and improper integrals, functions of two and three variables, and differential equations. In the first chapter, methods of integration discussed are integration by parts, trigonometric integrals, trigonometric substitution, and integration of rational functions. The second chapter consists of limit determination, L'Hopital Rule, and improper integral. Then students will be introduced to the topic of the function of two and three variables. In the last chapter first and second-order differential equations will be discussed. Applications in engineering and sciences will be covered in chapters three and four.
MEQ441	ENGINEERING MECHANICS	This course covers basic principles in statics and dynamics. The course begins with basic concepts of mechanics i.e. space, time, mass, and force, the concept of vectors and laws governing addition and resolution of vectors, and followed by the equilibrium of particles and rigid bodies. It then proceeds to simple practical applications involving the analysis of forces in structures, machines, and problems involving friction. The course also covers the first and second moments of area and mass. The study continues with kinematics and kinetics of the particle and rigid body.
MEQ444	WORKSHOP PRACTICE	The course covers lectures on basic understanding and 'hands-on' experiences on workshop-related activities followed by the documentation of overall observation and findings. The lectures are on the overall pictures of workshop practice, machines, materials, and safety aspects. The 'hands-on' experience covers the various basic workshop crafts, forming and metal cutting processes, and fabrication methods such as hand tools, sheet metal working, lathe work, milling work, foundry, and welding activities.
MEQ431	MATERIAL SCIENCE	The course covers some fundamentals of material sciences, which are necessary for the understanding of materials properties for their appropriate applications. The major families of materials such as metals, ceramics, polymers, and composite are discussed for their types, properties, and applications.
MEQ401	INTRODUCTION TO ENGINEERING TECHNOLOGY AND PROFESSIONALISM	The course covers the engineering technology profession in general and manufacturing engineering technology in particular. Students will be introduced to the various disciplines in engineering technology and particularly manufacturing engineering technology, basic problem-solving methods, laboratory report writing and the use of computers in engineering

		technology solutions, engineering estimations and approximations, dimensions, units, and unit conversions, and representation of technical information. Group work introduces students to working in a team to collectively undertake and complete the assigned tasks. The computational tools useful for solving engineering problems are covered in the practical sessions.
MEQ421	ENGINEERING DRAWING	This course introduces the basic concepts in technical and mechanical engineering drawing and familiarizes students with the use of drawing instruments and aids in preparing basic geometrical drawings of simple objects. Topics covered include principles of orthographic projection, isometric drawings, sectioning drawing, development of part and product drawing, drawing standards, and practices, fit and tolerances, working drawings, and fabrication drawings. Students will be trained to do manual drawing and CAD practices.

SEMESTER 2		
Course Code	Course Name	Course Description
XYZ121	CO-CURRICULUM II (HEP List of Elective)	These courses will produce students who have personalities perfectly in line with the demands of religion, race, and nation. In addition, for have to strengthen the foundation of soft skills in leadership, charisma, and skills in social affairs and also has its own identity and spirit of the fighting spirit and heroism as well as sensitive to development efforts and well-being of their race, religion, and country. Students are also able to practice the skills needed by all the time
MEQ452	STRENGTH OF MATERIALS	The course covers stresses and strains of deformable bodies under axial loading, bending, and torsion. Topics covered include axial stresses and strains, thermal stress, simple statically determinate and indeterminate systems, torsional stresses, deflections of beams, a transformation of plane stresses, and elastic buckling in columns.
MEQ460	MANUFACTURING PROCESSES AND TECHNOLOGY	This course is a quantitative and qualitative study of the main manufacturing processes in the production of metallic, polymeric, and ceramic components. It will illustrate how a design is turned into a product. It will offer a detailed understanding of manufacturing processes used in industry such as casting, molding, forming, cutting, and welding. It will also discuss how the material properties of a product control the spectrum of manufacturing processes that can be utilized and will highlight major design guidelines for each manufacturing process to be successful. Upon completion of this course, students will be able to understand the conventional manufacturing methods employed for making different products.
MEQ451	THERMOFLUIDS	This course is designed for students studying thermodynamics and fluid mechanics for the first time. Considerable emphasis is placed on understanding the basic concepts and principles related to thermodynamics and fluid mechanics and also the applications of First Law and Second Law of thermodynamics, Continuity, Bernoulli, and Steady-Flow Energy equations. Fundamental concepts and principles of operation of various thermal fluid systems and applications are also covered in this course.
MEQ494	THERMOFLUIDS LAB	This course is designed for students having two different practical experiences, involving experimental work in the area of thermodynamics and fluid mechanics. It provides students with the knowledge and opportunity to conduct the experimental work

		in a laboratory using various thermal fluid equipment under minimum supervision and perform investigation and analysis related to the theoretical understanding of thermodynamics and fluid mechanics.
CSC430	COMPUTER PROGRAMMING AND APPLICATIONS	This course is designed for students to study engineering programming. Fundamental concepts and principles of the chosen computer programming language are covered in this course. Considerable emphasis is placed on the understanding and application of computer programming.
MEQ491	MECHANICS AND MATERIALS LAB	The course consists of practical works involving investigations and analysis in the area of mechanics and material science.

SEMESTER 3		
Course Code	Course Name	Course Description
XYZ131	CO-CURRICULUM III (HEP List of Elective)	These courses will produce students who have personalities perfectly in line with the demands of religion, race, and nation. In addition, for have to strengthen the foundation of soft skills in leadership, charisma, and skills in social affairs and also has its own identity and spirit of the fighting spirit and heroism as well as sensitive to development efforts and well-being of their race, religion, and country. Students are also able to practice the skills needed by all the time.
CTU552	FALSAFAH DAN ISU SEMASA	Kursus merangkumi hubungan ilmu falsafah dengan Falsafah Pendidikan Negara dan Rukunegara. Penggunaan falsafah sebagai alat untuk memurnikan budaya pemikiran dalam kehidupan melalui seni dan kaedah berfikir serta konsep insan. Topik utama dalam falsafah iaitu epistemologi, metafizik dan etika dibincangkan dalam konteks isu semasa. Penekanan diberikan kepada falsafah sebagai asas bagi menjalin dialog antara budaya serta memupuk nilai sepunya. Di hujung kursus ini pelajar akan mampu melihat disiplin-disiplin ilmu sebagai satu badan ilmu yang komprehensif dan terkait antara satu sama lain.
MEQ521	MACHINE ELEMENT DESIGN	This course introduces the important machine elements encountered in machine design. It covers mechanical joints such as power screws, fasteners, riveted and power transmission units such as bearings, shaft, and its associated parts, belt, clutches, and brakes as well as gives elementary exposure to design analysis of some of these machine elements.
MEQ531	METROLOGY	The course covers the fundamental aspects of engineering measurements and their corresponding applications in manufacturing. Students will be introduced to the importance of error analysis in the dimensional control of manufacturing products. Basic quantities such as lengths, shapes, and various parameters will be introduced. Laboratory work exposes students to various measurement instruments, both conventional and advanced, the hands-on practical analysis of measurement data as well as the errors induced.
MEQ541	CADCAM	This course introduces the principles and applications of CAD and CAM in product and manufacturing design and is highly relevant to future trends in automation and manufacturing processes. It teaches the various spheres of manufacturing activities with the differences between the conventional and computer-based manufacturing systems. It also teaches students the skills needed to design using CAD and CAM. The application of CAD and

		CAM tools and techniques in developing CAD and CAM models is described in the design process along with the completion of this course.
MEQ542	COMPUTER AIDED INDUSTRIAL DESIGN	This course facilitates communication and concurrent development of the concept design process from problem identification until concept design visualization. It improves the product design concept through the combination usage of concept design tools and Computer-Aided Industrial Design (CAID). The focused approach ensures that the final concept meets the needs of the user and the market. Several lab works and mini projects based on practical industrial needs which incorporate these elements will be assigned.
MEQ545	ENGINEERING ECONOMICS	This course comprises topics that cover the principles, basic concepts, and methodology of the engineering economy. The topics also emphasize the engineering economic analysis and enable rational decision-making related to cost in environmental engineering practices. Furthermore, the course will provide basic concepts and principles of project management. Planning, scheduling, monitoring, controlling, evaluating, and terminating the project are also emphasized in this course.

SEMESTER 4		
Course Code	Course Name	Course Description
ELC501	ENGLISH FOR CRITICAL ACADEMIC READING	This course is designed to develop students' ability to read analytically and think critically. It focuses on the relationship between reading and critical thinking and provides students with a structured method for interpreting content and organization of written texts. The tasks and activities suggested are discipline-based.
BXY401	THIRD LANGUAGE 1 (APB List of Elective)	This is the University's compulsory course. Students are required to complete 6 Credit Hours in the 3rd Language options which include: Mandarin, Japanese, Korean, German, French, Arabic, etc.
EPE491	ELECTRICAL POWER AND MACHINES	The course covers the introduction to the electrical supply system, single and three-phase supply, elements of industrial power system, operation and industrial applications of electrical machines, power transformers, single-phase motors, solid-state drives, and aspects of electrical safety
MAT455	FURTHER CALCULUS FOR ENGINEERS	The three main topics covered in this course are infinite series, multiple integrals, and vector calculus. The first topic begins with the basic concepts of convergence of an infinite sequence and series, followed by the use of various tests to determine the convergence of infinite series. The second chapter introduces the evaluation of multiple integrals using various coordinate systems. The last chapter introduces the main operations of vector calculus, namely the gradient, the divergence, and the curl, followed by integration over paths and surfaces. Applications of three important theorems (Green's theorem, Stokes' theorem, and divergence theorem) are also included.
MEQ564	MANUFACTURING LAB	The course provides students with hands-on experience on the operation, evaluation, and overcoming problems related to basic manufacturing practices such as metal casting, welding, and thermal cutting, metal cutting, and non-traditional machining. Demonstration and practical sessions on certain manufacturing practices will be carried out.
MEQ555	CONTROL SYSTEM	The course covers the introduction to mathematical modeling and

		control engineering, models of industrial control devices and systems, basic concepts and principles of feedback controls, system stability and its criteria, performance specifications, frequency response analysis, control system design via state-space formulation, and control design applications.
MEQ575	COMPUTATIONAL FLUID DYNAMICS FOR TECHNOLOGIST	The course will prepare the students with the necessary knowledge to apply computational methods to solve problems related to flow mechanics. The students will have hands-on experience in using commercial computational fluid dynamics software to solve engineering problems in fluid flow and heat transfer applications.

SEMESTER 5		
Course Code	Course Name	Course Description
MEQ635	FINITE ELEMENT ANALYSIS FOR TECHNOLOGIST	The course will equip students with the necessary knowledge to use finite element analysis to solve problems related to solid mechanics and dynamics. FEA is a design tool that is extensively used in industry and research institutions. Students will also gain hands-on experience in using finite element analysis commercial software to solve realistic engineering problems.
STA408	STATISTICS FOR SCIENCE AND ENGINEERING	This course introduces the students to the basic and intermediate methods of data analysis. Emphasis will be given to the usage of descriptive and inferential statistics including measures of central tendency, measures of dispersion, correlation, regression, hypothesis testing, and analysis of variance. Students will be able to interpret the computer output from the statistical software.
BXY451	THIRD LANGUAGE 2 (APB List of Elective)	This is the University's compulsory course. Students are required to complete 6 Credit Hours in the 3rd Language options which include: Mandarin, Japanese, Korean, German, French, Arabic, etc.
CTU554	PENGHAYATAN ETIKA DAN PERADABAN 2	Kursus ini mempersiapkan pelajar untuk menghayati etika dan peradaban yang wujud dalam masyarakat kepelbagaian etnik di Malaysia untuk memperteguhkan pemikiran kritikal dan analitikal mereka bagi menangani kehidupan yang lebih mencabar. Pengisian kursus ini memfokuskan kepada penghayatan etika dan peradaban dalam acuan Malaysia. Pelajar akan didedahkan dengan dinamika konsep etika dan peradaban yang menjadi kekuatan kepada pembentukan negara Malaysia berdasarkan susur masa evolusi sejarahnya dari era pra-kolonial sehingga ke pasca-kolonial. Kefahaman tentang pembentukan etika dan peradaban dalam masyarakat kepelbagaian dibincangkan bagi meningkatkan penghayatan etika dan peradaban ke arah pemantapan kesepaduan nasional dan bangsa Malaysia. Peradaban acuan Malaysia perlu dikupas serta diperdebatkan dalam aktiviti akademik berpanduan Perlembagaan Persekutuan sebagai tapak integrasi dan wahana etika dan peradaban. Pembinaan kesepaduan nasional amat dipengaruhi oleh globalisasi dan perkembangan teknologi maklumat dan komunikasi yang kompleks. Oleh kerana itu, penghayatan etika dan peradaban menzahirkan perilaku tanggungjawab sosial dan digerakkan pada peringkat individu, keluarga, komuniti, masyarakat, dan negara. Justeru, perubahan yang berlaku dalam masyarakat dan pembangunan langsung ekonomi telah membawa cabaran baru dalam mengukuhkan kelestarian etika dan peradaban di Malaysia. Amalan Pendidikan Berimpak Tinggi (HIEPs) dipraktikkan dalam pengajaran dan pembelajaran bagi mendalami kursus ini. (pengajaran & pembelajaran).

EWC661	ENGLISH FOR REPORT WRITING	This course teaches students how to develop a range of essential written communication skills using common report writing conventions to produce an effective investigative report. In doing so, it also enables students to further improve their skills in retrieving and eliciting information related to the issue at hand. Besides that, it provides a platform for students to inform and persuade when presenting a proposal. In tandem, it reinforces teamwork skills through establishing good rapport among the team members throughout the report preparation. At the end of the course, students will collaboratively produce a report which has great quality, clarity, and impact.
MEQ611	INDUSTRIAL DESIGN PROJECT	This course incorporates and integrates previously acquired knowledge and skills in the study of mechanical engineering through a real-world and open-ended engineering project. Students will continue their design efforts until completion. Product design using and based on current standards, codes, and practices is emphasized.
MEQ6XX	SPECIAL TOPIC 1	Students may take an elective classified under the manufacturing area. Please refer to the list of Electives

SEMESTER 6		
Course Code	Course Name	Course Description
BXY501	THIRD LANGUAGE 3 (APB List of Elective)	This is the University's compulsory course. Students are required to complete 6 Credit Hours in the 3rd Language options which include: Mandarin, Japanese, Korean, German, French, Arabic, etc.
ENT600	TECHNOLOGY ENTREPRENEURSHIP	Behind every successful technology company is a visionary, effective and efficient technopreneur. In this course, students will be exposed to entrepreneurship and apply their entrepreneurial skills in developing an advanced technology that could be a basis for the creation and development of a technology-based venture. This subject is designed to inculcate the entrepreneurial skills among science and technology cluster students and promote the development of technology-based entrepreneurship knowledge. The course delivery combines both theoretical and practical aspects of technology entrepreneurship. The theoretical aspect is looking at the important elements in understanding technology entrepreneurship, while the practical aspect is engaging the students to develop their technology-based idea business blueprint. The course has two key components of face-to-face lectures and practical project-based assignments monitored with the course lecturer.
MEQ667	QUALITY AND RELIABILITY	This course covers concepts and techniques of quality assurance and reliability engineering.
MEQ651	FINAL YEAR PROJECT I	This course offers the opportunity to apply the material learned throughout the program. Students will be assessed by presentation skills, logbooks, and submission of the project proposal. The project will be implemented and assessed individually under lecturer(s) supervision.
MEQ6XX	SPECIAL TOPIC 2	Students may take an elective classified under the manufacturing area. Please refer to the list of Electives
MEQ6XX	SPECIAL TOPIC 3	Students may take an elective classified under the manufacturing area. Please refer to the list of Electives

SEMESTER 7		
Course Code	Course Name	Course Description
MEQ652	FINAL YEAR PROJECT II	This subject represents a culmination of an independent study or research related to the elements of the invention, the innovation machine, or technologies guided by members of the faculty. The organization method of presentation and subject matter of the research are important in conveying to others the result of the study.
MEQ688	OCCUPATIONAL SAFETY AND HEALTH	This course the fundamentals of occupational safety and health in the working environment. These include the implementation and regulation of the Occupational Safety and Health Act (OSHA) in Malaysia. The course also covers the identification of occupational health and industrial hazards. The course emphasis on mechanical designers' responsibilities in occupational safety and health and will provide a guideline for students to implement occupational safety and health in the working environment and be able to self-engage with updated knowledge of occupational safety and health through a work-based learning activity.
MEQ689	QUALITY IMPROVEMENT	The course covers the fundamentals of quality improvement in the working environment. Topics of quality improvement tools and methods used to identify, analyses, and design the solutions are systematically covered. The project-based assessment will be given to students at the end of this course and a case project in implementing the quality improvement will be studied. This course will provide a guideline for students to implement quality improvement in the working environment and be able to self-engage with updated knowledge of the quality improvement through a work-based learning activity

SEMESTER 8		
Course Code	Course Name	Course Description
MEQ699	INDUSTRIAL TRAINING	This is a minimum 24 weeks course of full-time, and mechanical engineering career-related experiences designed to enhance the student's understanding and readiness for an intended career with a business, industry, or government agency. It is aimed at helping them to improve their competency level with direct hands-on or related employment enrichment programs and with exposure to the actual working atmosphere which they will eventually face after graduation. During the training, the students must conduct their activities in accordance with the requirements as approved by the Faculty and shall abide by the personnel regulations of the industry. Students are assessed by both, the supervisor from the industry and the evaluating lecturer. A comprehensive written report on industrial training is compulsory.
MEQ695	INDUSTRIAL MANAGEMENT	This course covers some of the important topics related to the management of manufacturing and a certain extent the services sectors of the industry. Topics covered include introductory concepts, concepts, and techniques in plant location, plant layout, procurement and inventory control, production planning and control, quality management and control, human resources and job design, maintenance management, and other aspects such as forecasting and project management. This course will provide a guideline for students to implement industrial management in the working environment and be able to self-engage with updated

		knowledge of industrial management through a work-based learning activity.
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LIST OF ELECTIVES - SPECIAL TOPIC 1		
Course Code	Course Name	Course Description
MEQ691	MOTORSPORT TECHNOLOGY	This course introduces the internal combustion engine in automotive and technologies integrated into the engine system. An explanation of engine testing using a dynamometer and computational tool to analyze engine characteristics will be taught briefly. The following topics will be covered; Introduction to IC engines, engine design and operating parameters, engine performance characteristics, engine measurements, and testing, and computational engine analysis. Students are expected to apply knowledge in engine development to enhance their understanding of the subject matter.
MEQ681	DRONE TECHNOLOGY	The course covers the basic aspect of drone technology started from the basic concept of fixed-wing drone technology to rotary-wing drone technology. Students are expected to apply the basic knowledge of drone technology to develop a flyable fixed-wing and rotary-wing drone.
MEQ661	DESIGN FOR MANUFACTURE	The course exposes the students to the product specifications and relationship with the manufacturability of products. The course will guide students to communicate with local industries using working drawings to produce their designed product.

LIST OF ELECTIVES - SPECIAL TOPIC 2		
Course Code	Course Name	Course Description
MEQ692	ELECTRIC VEHICLE TECHNOLOGY	This course introduces the electric vehicle as an alternative to fossil fuel-driven vehicles on the road for better fuel consumption and reduces vehicle emissions to the environment. An explanation of the electric vehicle operation, system, and high voltage battery will be taught briefly. The topics that will be covered are the introduction to the electric vehicle, safe working, tools and hazard management, electric vehicle design, maintenance, and replacement of electric vehicle components. Students are expected to apply knowledge in electric vehicles to enhance their understanding of the subject matter.
MEQ682	AVIATION TECHNOLOGY	The course covers the basic aspect of aviation technology such as aircraft construction, flight control, aircraft systems, flight instruments, and advanced aircraft systems. Students are expected to apply the basic knowledge of aviation technology combined with a computational tool to perform aviation design projects.
MEQ662	ERGONOMICS DESIGN	This course provides details about human interaction with work tasks and technology. Guidelines are given for amplifying human capabilities, utilizing human abilities, facilitating human efficiencies, and avoiding over-loading or under-loading. Details are presented about the human characteristics for the appropriate design of the living and work environment. Regulations governing safety and health aspects in the working environment are presented. Students will carry out a mini-project to formulate appropriate ergonomic countermeasures on existing occupational issues at an active working premise.

LIST OF ELECTIVES - SPECIAL TOPIC 3		
Course Code	Course Name	Course Description
MEQ693	AUTOMOTIVE VEHICLE DESIGN	This course introduces automotive design practice and some essential parts of the vehicle system. An explanation of the design tools used in automotive design will be taught briefly. The following topics will be covered; Introduction to automotive technology, vehicle body, and chassis, body design: The styling process, vehicle performance, and vehicle braking system. Students are expected to apply the automotive design concept to vehicle development to enhance their understanding of the subject matter.
MEQ683	AERODYNAMICS DESIGN	The course covers fundamentals of aerodynamics forces, airfoil, and aerodynamic application on aircraft and road vehicles. Topics of aerodynamics characteristics, airfoils, aircraft aerodynamics design, car aerodynamics design, and computational aerodynamics analysis will be taught briefly. Students are expected to apply the basic aerodynamic concepts on an analytical CFD tool to enhance their understanding of the subject matter.
MEQ663	SUSTAINABLE MANUFACTURING	Sustainable manufacturing is defined as “the creation of manufactured products that use processes that minimize negative environmental impacts, conserve energy and natural resources, are safe for employees, communities, and consumers and are economically sound.” Even though this definition exists, sustainable manufacturing still has many meanings in many contexts, industries, and forums. This course is designed to introduce the fundamental concepts of sustainable manufacturing. Students will learn these fundamentals through textbook reading, homework assignments, classroom case study discussions, projects, presentations, and guest speakers. While the focus of the course will be on sustainable manufacturing, the course will also look at the connections of sustainable design, environmental sciences, and the social sciences with sustainable manufacturing.

AWARDS AND GRADING SCHEME

Award of Degree

Students will be awarded a bachelor's degree for CEEM243 when they fulfill all the following criteria:

- i. Obtained a minimum Cumulative Grade Point Average (CGPA) of 2.00.
- ii. Passed all courses as required by the programme of study.
- iii. Fulfilled all the conditions and requirements set by the University.
- iv. Approved by the University Senate.

Classification of the degree awarded

All students registered for the bachelor's degree program are permitted to attempt the full honours program. The Bachelor degree classification is determined as follows:

Degree Classification CGPA

First Class 3.50 - 4.00

Second Class Upper 3.00 - 3.49

Second Class Lower 2.20 - 2.99

Third Class 2.00 - 2.19

Grading Scheme

The grading scheme for all assessments and final exam scores is summarized in the table below:

Range of Score	Grade	Grade Points	Result
90 - 100	A+	4.00	Pass
80 - 89	A	4.00	Pass
75 - 79	A -	3.67	Pass
70 - 74	B +	3.33	Pass
65 - 69	B	3.00	Pass
60 - 64	B -	2.67	Pass
55 - 59	C +	2.33	Pass
50 - 54	C	2.00	Pass
47 - 49	C -	1.67	Fail
44 - 46	D +	1.33	Fail
40 - 43	D	1.00	Fail
30 - 39	E	0.67	Fail
0 - 29	F	0.00	Fail

PLAGIARISM

“Plagiarism is a serious academic offence”

The Faculty of Mechanical Engineering UiTM CPP in upholding its professionalism and academic integrity by all means is against all acts and forms of plagiarism by the students. Proper citation and copyright compliance must be adhered to by students at all times in their academic work. Students must be aware that stealing someone else’s work is wrong and is deemed as intellectual dishonesty which carries stern disciplinary penalties. Some examples that amounted to plagiarism but are not limited to are:-

- Copy an article or a paper from the website or an online database, or books or journals without a proper citation.
- Cut and paste to create a paper from several sources without proper acknowledgement.
- Quote less than all the words copied. A student quotes a sentence or two and then continues copying from the sources without citing them.
- Fake a citation. Give a citation when one does not quote from it.

The following guidelines provide the basic requirements for the acknowledgement of sources in your academic work.

i. Bibliographies and footnotes

All the sources - printed materials such as books and journals, or electronic materials such as websites, CD-ROM, and electronic mails, and other sources which have been consulted in the preparation of your academic work should be listed in a bibliography shall not be considered as adequate for the specific use of that source within the report. Therefore, the extent of indebtedness to the source must be made clear. Any sentence or phrase, however small, which is not your original work must be properly acknowledged. It must be placed in quotation marks or indented beyond the regular margin.

ii. Paraphrasing

Any material which is paraphrased or summarized must also be specifically acknowledged in a footnote or the text.

iii. Facts, Formulas, and Ideas

Any facts, formulas, ideas, and other kinds of information which are borrowed should be specifically acknowledged in a footnote or the text. However, those which are widely known and are considered to be in the “public domain” of common knowledge do not always require citation. Students when in doubt should consult any of the faculty members.

iv. Homework, Laboratory Work, Problem Sets and Computer Programmes

The organization and presentation of laboratory and computational courses may vary from one course to another. Often students work in a group and as such, a proper acknowledgement of the extent of the collaborated work must appear when submitting the reports. In the cases where there are two or more signatories to a submitted report, each student’s signature is sufficient to signify that the student has contributed fairly to the submitted work’

v. Multiple Submissions

Occasionally the student may be permitted to rewrite an earlier work or to satisfy two academic requirements by producing a single piece of work more extensive than that which would satisfy either requirement on its own. In such cases, the student must obtain the prior written permission of each instructor. In cases where the previously submitted work, or a portion of it, is submitted in its original or revised form to another instructor, the student must also submit the original work with the revised version. If a single extended work is written for more than one course, a student must indicate that at the beginning of the report.

OUTCOME-BASED EDUCATION

Introduction

Outcome-Based Education (OBE) is the paradigm shift resulting from the reevaluation of Traditional Education (TE). TE narrowly focused on the content and produced students with varying degrees of achievement levels (stratification of achievers). Thus this model did not produce learners, which could perform effectively in the workplace. OBE has changed the focus of learning institutions from the content to the learner. According to William Spady, (1998,1999) a major proponent of OBE, three goals drive this approach to create academic curricula. 1) All students can learn and succeed, but may not be on the same day or in the same way. 2) Each success achieved by a student breeds more success. 3) Academic institutions control the conditions of success.

Curriculum Design for OBE

OBE is a methodology of curriculum design and teaching that focuses on what students can do after they are taught. OBE focuses on these key questions:

- a) What should the students learn?
- b) What is the motivation for the students to learn it?
- c) How can the academic institution and its resources help students learn it?
- d) How will it be determined what the students have learned (assessment)?

Thus, the OBE's instructional planning process is a reverse of that associated with traditional educational planning. The desired outcome is determined first and the curriculum, instructional materials, and assessments are designed around to support and facilitate the intended outcome (Spady 1988; 1993). All curriculum and teaching decisions are made based on how best to facilitate the desired outcome.

Sample of Bloom's Taxonomy

Cognitive Skills (C)

KNOWLEDGE

Arrange, define, duplicate, identify, label, list, match, memorize, name, order, outline, recognize, recall, relate, repeat, reproduce, select, state

COMPREHENSION

Classify, convert, defend, describe, distinguish, estimate, explain, express, extend, generalize, give examples, identify, indicate, infer, locate, paraphrase, predict, recognize, report, review, rewrite, select, summarize, translate.

APPLICATION

Apply, change, choose, compute, demonstrate, discover, dramatize, employ, illustrate, interpret, manipulate, modify, operate, practice, predict, prepare, produce, relate, schedule, show, sketch, solve, use, write

ANALYSIS

Analyze, appraise, break down, calculate, categorize, compare, contrast, criticize, diagram, differentiate, discriminate, distinguish, examine, experiment, identify, illustrate, infer, model, outline, point out, question, relate, select, separate, subdivide, and test.

SYNTHESIS

Arrange, assemble, categorize, collect, combine, comply, compile, compose, construct, create, devise, design, develop, explain, formulate, generate, integrate, manage, modify, organize, plan, propose, repair, rearrange, reconstruct, relate, reorganize, revise, rewrite, set-up, summarize, synthesize, tell, write

EVALUATION

Appraise, argue, assess, attach, choose, compare, conclude, contrast, criticize, defend, discriminate, evaluate, judge, justify, interpret, predict, rate, relate, select, summarize, support, value

Affective Skills (A)

RECEIVING (willingness to attend)

ask, choose, describe, follow, give, hold, identify, locate, name, point to, select, reply, use

RESPONDING (active participation)

answer, assist, compile, comply, conform, discuss, greet, help, label, perform, practice, present, read, recite, report, select, tell, write

VALUING (worth or value a student attaches to a particular object)

complete, describe, differentiate, explain, follow, form, initiate, invite, join, justify, propose, read, report, select, share, study, work

ORGANIZATION (bringing together different values)

adhere, alter, arrange, combine, compare, complete, defend, explain, generalize, identify, integrate, modify, order, organize, prepare, relate, synthesize

CHARACTERIZATION BY A VALUE

act, discriminate, display, influence, listen, modify, perform, practice, propose, qualify, question, revise, serve, solve, use, verify

Psychomotor Skills (P)

PERCEPTION

Choose, describe, detect, differentiate, distinguish, identify, isolate, relate, select, separate

MECHANISM

Assemble, build, calibrate, construct, dismantle, display, dissect, fasten, fix, grind, heat, manipulate, measure, mend, mix, organize, sketch

COMPLEX OR OVERT RESPONSE

Assemble, build, calibrate, construct, dismantle, display, dissect, fasten, fix, grind, heat, manipulate, measure, mend, mix, organize, sketch

ADAPTATION

Adapt, alter, change, rearrange, reorganize, revise, vary

ORIGINATION

Arrange, combine, compose, construct, create, design, originate

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEOs are specific attributes expected to graduate within 3 to 5 years after graduation during their career and professional life. These attributes are consistent with the mission and vision of the Institute of Higher Learning (IHL).

PEOs	PEOs Statement	Description	Performance Indicator
PEO1	Manufacturing technologists adapt and transform acquired knowledge moving towards IR4.0 knowledge in public and private sectors with respect to manufacturing engineering technology or other related professional fields in engineering technology.	The alumni shall progress through his/her professional career and be involved in leading a project team having authority and subordinates.	More than 70% of graduates are employed and involved in manufacturing engineering technology practice or other related professional fields.
PEO2	Manufacturing technologists are expert in their professional fields.	The alumni shall work in the field of engineering technology and be registered to become professional technologists or technologist experts or equivalent.	At least 90% of graduates register their professional membership or engineering technology practice; 25% of alumni holding leadership positions having authority and subordinates.
PEO3	Manufacturing technologists are globally recognized and employed in multinational or international organizations.	The alumni shall work in multinational/international companies or equivalent international levels.	30% of alumni work in multinational or international companies or equivalent international levels.
PEO4	Manufacturing technologists practice ethical and professional values in their respective field.	The alumni shall have ethical values and act professionally when dealing with engineering technology works or issues.	90% of stakeholders/respondents are satisfied with alumni ethical and professional values.

PROGRAMME OUTCOMES (PO)

Statements that describe what students are expected to know and be able to perform or attain upon graduation. These relate to the skills, knowledge, and behaviour that students acquire through the programme. Key Performance Indicator (KPI) for the PO attainment: 65% out of total students should achieve a minimum of 50% scores for each PO at the end of the programme

PO	PROGRAMME OUTCOMES
	Students of Bachelor of Manufacturing Engineering Technology with Honours programme are expected to attain the following in the practice-oriented learning environment:
PO1	Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to defined and applied engineering procedures, processes, systems or methodologies (C) (SK1 to SK4)
PO2	Problem analysis: Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialisation (C) (SK1 to SK4)
PO3	Design/ development of solutions: Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (C) (SK5)
PO4	Investigation: Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions (C) (SK8)
PO5	Modern Tool Usage: Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations (P) (SK6)
PO6	The Engineer and Society: Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems (A) (SK7)
PO7	Environment and Sustainability: Understand the impact of engineering technology solution of broadly-defined engineering problems in societal and environmental contexts and demonstrate knowledge of and need for sustainable development (A) (SK7)
PO8	Ethics: Understand and commit to professional ethics and responsibilities and norms of engineering technology practice (A) (SK7)

PO9	Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse technical teams. (A)
PO10	Communications: Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions (A)
PO11	Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments (A)
PO12	Life Long Learning: Recognise the need for, and have the ability to engage in independent and life-long learning in specialist technologies (A)

USEFULL REFERENCES

1. Peraturan Akademik Diploma Dan Sarjana Muda UiTM Pindaan 2021 [Bilangan 1]

Link :

<https://drive.google.com/file/d/15b-M8JHKWSN0Da9q7iE4SaB2J4a3DQ8t/view2>.

2. Pengecualian Kredit Pemindahan Kredit

Link :

https://drive.google.com/file/d/1y3lZrsNeOtjbF18f-BZZgy-Aj_tfynwm/view?usp=sharing

3. Permohonan Cuti Khas

Link :

<https://drive.google.com/file/d/1sUxI-1p8qj92tb-kIZg3Jl2wmC1bNQf/view?usp=sharing>

4. Kalendar akademik UiTM

Link :

<https://hea.uitm.edu.my/v4/index.php/calendars/academic-calendar>