UNIVERSITI TEKNOLOGI MARA (UiTM) CAWANGAN PULAU PINANG

Faculty of Mechanical Engineering

EM110

STUDENT HANDBOOK

Diploma in Mechanical Engineering (EM110)

2020 EDITION

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INTRODUCTION

FACULTY 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, creative, innovative and professional.

QUALITY POLICY

The Faculty of Mechanical Engineering 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.

CUSTOMER CHARTER

- 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.

FACULTY BACKGROUND

HISTORY

Faculty of Mechanical Engineering of UiTM is the off-spring of the former School of Engineering (one of the oldest School of ITM/UiTM-established in 1967) which was formed in 1996 with three faculties, namely Civil, Electrical and Mechanical Engineering.

The establishment of the Faculty of Mechanical Engineering (FKM) in University Teknologi MARA Penang branch (UiTMCPP) is to increase the number of bumiputera students to meet the manpower needs of mechanical engineering throughout the country. It was established in line with the establishment of UiTMCPP on June 16, 1996. At that time there were only two staff members only with a total of 35 students enrolled in full time Diploma in Mechanical Engineering. In August 2003, FKM moved to the current permanent campus at Permatang Pauh.

TEACHING STAFF

To ensure a high teaching standard, the faculty is very selective on the recruitment of lecturers and supporting staff. The faculty currently has 52 lecturers, 19 assistant lecturers, and 12 assistant engineers. Lecturers are required to upgrade their knowledge and skills by carrying out research and consultancy work. They can undertake short-term or long-term research projects and other relevant consultancy works. Besides teaching, lecturers are also encouraged to engage in industrial training in order to obtain a professional engineer status (PE). The lecturers are assessed for their career enhancement annually according to the university's policy.

FACULTY FACILITIES

Below is a list of equipment available at our facilities, mainly in various Faculty laboratories and workshops in the campus:

Location	Equipment
Automotive Laboratory	Sectioned automotive components
	Internal combustion engines
	Digital tyre wheel balancer
	Portable automotive emission analyser
	Tools with toolbox drawer for automotive maintenance works
	Basic automotive electrical trainer
	Antilock brake system trainer
Fluid Power Laboratory	Electro pneumatic trainer

	Electro hydraulic trainer
Fluid Mechanics Laboratory	Hydrostatics and fluid properties bench
	Osborne Reynold apparatus
	Pipe friction losses apparatus
	Centrifugal pump apparatus
	Axial flow pump or turbine apparatus
Location	Equipment
Fluid Mechanics Laboratory	Compressible flow bench
	Impact of jet apparatus
Thermodynamics Laboratory	Marcet boiler
	Single cylinder petrol engine test bench
	Steam motor and energy conversion apparatus
	Perfect Gas Law apparatus
	Thermal conductivity apparatus
	Concentric tube heat exchanger apparatus
	Free and forced convection heat exchanger apparatus
	Cooling tower experiment unit
	Air condition experiment unit
	Refrigeration laboratory unit
	Combustion laboratory unit
	Two shaft gas turbine laboratory unit
Metrology Laboratory	Standard gauge block set
	Profile projector
	Optical flat
	Screw plug and ring gauges

	Dial calibration tester
	Thread carriage diameter
	Surface roughness tester
	Roundness measurement instrument
	Tool makers microscope
	Digital autocollimator
	Digital height gauge
	Callipers
	CMM machine
	Laser interferometer
Material Laboratory	Scanning electron microscope
	Image analyser
	Sterei zoom microscope
	Optical microscope
	Hardness testing machines (Vickers and Brinell)
	End quench unit with furnace
	Sample preparation tools and equipment
Sheet metal workshop	Bench drill presses
	Sheet metal folding machines
	Sheet metal shears
Location	Equipment
Sheet metal workshop	Bench grinder
	Motorised plate bending roll machine
	Band saw
	Pipe bending machine

Foundry	Induction furnace
	Oil fire furnace
	Sand casting equipment
Investment casting laboratory	Wax casting equipment
Industrial Laboratory	Basic relay wiring panel box
	Pneumatic training kit
	Industrial robotic PLC trainer
	PLC training kit
CNC Laboratory	CNC wire cut machine
	CNC milling machine
Milling and Lathe Workshop	Lathe machines
	Milling machines
Welding Workshop	Plasma cutter
	Welding machine; TIG, Spot, Arc, and Submerged
	Oxy Acetylene Gas Cutting and Welding Equipment
Strength of Materials Laboratory	Universal Material Tester
	Tensile testing equipment
Dynamics Laboratory	Centrifugal force apparatus
	Static and dynamic balancing apparatus
	Flywheel apparatus
Aerospace Laboratory	Twin rotor MIMO system
	Servo fundamentals trainer
	Flight simulator
	Laminar flow table
	Wind tunnel

PROGRAM INFORMATION

ACADEMIC PROGRAMME

The faculty offers two education programs in two levels, which are Diploma in Mechanical Engineering (EM110) and Bachelor in Mechanical Engineering (Manufacturing) (Hons.) (EM241). The current EM110 program is MQA accredited and EM241 program is accredited by the Malaysia Engineering Accreditation Council (EAC).

PROGRAMME LEVEL

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

- Diploma in Mechanical Engineering: A 3 year program, with an entry from SPM or any recognized certificate, tailored to meet the industry requirements for assistant engineers and engineering technicians, with the opportunity to continue to a Bachelors Degree in Engineering, B.Eng (Hons.) program upon successful completion. In their fourth and fifth semesters, students are given optional modules to specialize in their area of interest. Among the choices are pure mechanical, manufacturing, automotive and aerospace engineering modules.
- Bachelor of Mechanical Engineering (Manufacturing) (Hons.): A 4 year program (entry from science matriculation, A-Level and STPM) designed to comply with the guidelines of Board of Engineer Malaysia (BEM) and the essential requirement for a professional engineer.

FACULTY'S STRENGTH

The faculty prides itself on these factors:

- Academic staff with various disciplines in Mechanical Engineering at Master and PhD Levels.
- Good number of staff having professional engineer qualification.
- Excellent laboratory facilities and equipment.
- A balanced structured curriculum for the program offered and recognized by professional bodies and accreditation boards locally and abroad.

PROGRAM PROFILE

Students are equipped with a firm foundation in engineering science, and other skills. The program incorporates Engineering mathematic, Mechanics, Material, Strength of Material, Thermo-fluids, Electrical systems, Manufacturing Design, Computer application, Management and Communication skills. There is a strong practical approach to the program and great emphasis is placed on laboratory work, industrial visits and design project. In the later years of the program there is the opportunity for the students to select elective courses, continuing with advance courses of their interest or venturing into a new area such as automotive design, refrigeration and air-conditioning, metrology, propulsion, and a variety of other elective subjects, totalling in 8 subjects.

Teamwork practice such as project control, management techniques, personal interaction and team skills are practiced through group projects. As part of the learning process, "Career Talks" by professional engineers from various industries are arranged regularly to help students gain knowledge and experience in the related field.

Students are also required to undergo industrial training in various industries. This training is for a period of minimum 16 weeks throughout their final semester of their Diploma. The objective of this training is to expose students to real working environment.

The assessment of the courses in the program is largely by a balance of coursework assessment which may include laboratory work, project and topical tests and formal examinations held at the end of each semester. Some courses are continuously assessed throughout the semester.

DEGREE PROGRAMS

EM110 DIPLOMA IN MECHANICAL ENGINEERING

This program is offered to SPM school leavers, Polytechnics, IKM, and alike. The duration of this program is 3 years comprising of six semesters.

For SPM candidates, they need to have at least a minimum of three credit subjects, including Bahasa Melayu, Mathematics, Additional Mathematics, Physics, and English, and they must pass their Sejarah and Chemistry (applied for all SPM 2013 candidates until current). Candidates must also be able bodied without any disabilities that may hinder them from conducting labs during their study.

For candidates with certificates from Polytechnics or any other institution with similar education level, recognized by the Malaysian government, they need to obtain at least a B grade in Mathematics and Engineering Science, and fulfil the general university requirement of a credit in Mathematics, Additional Mathematics, Physics, and English with a pass for Chemistry. Candidates must also be able bodied without any disabilities that may hinder them from conducting labs during their study.

The program incorporates Engineering Mathematics, Mechanics, Material, Strength of Material, Thermo-fluids, Electrical Systems, Design, Manufacturing, Computer Applications, Management and Communication skills. There is a strong practical approach to the program and great emphasis is placed on laboratory work, industrial visits, design project, and final year project. Students also have the opportunity to continue venturing into different interests during fourth and fifth semesters by selecting their elective courses, with topics related to pure mechanical engineering, manufacturing, automotive, and also aerospace.

Teamwork practice such as project control, management techniques, personal interaction and team skills are all practiced through group projects. As part of the learning process, career talks by professional engineers from the industries are arranged regularly to help student gain knowledge and experience in the related field.

The students are also required to undergo industrial training in industry. This training is for a period of 14 weeks during their final semester. The objective of this training is to expose students to real working environment in the industries.

All students undertake a major individual project in their fifth semester, as partial requirement for the Diploma Program. During the final project, students are involved in planning, designing, fabricating, testing, data collecting and analysing, and arriving at a conclusion before completing the project. The aim of this project is to develop creativity and to get exposure in various industrial processes.

The assessment of the courses in the program is largely by a balance of coursework assessment which may include laboratory work, project and topical tests and formal examinations held during the semester and final examination weeks at the end of each semester.

ADMISSION REQUIREMENTS

Table 1: Entry Requirements

Diploma of Mechanical Engineering EM110 (3 years / 6 semesters)	UPU Code UE4521001
	Faculty Faculty of Mechanical Engineering
	Duration of Program 6 Semesters
	General Requirements ▪ Pass in SPM or equivalent ▪ Obtained a grade C in three subjects including *Bahasa Melayu* paper in SPM or equivalent ▪ Pass *Sejarah* paper in SPM (for SPM 2013 until current)
	Additional program requirements – SPM holder ▪ Obtained a minimum grade C in the subjects listed below: ○ Mathematics ○ Additional Mathematics ○ Physics ○ English AND ▪ Obtained a passing grade for Chemistry AND ▪ No physical disability that will impede practical work

	Additional program requirements – Certificate from Polytechnic ▪ Obtained a certificate from Polytechnic or any other institutions recognized by the Malaysian Government AND ▪ Obtained minimum grade B in two subjects listed below: ○ Mathematics ○ Engineering Science AND ▪ Obtained a minimum C in the subjects listed below: ○ Mathematics ○ Additional Mathematics ○ Physics ○ English AND ▪ Obtained a passing grade for Chemistry AND ▪ No physical disability that will impede practical work

STUDENT ENTRY STANDARD

Candidates that hold a Diploma in Mechanical Engineering from UiTM will be enrolled directly into 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 semester one and two. Where as candidates holding diploma awarded by other recognized institutions will be enrolled with some credit exemptions approved by the faculty.

Candidates from matriculation program and STPM will be enrolled into the first semester.

STUDENT ENTRY REGULATIONS

Students are not allowed to register more than one program 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 Senate of UiTM. The selection of students to the program is done by the Admissions Office and not by the faculty.

Failed and dismissed students are not allowed to reapply to the same program but are allowed to apply to other program after one semester.

CREDIT TRANSFER

Students can apply for transfer of courses from other recongnized institutions of higher learning according to the regulation specified by the University. There are no upper limit to the maximum amount of credit that can be transfer as long as it meet the requirements declared by the University. For the detail of the requirements, student need to refer to the "Peraturan Akademik Diploma dan Sarjana Muda UITM 2017" handbook.

CREDIT EXEMPTION

Students who have applied for credit examption shall follow the guidelines set out by the University. The total credits that can be exempted from other recognized institutions must not be more than 30% from the total credits units of the programme. The process of application for credit exemption must be perform by the student during the first 14 days from the admission date and each student is only allow to apply once during the duration of the programme.

CURRICULUM STRUCTURE

Table 2: Diploma of Mechanical Engineering – EM110

SEM	NO	COURSE	CODE	PRE / CO - REQUISITE	CREDIT UNIT	LEC	TUT	LAB / PRAC	CONTACT HOUR
SEM 1	1	FUNDAMENTALS OF ISLAM	CTU101	-	2	2	0	0	2
	2	CO-CURICULUM I	XYZ111	-	1	0	0	2	2
	3	INTEGRATED LANGUAGE SKILLS I	ELC121	-	3	3	0	0	3
	4	MATHEMATICAL THINKING FOR NOVICES	UED101	-	0	0	0	0	0
	5	CALCULUS I	MAT183	-	3	3	1	0	4
	6	FUNDAMENTAL PHYSICS I	PHY133	-	3	2	1	2	5
	7	INTRODUCTION TO ENGINEERING	MEC101	-	3	2	0	2	4
	8	ENGINEERING DRAWING	MECXXX	-	3	1	0	4	5
				TOTAL	18	13	2	10	25
SEM 2	1	ISLAMIC THOUGHT AND CIVILIZATION	CTU151	-	2	2	0	0	2
	2	CO-CURICULUM II	XYZ121	-	1	0	0	2	2
	3	INTEGRATED LANGUAGE SKILLS II	ELC151	-	3	3	0	0	3
	4	FUNDAMENTALS OF COMPUTER PROBLEM SOLVING	CSC128	-	3	2	0	2	4
	5	CALCULUS II FOR ENGINEERS	MAT235	MAT183	3	3	1	0	4
	6	STATICS	MEC111	PHY130	3	3	1	0	4
	7	MATERIAL SCIENCE	MEC281	CHM141	3	3	1	0	4
				TOTAL	18	16	3	4	23
SEM 3	1	SCIENCE AND TECHNOLOGY IN ISLAM	CTU211	-	2	2	0	0	2
	2	CO-CURICULUM III	XYZ131	-	1	0	0	2	2
	3	INTEGRATED LANGUAGE SKILLS III	ELC231	-	3	3	0	0	3
	4	STRENGTH OF MATERIALS	MEC211	MEC111	3	3	1	0	4
	5	DYNAMICS	MEC221	MEC111	3	3	1	0	4
	6	FLUID MECHANICS	MEC241	PHY130	3	3	1	0	4
	7	MECHANICS AND MATERIALS LAB	MEC291	CO-REQ MEC211 / MEC221 / MEC281	1	0	0	2	2
	8	WORKSHOP PRACTICE	MEM160	-	2	1	0	3	4
				TOTAL	18	15	3	7	25

SEM	NO	COURSE	CODE	PRE / CO - REQUISITE	CREDIT UNIT	LEC	TUT	LAB / PRAC	CONTACT HOUR
SEM 4	1	BASIC ELECTRICAL ENGINEERING	ELEXXX	-	3	2	0	2	4
	2	THERMODYNAMICS	MEC251	PHY130	3	3	1	0	4
	3	THERMOFLUIDS LAB	MEC294	CO-REQ MEC241 / MEC251	1	0	0	2	2
	4	MANUFACTURING PROCESSES AND TECHNOLOGY	MEM360	-	3	2	0	2	4
	5	FINAL YEAR PROJECT I	MECXXX	-	2	0	2	0	2
	6	ELECTIVE 1	MEX3YY	-	3	2	0	2	4
				TOTAL	15	9	3	8	20
SEM 5	1	FUNDAMENTALS OF ENTREPRENEURSHIP	ENT300	-	3	3	0	0	3
	2	FINAL YEAR PROJECT II	MECXXX	-	4	0	1	6	7
	3	MACHINE ELEMENT DESIGN	MEC331	CO-REQ MEC211	3	3	1	0	4
	4	ELECTIVE 2	MEX3XX	-	3	2	0	2	4
	5	ELECTIVE 3	MEX3XX	-	3	2	0	2	4
				TOTAL	16	10	2	10	22
SEM 6	1	INDUSTRIAL TRAINING	MECXXX	-	8	0	0	20	20
				TOTAL	8	0	0	20	20
				GRAND TOTAL	93	63	13	59	135

Table 3: Electives offered

ELE	SEM	COURSE	CODE	PRE / CO - REQUISITE	CREDIT UNIT	LEC	TUT	LAB / PRAC	CONTACT HOUR
MECHANICAL	4	CONTROL SYSTEM AND INSTRUMENTATION	MEC322	NONE	3	2	0	2	4
	5	PLANT ENGINEERING	MEM376	NONE	3	2	0	2	4
	5	FLUID POWER TECHNOLOGY	MEM341	MEC241	3	2	0	2	4
MANUFACTURING	4	AUTOMATION	MEM365	NONE	3	2	0	2	4
	5	MACHINING TECHNOLOGY	MEM368	NONE	3	2	0	2	4
	5	METROLOGY	MEM371	NONE	3	2	0	2	4
AUTOMOTIVE	4	AUTOMOTIVE ENGINE TECHNOLOGY	MEV351	NONE	3	2	0	2	4
	5	AUTOMOTIVE SERVICE WORKSHOP	MEV300	NONE	3	2	0	2	4
	5	MOTOR VEHICLE TECHNOLOGY	MEV321	NONE	3	2	0	2	4
AEROSPACE	4	INTRODUCTION TO AEROSPACE ENGINEERING	MEA301	NONE	3	2	0	2	4
	5	PROPULSION	MEA351	NONE	3	2	0	2	4
	5	AERODYNAMICS	MEA321	NONE	3	2	0	2	4

COURSE DESCRIPTION

SEMESTER 1

CTU101 – FUNDAMENTALS OF ISLAM

Kursus ini menjelaskan kepada pelajar mengenai tasawwur Islam dan menghubungkaitkan akidah dengan amalan seharian. Kursus ini juga membincangkan aplikasi syariah, ibadah dan akhlak dalam kehidupan serta mengenalpasti isu dan cabaran semasa. Kemahiran membaca, menghafaz dan menganalisis al-Quran turut diterapkan

XYZ111 – CO-CURICULUM

Kursus ini memperkenalkan kepada pelajar mengenai tingkahlaku, sahsiah, kepimpinan dan adab berkomunikasi melalui pelajaran komponen disiplin iaitu kawad kaki pasukan beruniform. Pelajar seterusnya diberi input kenegeraan dan kerohanian bagi menerapkan sifat patriotisme dan pembentukan akhlak. Aspek kecergasan fizikal diberi melalui latihan jasmani

ELC121 – INTEGRATED LANGUAGE SKILLS I

This course is designed to build the listening, speaking and reading skills to help students perform effectively and competently in the social and academic contexts. This is done through the integration of language skills with an emphasis on listening. It aims to raise students' proficiency to the intermediate level. This course focuses on enhancing the students' abilities to use the language by exploiting a variety of materials in varied situations. Appropriate consideration is given to the development of higher-level grammatical construction, vocabulary expansion and extensive reading activities which are intended to increase students' lexical density.

UED101 – MATHEMATICAL THINKING FOR NOVICES

One of the major aims of mathematical learning is the development of mathematical thinking. This course embarks on this endeavour by using problem solving as the central tool towards this development. It involves the acquisition and application of mathematics concepts and skills in a wide range of situations, including non-routine and real world problems to provide an opportunity for students to become problem solvers. Students will participate in a variety of exercises, problems, and investigations as they explore mathematics concepts from a problem solving perspective in an interactive manner. The emphasis will be on exploration of various mathematics contexts to learn mathematics, to solve problems, and to communicate mathematical ideas through multiple representations

MAT183 – CALCULUS I

This is the first course in the calculus series. It starts with topics on functions and graphs, limits and continuity, techniques of differentiation and integration and its applications.

PHY133 – FUNDAMENTAL PHYSICS I

This course will interactively engage students cognitively and scientifically in areas of system of units, linear kinematics, dynamics of motion, mechanics of solid and fluid, rotational kinematics and heat and thermodynamics. Students will define concepts, state and write laws and theories, performs investigations via laboratory exercises,

discuss the results and relationships with peers and facilitators. Lecture hours consist a mixture of lectures and active learning. The outcomes shall be assessed through a variety of tools which include the traditional paper examination and classroom engagement.

MEC101 – INTRODUCTION TO ENGINEERING

The course covers the engineering profession in general and mechanical engineering in particular. Students will be introduced to the various disciplines in engineering and particularly mechanical engineering, basic problem-solving methods, laboratory report writing and the use of computers in engineering 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.

MECXXX – 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 drawing of simple objects. Topics covered includes 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

CTU151 – ISLAMIC THOUGHT AND CIVILIZATION

Kursus ini menjelaskan konsep tamadun Islam, perkembangan serta pengaruh dan sumbangannya kepada peradaban dunia. Kursus ini juga menjelaskan pemikiran, isu dan cabaran dunia Islam kontemporari.

XYZ121 - CO-CURICULUM II

Kursus ini merangkumi empat komponen, iaitu disiplin seni mempertahankan diri (Tempur Tanpa Senjata) patriotisme, kerohanian dan rekreasi. Kursus ini juga memperkenalkan pelajar kepada asas ikhtiar hidup.

ELC151 – INTEGRATED LANGUAGE SKILLS II

This course is designed to help students become confident and independent readers. Specifically, students will be exposed to intensive reading skills which include skimming and scanning, recognizing structures and mechanics used in texts, summarizing and evaluating texts. By exposing them to a variety of reading materials and short stories, extensive reading strategies are introduced to create enjoyable reading experiences outside the classroom and to enrich and strengthen their knowledge of words. In addition, speaking and listening skills are integrated into the course to help students perform effectively and competently in the social and academic interaction. This course aims to raise their proficiency to high intermediate level by exploiting a variety of materials in varied situations

CSC128 – FUNDAMENTALS OF COMPUTER PROBLEM SOLVING

This course is an introduction to problem solving using computers. It emphasizes various aspects of problem solving, mainly consisting of the problem domain, phases of problem solving and basic techniques in designing a solution. The approach to problem solving is via top-down design, structured and modular programming. The emphasis is on solving problems using computer rather than the syntactical aspects of the chosen programming language.

MAT235 – CALCULUS II FOR ENGINEERS

This course consists of four chapters: methods of integration, L'Hospital's rule and improper integral, functions of two and three variables and ordinary differential equations. In the first chapter, integration methods discussed are integration by parts, trigonometric integrals, trigonometric substitutions and integration of rational functions. Chapter two discussed about the limit of indeterminate form and improper integral. In the third chapter, students will be introduced to partial derivatives and its applications in engineering and sciences. Topics on methods of solving first and second order differential equations with its applications will be discussed in the last chapter

PRE-REQUISITE: MAT183

MEC111 – STATICS

The course begins with basic concepts of mechanics i.e. space, time, mass, and force, 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 areas and masses.

PRE-REQUISITE: PHY130

MEC281 – 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 structures, properties and applications.

SEMESTER 3

CTU211 – SCIENCE AND TECHNOLOGY IN ISLAM

Kursus ini menjelaskan konsep sains dan teknologi dalam Islam serta sejarah perkembangannya. Juga membincangkan kemukjizatan al-Quran, al-Sunnah serta aplikasi kaedah fiqh dan maqasid syariah bagi menangani isu etika dalam sains dan teknologi.

XYZ131 – CO-CURICULUM III

Kursus ini adalah lanjutan kepada pelajaran kemahiran TTS,sukan air,rekreasi,ikhtiar hidup dan tambahan kepada tahap kecergasan mental dan fizikal. Selain itu, pelajar juga diterapkan dengan kemahiran berkomunikasi, berfikir secara kreatif dan semangat kerja berpasukan

ELC231 – INTEGRATED LANGUAGE SKILLS III

This course is designed to equip students with the necessary writing skills to help them improve their written English. This is conducted by integrating reading, speaking skills with the emphasis is on writing skills. This course also aims to equip students with the necessary skills to discuss arguments and issues effectively. It focuses on enhancing the students' abilities to use the language by exploiting a variety of materials in varied situations. Appropriate consideration is given to the development of higher-level grammatical construction and vocabulary expansion which are intended to help increase students' lexical density.

MEC211 – STRENGTH OF MATERIALS

The course covers stresses and strains of deformable bodies in tension, compression, bending, and torsion. Topics covered include axial stresses and strains; thermal stress; simple statically determinate and indeterminate systems; torsional stresses; power transmission in shafts; bending stresses in beams; transformation of plane stresses; and elastic buckling in columns.

PRE-REQUISITE: MEC111

MEC221 – DYNAMICS

Dynamics is a second course in engineering mechanics. It deals with the conditions of motion of a body which may be treated as a particle or a rigid body. It covers both kinematics and kinetics of rigid bodies in planar motion. The course emphasizes the use of scalar and graphical approach to problem solving in dynamics.

PRE-REQUISITE: MEC111

MEC241 – FLUID MECHANICS

This course covers the introduction of fundamental fluid mechanics theory including properties of fluid, hydrostatics and control volume analysis. Applied topics covering dimensional analysis and similarity, incompressible flow in pressure conduit and flow measurement are also taught.

PRE-REQUISITE: PHY130

MEC291 – MECHANICS AND MATERIALS LAB

The course consists of practical works involving the investigations and analysis in the area of mechanics and material science.

CO-REQUISITE: MEC211/MEC221/MEC281

MEM160 – WORKSHOP PRACTICE

This subject aims to introduce real mechanical engineering environment represented in a workshop scale to the students. The students will be exposed to workshop rules and regulations, safety and ethic, which guarantee mechanical engineering good practice. The students will also be exposed to measurement tools, bench-work tools, cutting tools, joining tools, casting tools, various machine tools especially for metal removal processes and sheet metal works. Various type of materials commonly used in workshop practice are also been introduced. Students will be given responsibility to produce one manufacturing product start from a technical drawing until finished product.

SEMESTER 4

ELEXXX – BASIC ELECTRICAL ENGINEERING

The course deals with the fundamentals of electrical engineering, working principles of the electrical motor and its performance. It covers DC and AC circuits, DC machines, transformers, and induction motors. It also covers fundamentals in power electronic such as power diodes and rectifiers.

MEC251 – THERMODYNAMICS

This course is designed for students studying thermodynamics for the first time. Considerable emphasis is placed on the understanding and application of the first law and second law of thermodynamics. Fundamental concepts and principles of various thermodynamics systems and plants are also covered in this course.

PRE-REQUISITE: PHY130

MEC294 – THERMOFLUIDS LAB

The course consists of two parts, i.e. laboratory experimental work in thermodynamics and fluid mechanics. It provides the students with the opportunity to operate various experimental equipment under supervision. Students shall complete all laboratory experiments and to relate them to theoretical understandings of thermodynamics and fluids course.

CO-REQUISITE: MEC241/MEC251

MEM360 – MANUFACTURING PROCESSES AND TECHNOLOGY

The course covers the various aspects of processes employed in the production of metallic, polymeric and ceramic components. Students will be exposed to various manufacturing processes.

MECXXX – FINAL YEAR PROJECT I

This course is the first part of the two-phase Final Year Project. It provides the opportunity for students to apply knowledge and skills acquired in all previous courses to undertake problem identification, formulation and solution of a well-defined engineering problem. The course is aimed to foster independent thinking and develop problem-solving skills. It focuses on the ability of the students to identify a problem of their own interests and then formulate it for further development in the next following semester. The students will have to do a literature review and come up with project planning.

MEX3YY – ELECTIVE 1

SEMESTER 5

ENT300 – FUNDAMENTALS OF ENTREPENEURSHIP

This course provides an overview of the requirements for launching an entrepreneurial career and starting up an entrepreneurial venture. After an appreciation of the concept of entrepreneurship, students will be exposed to the critical role of opportunity recognition and evaluation. The course also shed light on the entrepreneur as the main success factor in the new venture formation and development. The central focus of the course is to prepare the students with the essence of entrepreneurship and business planning skills that is essential for the success of new ventures. The subject delivery combines both theoretical and practical aspects of entrepreneurship. Theoretical aspect is looking at the important elements in understanding entrepreneurship, while practical aspect is engaging the student to develop and propose a viable Business Plan.

MECXXX – FINAL YEAR PROJECT II

This course is the second part of the two-phase Final Year Project. It provides an opportunity for students to apply knowledge and skills acquired in earlier courses to the solution of an engineering problem. The second part focuses on the execution of the project, project evaluation, testing, and analysis toward completion and achievement of the project objectives. Students will have to communicate their findings or project outcomes in both written and oral forms.

MEC331 – 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, gears, clutches and brakes as well as given elementary exposure to design analysis of some of these machine elements

CO-REQUISITE: MEC211

MEX3XX - ELECTIVE 2

MEX3XX – ELECTIVE 3

SEMESTER 6

MECXXX – INDUSTRIAL TRAINING

This is a 16 weeks (minimum) course of external, full-time, and mechanical/manufacturing 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, supervisor from the industry and the evaluating lecturer. A comprehensive written report on the industrial training is required.

SPECIAL TOPICS (ELECTIVES)

MEC322 – CONTROL SYSTEM AND INSTRUMENTATION

The course emphasizes basic concepts, principles and practical aspects of control system and instrumentations. It covers basic control principles and the usage of instrumentation tools in various industrial and commercial applications, relay control systems, industrial digital computer, and automatic control systems. Emphasis is given to pressure, flow, torque, power, temperature, level measurements, and computer control.

MEM376 – PLANT ENGINEERING

This course covers theoretical practical knowledge on maintenance management, industrial building and facilities system. The contents also include the operating principles and general maintenance work of industrial facilities such as air conditioning, ventilation, boiler and firefighting system. The students are also provided with knowledge on the industrial safety, health and hazard.

MEM341 – FLUID POWER TECHNOLOGY

This course covers the fundamental topics for understanding the principle, design and operation of fluid power system. Topics are classified into hydraulics and pneumatic. Practical sessions give students better views on working principle of individual components as well as analysis on relationship between pressures, forces, flow and velocity.

MEM365 – AUTOMATION

The course deals mainly with the design and control of hydraulics, pneumatics and electrical-pneumatic control systems. The topic includes basic concepts, terminology, and components of automation and robotics in industry, pneumatic and hydraulic circuits, control valves, and programmable logic controls. There is also an introduction to the new trend of manufacturing automation, which involves applications of robotics and automated assembly.

MEM368 – MACHINING TECHNOLOGY

The course involves the study of the basic principles of various types of conventional and advanced metal removal processes. It utilizes knowledge and experience that students received in workshop practices. This involves the latest advancement of machining processes and the preparation for the future challenge of technological change.

MEM371 – METROLOGY

The course covers the standards and basic principles involved in measurements including linear measurements. Measurements are conducted using tools which are incorporated during practical sessions of the course.

MEV351 – AUTOMOTIVE ENGINE TECHNOLOGY

The course covers the fundamental aspects of IC engine and their related systems. The topics selected are related to the identification of the engine parts and its main systems, the principles of thermodynamics, function and construction of fuel system, cooling system, lubrication system and induction systems.

MEV300 – AUTOMOTIVE SERVICE WORKSHOP

The course covers basic maintenance and servicing of various components and systems of an automobile. Topics include practice fundamentals, diagnosis and service of engine systems, engine service and drive trains.

MEV321 – MOTOR VEHICLE TECHNOLOGY

This course covers the principles and construction of the powertrain system in the vehicle. It includes clutch, torque converter, manual and automatic transmission system, front and rear wheel drive train system. The introduction to suspension system, steering system, and braking system are also covered in this course. In addition, the technology integrated with powertrain, suspension system, steering system, and braking system is presented in this course.

MEA301 – INTRODUCTION TO AEROSPACE ENGINEERING

This course introduces the students to the various aspects in the field of aerospace engineering. The students will be taught the fundamental aerospace principle and knowledge which include the standard atmosphere, aircraft anatomy, basic aircraft performance and stability concept. Students will be given the opportunity to apply their knowledge, whereby they are required to involve in a mini project that is related to aerospace engineering.

MEA351 – PROPULSION

In this course, students will be introduced to various aerospace propulsion systems. Students will be taught to perform thermodynamics analysis of internal combustion reciprocating engine and turbojet engine. Students will also be taught to calculate thrust and performance parameters for all types of engines and all its components. Not only that, students are also briefly introduced to the study of chemical rocket propulsion as part of the syllabus. Students are also assigned to projects which will be a requirement for the final grade of the course

MEA321 – AERODYNAMICS

The course covers about low speed aerodynamics of airfoil, finite wing and airplane. Topics of airflow properties, wind tunnel, aerodynamics characteristics, viscous flow and airfoil data will be taught briefly. Students are expected to apply the basic aerodynamic concepts on an analytical CFD tool to enhance their understanding on the subject matter.

AWARDS AND GRADING SCHEME

AWARD OF DEGREE

Student will be awarded a Diploma in Mechanical Engineering, EM110 when they fulfill all the following criteria:

- obtained a minimum Cumulative Grade Point Average (CGPA) of 2.00;
- passed all courses as required by the programme of study;
- fulfilled all the conditions and requirements set by the University;
- approved by the University Senate.

CLASSIFICATION

The Diploma classification is determined as follows:

Table 4: Awarded degree classification.

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

After the final score has been finalized (inclusive of all assessments and final exam scores), the grade will be categorized according to the following marking scheme:

Table 5: University grading scheme.

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

FINAL YEAR PROJECT

Final Year Project (FYP) is part of the requirements for the awarding of the Bachelor degree to a student. The topic of the FYP are selected from areas such as engineering management, mechanics, robotics, manufacturing, thermofluids,and other research areas related to mechanical engineering. The FYP is supervised by a project supervisor and coordinated by a Final Year Project Coordinator. The lecturer who offers the topics shall be appointed as the project advisor. Students who have finished industrial training may conduct their FYP based on their industrial training project.

The project is carried out in two semesters, semester 7 and semester 8. During these semesters, students are expected to integrate and implement their knowledge and skills obtained throughout their studies. Students will work under the supervision of a lecturer. The roles of a supervisor are to guide and monitor the progress of the student's works. All activities from planning, implementing and scheduling must be recorded in a log book. The assessment will be done at the end of semester 7 and 8.

Figure 1 Flow chart of final year project.

INDUSTRIAL TRAINING

Industrial training or internship refers to work experiences that are relevant for professional development prior to graduation. One of the requirements for the award of the Diploma is that students must complete at least 16 weeks (one semester) of Industrial Training.

Students should note that the Industrial Training is an essential component in the development of the practical and professional skills required by engineers to support forthcoming graduate employment. Many employers regard this period as a chance to vet new employees for future employment.

All students should make considerable effort and give sufficient thought in obtaining the most relevant and effective Industrial Training. It is desirable to experience a wide range of re-entering activities. Developing an awareness of general workplace ethics and interpersonal skills are important objectives of the industrial training experience.

Normally students shall undergo Industrial Training during semester six and obtain places for Industrial Training in any appropriate company of their own choice. The Faculty's Coordinator of Industrial Training (CIT) will provide an internship briefing prior to applying for internship placement. During this briefing, students are given general guidelines on how to apply, what to do before, during, and after Industrial Training, and rules and regulations pertaining to the Industrial Training. Students are advised to contact the CIT's office for any inquiry and regularly check for latest information and updates in the Industrial Training website (https://fkmppli.wordpress.com)

The objectives of the programme are:

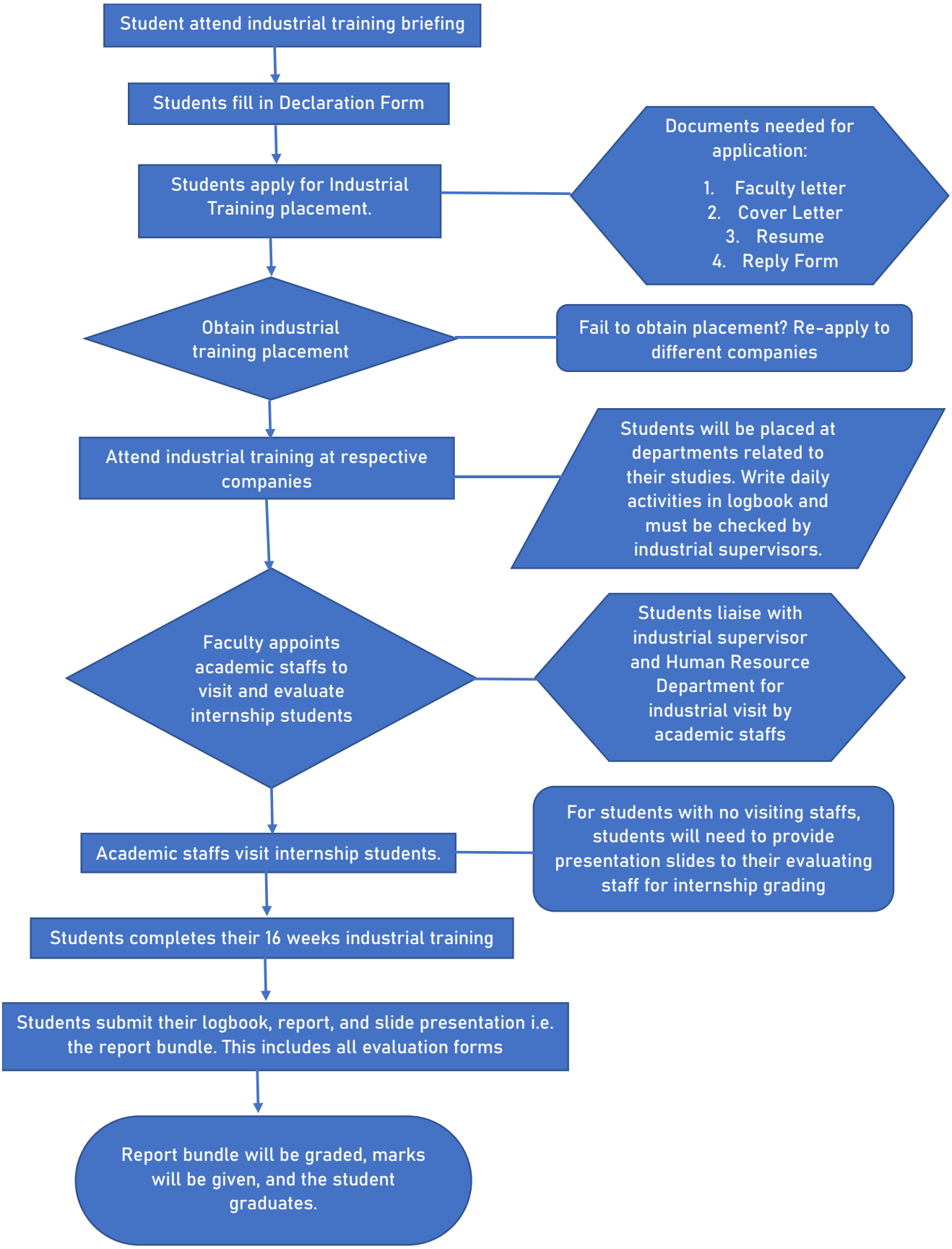
- To expose students to actual working culture and industrial practice.
- To allow students to apply their theoretical knowledge into practice.
- To motivate students to practice the right working attitudes and professionalism to increase their employability potential.
- To facilitate students to potential employers.

During the Industrial Training period, students are required to always observe the rule and regulation set by both the Faculty and the Company. They are required to record daily activities in the provided logbooks. At the end of the industrial training, each student is required to submit a full report, containing detailed job description carried out by them as stated in the report bundle bought by the students. Academic staffs are assigned to each of the students to evaluate students and assess the company's suitability to the training program. The CIT monitors all student during their industrial training. Any matters pertaining to the industrial training should be referred to the CIT or their respective committee members before any decision is made.

Assessment for the industrial training are based on daily logbook, industrial training report, industrial supervisor feedbacks and evaluation from appointed academic staffs.

INDUSTRIAL TRAINING FLOWCHART

Below shows a flowchart on what needs to be done before, during, and after industrial training.



INTERNSHIP TIMELINE

Students are also provided with an industrial training guideline for them to follow throughout the semester. Adhering to these dates are crucial in order for the Faculty to be able to fill in their grades by the end of the semester. Below is an example of a timeline provided to the students. The timeline is provided on every semester and the dates are adjusted accordingly as per the University Academic Calendar.

UNIVERSITI TEKNOLOGI MARA

EM110 MEC399 - INDUSTRIAL TRAINING TIMELINE SEMESTER 2 2019/2020 (FEBRUARY – JUNE)

PERSON IN CHARGE	DESCRIPTION	ACTION TO BE DONE	DATE/s	SUBMISSION MODE
STUDENT	Internship starts	Student starts internship with their chosen company	EARLY START: 2 FEBRUARY 2020 FINAL LATE START: 23 FEBRUARY 2020	-
STUDENT	Subject Registration (MEC399 – INDUSTRIAL TRAINING)	Student must register and pay the fees for the subject in order to receive final grade at the end of the semester	19 February – 15 March 2020	Online through Student Portal
STUDENT & INDUSTRIAL SUPERVISOR	Reporting form	Student must submit the reporting form (attached with the LI file) to their supervisor for proof of training at the company. NO INTERN PROOF, NO VISIT, DEDUCT MARKS.	Submit by 26 February 2020 (or earlier if the student wishes to do so)	1. An emailed softcopy to intern.fkm.uitmpp@gmail.com 2. Hardcopy attached to the LI document and must be submitted at the end of the semester
INDUSTRIAL TRAINING COORDINATOR	Check reporting form	Coordinator checks the reporting form submitted by	27 February – 1 March	N/A

		students for documentation		
STUDENT	Subject Validation	Student must check that they have registered for the subject and validate accordingly.	16 March – 29 March	N/A
STUDENT	Pay UITM fees	Student must pay their fees in order for their final grades to appear by the end of the semester. NO PAY, NO GRADE, FAIL INTERN AND REPEAT AGAIN.	Pay by 22 March 2020	University Bursary (Bendahari)
STUDENT & INDUSTRIAL SUPERVISOR	Logbook for Industrial Training	Student must update their logbook and must be checked by their supervisor – include official stamp and sign	Between 2 February – 16 June 2020	To be completed daily and must be attached to the LI document and submitted at the end of the semester
INDUSTRIAL TRAINING COORDINATOR	Notification for visit	Coordinator delegates industrial visits to faculty lecturers	2 – 6 March 2020	An email/announcement will be circulated among the lecturers for industrial visits
STUDENT & INDUSTRIAL SUPERVISOR	Notification for visit	Student must notify their industrial supervisor on lecturer visits	Starting 7 March 2020	Notification will be made through website -- https://fkmppli.wordpress.com/
STUDENT & LECTURER	Industrial visit from lecturers	1. Student must prepare for industrial visit evaluation from lecturers 2. Students must liaise with their evaluating lecturers to decide on the date of visit	16 March – 22 May 2020	Use lecturer's evaluation form (that is attached with the LI binder file). Attach the form with the LI document and submit at the end of the semester

		3. Lecturers must communicate with respective students to decide on visiting dates. Do not ask the UNIT LI to liaise with students.		
STUDENT & INDUSTRIAL SUPERVISOR	Industrial Supervisor Evaluation	Student sends an evaluation form to their industrial supervisor.	To be completed before student finishes their internship	Use Industrial supervisor evaluation form (that is attached with the LI binder file). Attach the form with the LI document and submit at the end of the semester.
STUDENT	Complete industrial training	Student should complete their industrial training with a minimum of 16 weeks in the industry.	EARLY END INTERNSHIP: 22 MAY 2020 FINAL END INTERNSHIP: 16 JUNE 2020	N/A
STUDENT	Report, Logbook, and Evaluation (LI Document) Submission	Student must complete all required documents in order to receive final grade for the semester	19 June 2020	Bind Hardcopy to the Faculty of Mechanical Engineering UITM Pulau Pinang (PIC: Ms Siti Nur Amalina)

STUDENT PORTFOLIO

As a UiTM student, students must keep a portfolio that descript you experience, achievements, result and anything related to you during your time studying in the University. This portfolio can then be an extension to your personal portfolio in your future acheivements. University has prepare a electronic system that you use and can be access via istudent portal under myE-Portfolio. The direct link to myE-Porfolio is http://myeportfolio.uitm.edu.my/.

OUTCOME BASED EDUCATION

Outcome Based Education (OBE) is the paradigm shift resulting from the re-evaluation 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 work place. 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 creating 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 students' capability of applying what has been taught to them. OBE focuses on these key questions which are:

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 final 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 example, 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.

PEO & PO

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

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

Table 5 EM110 PEOs

Graduates who apply scientific knowledge and technical skills in mechanical engineering related industry.	PEO1
Graduates who have the abilities for leading, communicating and working in a team with professional and sustainable practices.	PEO2
Graduates who demonstrate effective information management, entrepreneurial skills and engage in life-long learning.	PEO3

PROGRAM OUTCOMES (PO)

Program outcomes are 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. The Key Performance Indicator (KPI) for the PO attainment: 75% out of total students should achieve a minimum of 50% marks for each PO at the end of the programme

Table 6 EM110 POs

Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation to wide practical procedures and practices (C)	PO1
Identify and analyse well-defined engineering problems reaching substantiated conclusions using related methods of analysis specific to their field of activity (C)	PO2
Design solutions for well-defined technical problems and assist with 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)	PO3
Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements (P)	PO4
Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (P)	PO5
Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (A)	PO6
Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (A)	PO7
Understand and commit to professional ethics and responsibilities and norms of technician practice (A)	PO8
Function effectively as an individual, and as a member in diverse technical teams (A)	PO9
Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions (A)	PO10
Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage engineering project (A)	PO11
Recognise the need for and have the ability to engage in independent updating in the context of specialised technical knowledge (A)	PO12

MAPPING OF PROGRAM OUTCOMES (PO) AND MQF OUTCOME DOMAINS (PLO)

MQF VERSION 1 (8 DOMAINS)

Table 7 PO & PLO Mapping with 8 Domains

12 PROGRAMME OUTCOME (ETAC 2019)		8 MQF LEARNING OUTCOME DOMAINS							
		Knowledge (C)	Practical skills (P)	Social Skills & Responsibility (A)	Values, Attitude & Professionalism (A)	Communication, Leadership & Teamwork Skills (A)	Problem Solving & Practical Skills (C)	Information Management & Lifelong Learning Skills	Managerial & Entrepreneurial Skills (A)
		PL01	PL02	PL03	PL04	PL05	PL06	PL07	PL08
Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation to wide practical procedures and practices (C)	PO1	√							
Identify and analyse well-defined engineering problems reaching substantiated conclusions using related methods of analysis specific to their field of activity (C)	PO2						√		
Design solutions for well-defined technical problems and assist with 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)	PO3						√		
Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements (P)	PO4		√						
Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (P)	PO5		√						
Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (A)	PO6			√					
Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (A)	PO7			√					
Understand and commit to professional ethics and responsibilities and norms of technician practice (A)	PO8				√				
Function effectively as an individual, and as a member in diverse technical teams (A)	PO9					√			

12 PROGRAMME OUTCOME (ETAC 2019)		8 MQF LEARNING OUTCOME DOMAINS							
		Knowledge (C)	Practical skills (P)	Social Skills & Responsibility (A)	Values, Attitude & Professionalism (A)	Communication, Leadership & Teamwork Skills (A)	Problem Solving & Practical Skills (C)	Information Management & Lifelong Learning Skills	Managerial & Entrepreneurial Skills (A)
		PL01	PL02	PL03	PL04	PL05	PL06	PL07	PL08
Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions (A)	PO10					√			
Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage engineering project (A)	PO11								√
Recognise the need for and have the ability to engage in independent updating in the context of specialised technical knowledge (A)	PO12							√	

MQF VERSION 2 (11 DOMAINS)

Table 8 PO & PLO Mapping with 11 domains

12 PROGRAMME OUTCOME (ETAC 2019)		11 MQF LEARNING OUTCOME DOMAINS										
		Knowledge & Understanding (C)	Cognitive Skills (C)	Practical Skills (P)	Interpersonal Skills (A)	Communication (A)	Digital Skills (P)	Numeracy Skills (C)	Leadership, Autonomy & Responsibility (A)	Personal Skills (A)	Entrepreneurial Skills (A)	Ethics & Professionalism (A)
		PL01	PL02	PL03	PL04	PL05	PL06	PL07	PL08	PL09	PL010	PL011
Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation to wide practical procedures and practices (C)	PO1	√						√				
Identify and analyse well-defined engineering problems reaching substantiated conclusions using related methods of analysis specific to their field of activity (C)	PO2		√					√				
Design solutions for well-defined technical problems and assist with 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)	PO3		√									
Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements (P)	PO4			√								
Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (P)	PO5			√	√							
Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (A)	PO6								√			
Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (A)	PO7									√		
Understand and commit to professional ethics and responsibilities and norms of technician practice (A)	PO8				√					√		√

12 PROGRAMME OUTCOME (ETAC 2019)		11 MQF LEARNING OUTCOME DOMAINS										
		Knowledge & Understanding (C)	Cognitive Skills (C)	Practical Skills (P)	Interpersonal Skills (A)	Communication (A)	Digital Skills (P)	Numeracy Skills (C)	Leadership, Autonomy & Responsibility (A)	Personal Skills (A)	Entrepreneurial Skills (A)	Ethics & Professionalism (A)
		PL01	PL02	PL03	PL04	PL05	PL06	PL07	PL08	PL09	PL010	PL011
Function effectively as an individual, and as a member in diverse technical teams (A)	P09				√				√	√		
Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions (A)	P010				√	√				√		
Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage engineering project (A)	P011										√	
Recognise the need for and have the ability to engage in independent updating in the context of specialised technical knowledge (A)	P012									√		

MAPPING OF PEO, PO, PLO MQF AND LO MOHE

MQF VERSION 1 (8 DOMAINS)

PEO (After 3 years graduation)	PO (Upon Graduation)	MQF (8 Domains) Learning Outcome	MOHE (9 Domains) Learning Outcome
PEO1 Graduates who apply scientific knowledge and technical skills in mechanical engineering related industry.	PO1 Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation to wide practical procedures and practices (Cognitive).	PLO1 Knowledge (Cognitive)	LO1 Knowledge (Cognitive)
	PO2 Identify and analyse well-defined engineering problems reaching substantiated conclusions using related methods of analysis specific to their field of activity (Cognitive).	PLO6 Problem solving and practical skills (Cognitive)	LO3 Critical & Scientific skill (Cognitive) →SS1
	PO3 Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (Cognitive).	PLO6 Problem solving and practical skills (Cognitive)	LO3 Critical & Scientific skill (Cognitive) →SS1
	PO4 Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements (Psychomotor).	PLO2 Practical skills (Psychomotor)	LO2 Practical skills (Psychomotor)
	PO5 Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (Psychomotor).	PLO2 Practical skills (Psychomotor)	LO2 Practical skills (Psychomotor)
PEO2 Graduates who has the ability to lead, communicate and work in a team with professional and sustainable practices.	PO6 Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (Affective).	PLO3 Social skills and responsibility (Affective)	LO5 Social, Teamwork (Affective) → SS3
	PO7 Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (Affective).	PLO3 Social skills and responsibility (Affective)	LO5 Social, Teamwork (Affective) → SS3

PEO (After 3 years graduation)	PO (Upon Graduation)	MQF (8 Domains) Learning Outcome	MOHE (9 Domains) Learning Outcome
	PO8 Understand and commit to professional ethics and responsibilities and norms of technician practice (Affective).	PLO4 Values, attitude and professionalism (Affective)	LO6 Value, ethic & moral (Affective) → SS5
	PO9 Function effectively as an individual, and as a member in diverse technical teams (Affective).	PLO5 and Communication, leadership teamwork skills (Affective)	LO9 SS7 Leadership (Affective) →
	PO10 Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions (Affective).	PLO5 and Communication, leadership teamwork skills (Affective)	LO4 → Communication (Affective) SS2
PEO3 Graduates who demonstrate effective information management, entrepreneurial skills and engage in life-long learning.	PO11 Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage engineering project (Affective).	PLO8 Managerial and entrepreneurial skills (Affective)	LO8 Entrepreneurial skills (Affective) → SS6
	PO12 Recognise the need for and have the ability to engage in independent updating in the context of specialised technical knowledge (Affective).	PLO7 Information management and lifelong learning skills (Affective)	LO7 and Information management lifelong learning skills (Affective) → SS5

MQF VERSION 2 (11 DOMAINS)

PEO (After 3 years graduation)	PO (Upon Graduation)	MQF (11 Domains) Learning Outcome	MOHE (9 Domains) Learning Outcome
PEO1 Graduates who apply scientific knowledge and technical skills in mechanical engineering related industry.	PO1 Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation to wide practical procedures and practices (Cognitive).	PLO1 Knowledge and understanding (Cognitive) PLO7 Numeracy skills (Cognitive)	LO1 Knowledge (Cognitive)
	PO2 Identify and analyse well-defined engineering problems reaching substantiated conclusions using related methods of analysis specific to their field of activity (Cognitive).	PLO2 Cognitive skills (Cognitive) PLO7 Numeracy skills (Cognitive)	LO3 Critical & Scientific skill (Cognitive) →SS1
	PO3 Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (Cognitive).	PLO2 Cognitive skills (Cognitive)	LO3 Critical & Scientific skill (Cognitive) →SS1
	PO4 Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements (Psychomotor).	PLO3 Practical skills (Psychomotor)	LO2 Practical skills (Psychomotor)
	PO5 Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (Psychomotor).	PLO3 Practical skills (Psychomotor) PLO6 Digital skills (Psychomotor)	LO2 Practical skills (Psychomotor)
PEO2 Graduates who has the ability to lead, communicate and work in a team with professional and sustainable practices.	PO6 Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (Affective).	PLO8 Leadership, autonomy and responsibility (Affective)	LO5 Social, Teamwork (Affective) → SS3
	PO7 Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (Affective).	PLO9 Personal skills (Affective)	LO5 Social, Teamwork (Affective) → SS3

PEO (After 3 years graduation)	PO (Upon Graduation)	MQF (11 Domains) Learning Outcome	MOHE (9 Domains) Learning Outcome
	PO8 Understand and commit to professional ethics and responsibilities and norms of technician practice (Affective).	PLO4 Interpersonal skills (Affective) PLO9 Personal skills (Affective) PLO11 Ethics and professionalism (Affective)	LO6 Value, ethic & moral (Affective) → SS5
	PO9 Function effectively as an individual, and as a member in diverse technical teams (Affective).	PLO4 Interpersonal skills (Affective) PLO8 Leadership, autonomy and responsibility (Affective) PLO9 Personal skills (Affective)	LO9 Leadership (Affective) → SS7
	PO10 Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions (Affective).	PLO4 Interpersonal skills (Affective) PLO5 Communication (Affective) PLO9 Personal skills (Affective)	LO4 → Communication (Affective) SS2
PEO3 Graduates who demonstrate effective information management, entrepreneurial skills and engage in life-long learning.	PO11 Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage engineering project (Affective).	PLO10 Entrepreneurial skills (Affective)	LO8 Entrepreneurial skills (Affective) → SS6
	PO12 Recognise the need for and have the ability to engage in independent updating in the context of specialised technical knowledge (Affective).	PLO9 Personal skills (Affective)	LO7 and Information management lifelong learning skills (Affective) → SS5

MAPPING OF COURSES TO MQF LEARNING OUTCOMES (LO)

MQF VERSION 1 (8 DOMAINS)

SEM	COURSE CODE	COURSE NAME	Knowledge (C)	Practical skills (P)	Social skills and responsibility (A)	Values, attitude and professionalism (A)	Communication, leadership and teamwork skills (A)	Problem solving and practical skills (C)	Information management and lifelong learning skills (A)	Managerial and entrepreneurial skills (A)
			LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8
1	CTU101	Fundamentals of Islam			√	√	√			
	XYZ111	Co-curriculum I			√	√				
	ELC121	Integrated Language Skills I					√			
	UED101	Mathematical Thinking for Novices					√	√		
	MAT183	Calculus 1	√					√	√	
	PHY130	Fundamentals Physics I	√				√	√		
	MEC101	Introduction to Engineering	√	√		√	√			
	MECXXX	Engineering Drawing	√	√						
2	CTU151	Islamic Thought and Civilization			√	√	√			
	XYZ121	Co-curriculum II			√		√			
	ELC151	Integrated Language Skills II					√			
	CSC128	Fundamentals of Computer Problem Solving	√					√		
	MAT235	Calculus II for Engineers	√					√		
	MEC111	Statics	√					√		
	MEC281	Material Science	√					√		
					√	√	√			
					√	√				
3	CTU211	Science and Technology in Islam					√			

	XYZ131	Co-curriculum III	√					√		
	ELC231	Integrated Language Skills III	√					√		
	MEC211	Strength of Materials	√					1		
	MEC221	Dynamics		√			√			
	MEC241	Fluid Mechanics	√	√	√		√			
	MEC291	Mechanics and Materials Lab	√	√						
	MEM160	Workshop Practice	√					√		
4	ELEXXX	Basic Electrical Engineering		√			√			
	MEC251	Thermodynamics	√	√			√	√		
	MEC294	Thermofluids Lab		√			√	√	√	√
	MEM360	Manufacturing Processes and Technology	√	√			√			
	MECXXX	Final Year Project I					√		√	√
	MEX3XX	ELECTIVE 1		√			√	√		√
5	ENT300	Fundamentals of Entrepreneurship	√					√		
	MECXXX	Final Year Project II	√	√	√		√			
	MEC331	Machine Element Design		√			√	√	√	
	MEX3XX	ELECTIVE 2		√	√	√	√			
	MEX3XX	ELECTIVE 3			√	√	√			
6	MEC390	Industrial Training			√	√				
List of Elective (Mechanical)										
MEX3XX	MEC322	Control System and Instrumentations		√			√	√		√
MEX3XX	MEM376	Plant Engineering		√	√	√	√			
MEX3XX	MEM341	Fluid Power Technology			√	√	√			
List of Elective (Manufacturing)										
MEX3XX	MEM365	Automation		√			√	√		√
MEX3XX	MEM368	Machining Technology		√	√	√	√			
MEX3XX	MEM371	Metrology			√	√	√			
List of Elective (Automotive)										
MEX3XX	MEV351	Automotive Engine Technology		√			√	√		√
MEX3XX	MEV300	Automotive Service Workshop		√	√	√	√			
MEX3XX	MEV321	Motor Vehicle Technology			√	√	√			
List of Elective (Aerospace)										
MEX3XX	MEA301	Introduction to Aerospace Engineering		√			√	√		√
MEX3XX	MEA351	Propulsion		√	√	√	√			
MEX3XX	MEA321	Aerodynamics			√	√	√			

MQF VERSION 2 (11 DOMAINS)

SEM	COURSE CODE	COURSE NAME	Knowledge & understanding (C)	Cognitive skills (C)	Practical skills (P)	Interpersonal skills (A)	Communications (A)	Digital skills (P)	Numeracy skills (C)	Leadership, autonomy and responsibility (A)	Personal skills (A)	Entrepreneurial Skills (A)	Ethics and professionalism (A)
			LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11
1	CTU101	Fundamentals of Islam				√	√			√	√		√
	XYZ111	Co-curriculum I				√				√	√		√
	ELC121	Integrated Language Skills I				√	√				√		
	UED101	Mathematical Thinking for Novices		√		√	√		√		√		
	MAT183	Calculus 1	√	√					√		√		
	PHY130	Fundamentals Physics I	√	√		√	√		√		√		
	MEC101	Introduction to Engineering	√		√	√	√	√	√	√	√		√
	MECXXX	Engineering Drawing	√		√			√	√				
2	CTU151	Islamic Thought and Civilization				√	√			√	√		√
	XYZ121	Co-curriculum II				√				√	√		
	ELC151	Integrated Language Skills II				√	√				√		
	CSC128	Fundamentals of Computer Problem Solving	√	√					√				
	MAT235	Calculus II for Engineers	√	√					√				
	MEC111	Statics	√	√					√				
	MEC281	Material Science	√	√					√				
3	CTU211	Science and Technology in Islam				√	√			√	√		√
	XYZ131	Co-curriculum III				√				√	√		√
	ELC231	Integrated Language Skills III				√	√				√		
	MEC211	Strength of Materials	√	√					√				
	MEC221	Dynamics	√	√					√				
	MEC241	Fluid Mechanics	√	√					√				
	MEC291	Mechanics and Materials Lab			√	√				√	√		

	MEM160	Workshop Practice	√		√	√			√	√	√		
4	ELEXXX	Basic Electrical Engineering	√		√			√	√				
	MEC251	Thermodynamics	√	√					√				
	MEC294	Thermofluids Lab			√	√				√	√		
	MEM360	Manufacturing Processes and Technology	√	√	√	√	√		√		√		
	MECXXX	Final Year Project I		√	√	√	√	√			√	√	
	MEX3XX	ELECTIVE 1	√		√	√	√	√	√		√		
5	ENT300	Fundamentals of Entrepreneurship				√	√				√	√	
	MECXXX	Final Year Project II		√	√	√	√	√			√	√	
	MEC331	Machine Element Design	√	√					√				
	MEX3XX	ELECTIVE 2	√		√	√	√	√	√		√		
	MEX3XX	ELECTIVE 3		√	√	√	√	√			√		
6	MEC390	Industrial Training			√	√	√	√		√	√		√
List of Elective (Mechanical)													
MEX3XX	MEC322	Control System and Instrumentations	√		√	√	√	√	√		√		
MEX3XX	MEM376	Plant Engineering	√		√	√	√	√	√		√		
MEX3XX	MEM341	Fluid Power Technology		√	√	√	√	√			√		
List of Elective (Manufacturing)													
MEX3XX	MEM365	Automation	√		√	√	√	√	√		√		
MEX3XX	MEM368	Machining Technology	√		√	√	√	√	√		√		
MEX3XX	MEM371	Metrology		√	√	√	√	√			√		
List of Elective (Automotive)													
MEX3XX	MEV351	Automotive Engine Technology	√		√	√	√	√	√		√		
MEX3XX	MEV300	Automotive Service Workshop	√		√	√	√	√	√		√		
MEX3XX	MEV321	Motor Vehicle Technology		√	√	√	√	√			√		
List of Elective (Aerospace)													
MEX3XX	MEA301	Introduction to Aerospace Engineering	√		√	√	√	√	√		√		
MEX3XX	MEA351	Propulsion	√		√	√	√	√	√		√		
MEX3XX	MEA321	Aerodynamics		√	√	√	√	√			√		

MAPPING OF COURSES TO PROGRAM LEARNING OUTCOMES (PO)

SEM	COURSE CODE	COURSE NAME	Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialization to wide practical procedures and practices	Identify and analyse well-defined engineering problems reaching substantiated conclusions using related methods of analysis specific to their field of activity	Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental	Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements	Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations	Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to	Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts	Understand and commit to professional ethics and responsibilities and norms of technician practice	Function effectively as an individual, and as a member in diverse technical teams	Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear	Demonstrate knowledge and understanding of engineering management principles and apply these to one' s own work, as a member or leader in a technical team and to manage engineering project	Recognise the need for and have the ability to engage in independent updating in the context of specialised technical knowledge
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	CTU101	Fundamentals of Islam						√	√	√		√		
	XYZ111	Co-curriculum I						√	√	√				
	ELC121	Integrated Language Skills I										√		
	UED101	Mathematical Thinking for Novices		√	√							√		
	MAT183	Calculus 1	√	√	√									√
	PHY130	Fundamentals Physics I	√	√	√							√		
	MEC101	Introduction to Engineering	√				√			√	√	√		
	MECXXX	Engineering Drawing	√			√	√							
2	CTU151	Islamic Thought and Civilization						√	√	√		√		
	XYZ121	Co-curriculum II						√	√		√			

	ELC151	Integrated Language Skills II										√		
	CSC128	Fundamentals of Computer Problem Solving	√	√	√									
	MAT235	Calculus II for Engineers	√	√	√									
	MEC111	Statics	√	√										
	MEC281	Material Science	√	√										
3	CTU211	Science and Technology in Islam						√	√	√		√		
	XYZ131	Co-curriculum III						√	√	√				
	ELC231	Integrated Language Skills III										√		
	MEC211	Strength of Materials	√	√										
	MEC221	Dynamics	√	√										
	MEC241	Fluid Mechanics	√	√										
	MEC291	Mechanics and Materials Lab				√					√			
	MEM160	Workshop Practice	√			√		√	√		√			
4	ELEXXX	Basic Electrical Engineering	√			√	√							
	MEC251	Thermodynamics	√	√										
	MEC294	Thermofluids Lab				√					√			
	MEM360	Manufacturing Processes and Technology	√	√		√						√		
	MECXXX	Final Year Project I			√		√					√	√	√
	MEX3XX	ELECTIVE 1	√				√					√		
5	ENT300	Fundamentals of Entrepreneurship										√	√	√
	MECXXX	Final Year Project II			√		√					√	√	
	MEC331	Machine Element Design	√		√									
	MEX3XX	ELECTIVE 2	√				√		√			√		
	MEX3XX	ELECTIVE 3			√		√					√		√
6	MEC390	Industrial Training					√	√		√		√		
List of Elective (Mechanical)														
MEX3XX	MEC322	Control System and Instrumentations	√				√					√		
MEX3XX	MEM376	Plant Engineering	√				√		√			√		
MEX3XX	MEM341	Fluid Power Technology			√		√					√		√

List of Elective (Manufacturing)														
MEX3XX	MEM365	Automation	√				√					√		
MEX3XX	MEM368	Machining Technology	√				√		√			√		
MEX3XX	MEM371	Metrology			√		√					√		√
List of Elective (Automotive)														
MEX3XX	MEV351	Automotive Engine Technology	√				√					√		
MEX3XX	MEV300	Automotive Service Workshop	√				√		√			√		
MEX3XX	MEV321	Motor Vehicle Technology			√		√					√		√
List of Elective (Aerospace)														
MEX3XX	MEA301	Introduction to Aerospace Engineering	√				√					√		
MEX3XX	MEA351	Propulsion	√				√		√			√		
MEX3XX	MEA321	Aerodynamics			√		√					√		√

RULES AND REGULATIONS

GENERAL RULES

- Students should always refer to the Academic and Student handbook regarding academic matters and while in the university. The latest Academic Handbook can be access from the link below: https://hea.uitm.edu.my/v1/index.php?option=com_content&view=article&id=84:academic-regulations&catid=58:academic-regulations

- Students should always aware of the updated information and announcements posted on the notice boards in the faculty and also at istudent portal.

ATTIRE AND DISCIPLINE

- Proper and formal attire must be worn during lectures and other programs conducted by the faculty and university.

- Male students must wear neck-tie on every Monday during lectures.

- No round-neck T-shirt, sandals, or slippers being worn while attending lectures and other official activities.

- Remember the University's compound is a Non Smoking Zone.

- Students should oblige to the rules and regulations to avoid any disciplinary action taken by the University/faculty.

EXAMINATION RULES

- Sitting for the final examination papers is compulsory to all students.
- Students must check the examination schedule regarding the date, time and venue.
- Students must ensure that the examination statements (slip penyata peperiksaan) are correct as per registered courses.
- Students must bring together the examination statement and identification card when sitting for the examinations.
- Students must adhere to the University's rules and regulations for the final examination before entering the exam hall.

INDUSTRIAL TRAINING

- Industrial training is compulsory to all EM110 students as part of their requirement for graduation.
- Students go for industrial training for the whole semester during Semester 6 or above.
- Students must be in good health and fit enough before they can perform industrial internship.

SAFETY ISSUES

- Students are advised to be aware of all safety rules and regulations of the University/faculty to avoid unnecessary accidents.
- The University/faculty is not responsible for any accident occurred due to violation of the rules and regulations.

STUDENT ACTIVITIES

- Students are strictly prohibited from indulging in activities that violates the University Act.
- Please refer to the respective Head of Program (*Ketua Program*) before involving in any activities outside the university programs.

PLAGIARISM

The Faculty of Mechanical Engineering upholds its professionalism and academic integrity by all mean and is against all acts and forms of plagiarism by the students. Students must comply to proper citation and copyright at all time in their academic work. Students must aware that stealing someone else's work is wrong and is deemed as intellectual dishonesty which carries stern disciplinary penalties. These are some examples amounted to plagiarism but not limited to:

- Copying an article or a paper from the website or an online data base, or from books or journals without a proper citation.
- Conducting cut and paste to create a paper from several sources without proper acknowledgement.
- Quoting copied words whether in a full or part sentence. A student who quotes a sentence or two and then continues copying from the same source without citing it.
- Faking a citation. Giving a citation when one does not actually quote from it.

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

1. BIBLIOGRAPHIES AND FOOTNOTES

All 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.

2. QUOTATIONS

Any sentence or phrase, however small, which is not your original work must be properly acknowledged. It must be placed in quotation marks or clearly indented beyond the regular margin.

3. PARAPHRASING

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

4. FACTS, FORMULAS AND IDEAS

Any facts, formulas, ideas and other kinds of information which are borrowed should be specifically acknowledged in a footnote or in 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 member.

5. HOMEWORK, LABORATORY WORK, PROBLEM SETS AND COMPUTER PROGRAMS

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 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 in the submitted work'.

6. 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 a 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 clearly indicate that at the beginning of the report.

7. ORAL REPORTS

In such cases where written notes for oral reports is to be submitted, students must clearly acknowledge any work that is not of their own in accordance with the requirements stated earlier.

8. STANDARD FORMS OF REFERENCE

Students should refer to sample sheets provided by the faculty for standard format for acknowledgement of sources of references. In general, a precise indication of the source of reference must include the author, title, place and date of publication, and page number.

Definitions of Academic Violations under the Jurisdiction of the Faculty of Mechanical Engineering on Discipline.

With regard to written assignments such as essays, laboratory reports or any other written work submitted officially to fulfill the academic requirements, the following acts are considered as academic infractions:

UNAUTHORIZED MULTIPLE SUBMISSION

Failure to obtain a prior written permission from relevant instructors for the submission of any work that has been submitted before in identical or similar form in fulfillment of any academic requirement at any institution.

FALSE CITATION

Citation of a source from which the material is in question is not truly obtained.

FALSE DATA

Use and submission of false data or information.

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