UNIVERSITI TEKNOLOGI MARA | Cawangan Pulau Pinang

Globally Renowned
Locally Rooted

STUDENT HANDBOOK

Bachelor of **Electrical and Electronic Engineering** with Honours (EE212)

2026

Empowering Future Engineers.
Shaping a Sustainable Tomorrow.



ELECTRICAL ENGINEERING STUDIES
Universiti Teknologi MARA
Cawangan Pulau Pinang

Knowledge | Integrity | Professionalism | Excellence

UiTM di hatiku | Usaha TAQWA Mulia

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STUDENT HANDBOOK EE212

BACKGROUND OF THE FACULTY

Universiti Teknologi MARA is an institution of higher learning that offers professional programmes which integrate science, industry and technology. During its early establishment in 1968, Faculty of Electrical Engineering was one of the departments in the School of Engineering. The department started off with offering Advanced Diploma in Electrical Engineering and followed by the Diploma in 1976.

In August 1996, Department of Electrical Engineering was upgraded to the Faculty of Electrical Engineering and the advanced diploma programme was renamed as the Bachelor of Engineering with Honours (Electrical). When the University obtained its university status in October 1996 (the university was formally known as Institut Teknologi MARA), the faculty started to offer the post graduate programmes namely Master of Science in Electrical Engineering by research and Doctor of Philosophy in Electrical Engineering.

VISION OF UiTM

A premier university driving Professional Bumiputera.

MISION OF UiTM

To elevate the knowledge, 'adab' (ethics and virtues), and expertise of Bumiputera in fostering an entrepreneurial spirit through advanced curricula, talent development, impactful research, and industry synergy, contributing to the nation's prosperity and global well-being.

FUNCTIONS OF THE FACULTY

The main functions of the faculty in upholding the government policy towards establishing Universiti Teknologi MARA as a premier university are as follow:

a) Teaching and Learning – to produce professional workforce in the area of electrical engineering.
b) Research and Consultancy – to foster a strong relationship with the industry in order to enhance the knowledge and expertise in the current technology through research and consultancy.
c) Publication – to transfer and contribute to the pool of knowledge through the publications.
d) Community Services – to serve the community, aligned with the social obligation of the university towards the nation.

DEPARTMENTS IN THE FACULTY

There are five departments in the faculty:

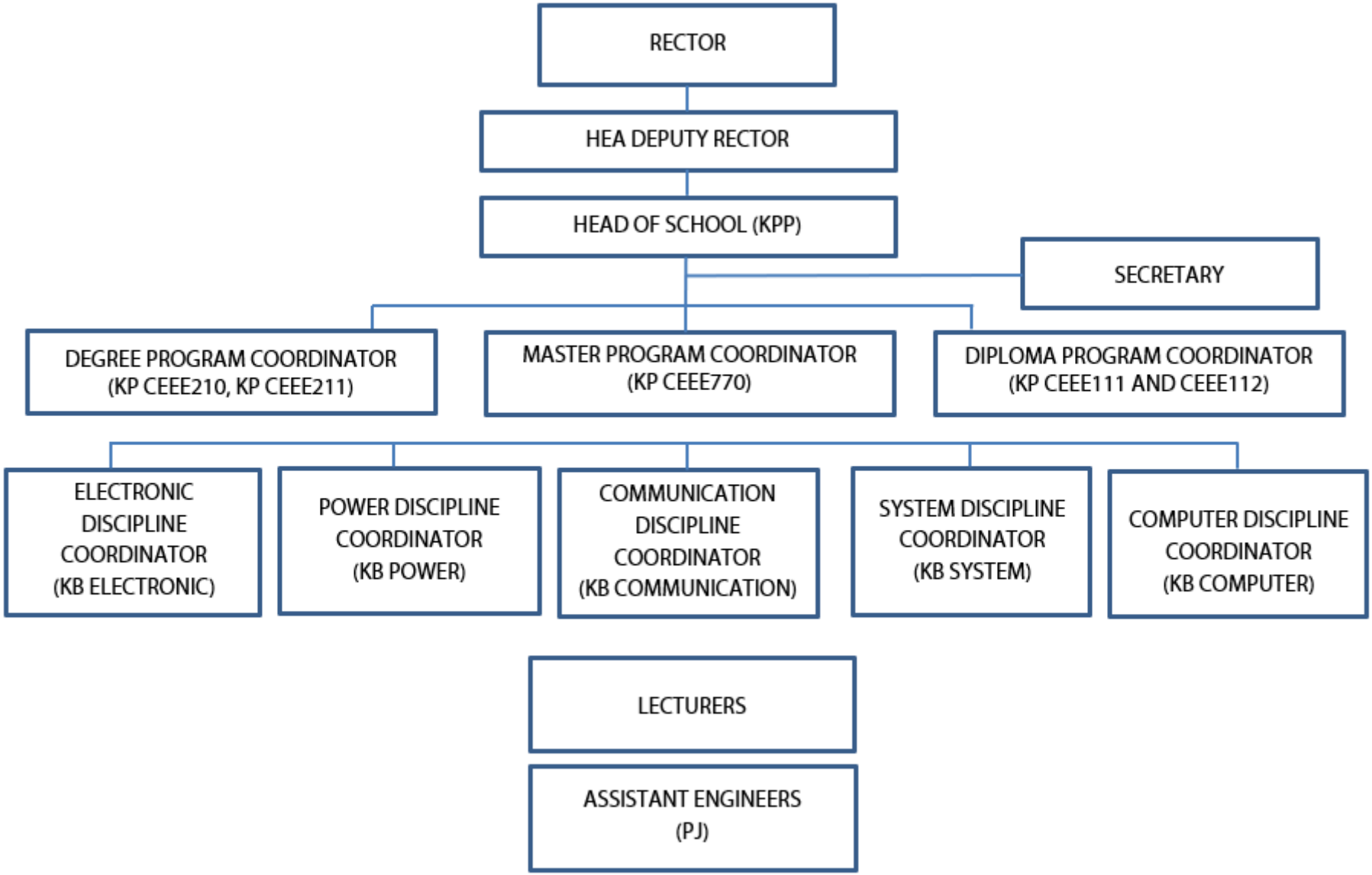
a) Electronic Engineering
b) Power Engineering
c) Systems Engineering
d) Communications Engineering
e) Computer Engineering

PROGRAMMES OFFERED

The faculty offered the following programmes:

a) Doctor of Philosophy in Electrical Engineering (Phd) (EE950-By Research)
b) Master of Electrical Engineering (EE750-By Research)
c) Master of Science Management Electrical and Electronics Engineering (EE771-By Coursework)
d) Bachelor of Electronic Engineering Technology (Industrial Electronics) with Honours (EE211)
e) Bachelor of Electrical and Electronic Engineering with Honours (EE212)
f) Diploma in Electrical Engineering (Electronics) (EE111)
g) Diploma in Electrical Engineering (Power) (EE112)

ORGANIZATION STRUCTURE
FACULTY OF ELECTRICAL ENGINEERING



BACHELOR OF ELECTRICAL AND ELECTRONIC ENGINEERING WITH HONOURS (EE212)

Programme Educational Outcomes (PEO)

PEO1	Demonstrate a broad level of knowledge, competency and practical skills, including digital and numeracy skills in electrical and electronics engineering practices and related fields
PEO2	Demonstrate good communication and interpersonal skills, including digital literacy, with consideration of sustainability in engineering practices, towards becoming a leader.
PEO3	Demonstrate personal skills that emphasis flexibility and adaptability as well as lifelong learning and entrepreneurial mindset with ethics alongside professionalism for successful societal and career development

Programme Outcomes (PO)

PO1	**Engineering Knowledge** - Apply knowledge of mathematics, natural science, computing and engineering fundamentals, and an engineering specialisation as specified in WK1 to WK4, respectively, to analyse and develop solutions to complex electrical/electronic engineering problems.
PO2	**Problem Analysis** - Identify, assess, research literature, and analyse and formulate complex electrical/electronic engineering problems in reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences with holistic considerations for sustainable development (WK1 to WK4).
PO3	**Design/Development of Solutions** - Design creative solutions for solving complex electrical/electronic engineering problems and design systems, components or processes to meet identified needs with appropriate consideration for public health and safety, whole-life cost, net zero carbon as well as resource, cultural, societal, and environmental considerations as required (WK5).
PO4	**Investigation** - Conduct investigations of complex electrical/electronic engineering problems using research methods, including research-based knowledge, design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions (WK8).
PO5	**Tool Usage** - Create, select and apply/perform while recognising limitations of appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex electrical/electronic engineering problems (WK2 and WK6).
PO6	**The Engineer and the World** - Analyse and evaluate solutions for complex engineering problems while accommodating the needs of sustainable development to society, the economy, sustainability, health and safety, legal frameworks, and the environment (WK1, WK5, and WK7).
PO7	**Ethics** - Apply and evaluate ethical principles, commit to professional ethics and norms of engineering practices and adhere to relevant national and international laws while adopting diversity and inclusion (WK9).
PO8	**Individual and Collaborative Team Work**- Function effectively as individuals, and as members or leaders in diverse and inclusive teams and in multi-disciplinary, face-to-face, remote and distributed settings (WK9). Function effectively as individuals, and as members or leaders in diverse and inclusive teams and in multi-disciplinary, face-to-face, remote and distributed settings.
PO9	**Communication** - Assume responsibility to communicate effectively and inclusively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, taking into account cultural, language, and learning differences.

PO10 **Project Management and Finance** - Apply and analyse knowledge of engineering management principles and economic decision-making and analyse relevant situations while showing commitment (A3) as a member and leader in a team and managing projects in one's own work and in multidisciplinary environments.

PO11 **Life Long Learning**- Recognise and elucidate the need for, and have the preparation and ability for i) independent and life-long learning, ii) adaptability and flexibility to new and emerging technologies, and iii) appraise critical thinking in the broadest context of technological change (WK8).

CURRICULUM DETAILS

BACHELOR OF ELECTRICAL AND ELECTRONIC ENGINEERING WITH HONOURS
ELECTRICAL ENGINEERING STUDIES,
UNIVERSITI TEKNOLOGI MARA, PULAU PINANG

SEM	NO	COURSE	CODE	PRE REQUISITE	CREDIT UNIT	LEC	TUT	PRAC	CONTACT HOUR
SEM 1	1	CO-CURRICULUM 1	HBU111	NONE	1	2	0	0	2
	2	CALCULUS FOR ENGINEERS	MAT435	NONE	3	3	1	0	4
	3	CIRCUIT THEORY	EEE411	NONE	3	3	1	0	4
	4	SIGNALS AND SYSTEMS	ESE411	NONE	3	3	1	0	4
	5	BASIC COMMUNICATION ENGINEERING	ECM413	NONE	3	3	1	0	4
	6	COMPUTER PROGRAMMING	ECE411	NONE	3	2	0	2	4
TOTAL					**16**	**16**	**4**	**2**	**22**
SEM 2	1	CO-CURRICULUM 2	HBU121	NONE	1	2	0	0	2
	2	FALSAFAH DAN ISU SEMASA	CTU552	NONE	2	2	0	0	2
	3	BASIC POWER ENGINEERING	EPO414	NONE	3	3	1	0	4
	4	BASIC INSTRUMENTATION AND CONTROL	ESE414	NONE	3	3	1	0	4
	5	ELECTRONICS	ELE414	NONE	3	3	1	0	4
	6	DIGITAL SYSTEMS 1	ECE414	NONE	3	3	1	0	4
	7	ELECTRICAL ENGINEERING LABORATORY 1	EEE415	NONE	1	0	0	3	3
TOTAL					**16**	**16**	**4**	**3**	**23**

SEM 3	1	CO-CURRICULUM 3	HBU131	NONE	1	2	0	0	2
	2	PENGHAYATAN ETIKA DAN PERADABAN II	CTU554	NONE	2	2	0	0	2
	3	ENGLISH FOR ORAL PRESENTATIONS	LLC400	NONE	2	2	0	0	2
	4	FURTHER CALCULUS FOR ENGINEERS	MAT455	MAT435	3	3	1	0	4
	5	ELECTRICAL POWER UTILISATION	EPO555	NONE	3	3	1	0	4
	6	MATERIAL AND SEMICONDUCTOR DEVICES	ELE511	NONE	3	3	1	0	4
	7	ELECTRONIC DRIVES AND APPLICATIONS	EPO556	NONE	3	3	1	0	4
TOTAL					**17**	**18**	**4**	**0**	**22**
SEM 4	1	ENGLISH FOR REPORT WRITING	LLC402	NONE	2	2	0	0	2
	2	INTRODUCTION TO NUMERICAL ANALYSIS	MAT575	NONE	3	3	1	0	4
	3	ELECTROMAGNETIC THEORY	ECM515	MAT455	3	3	1	0	4
	4	MICROPROCESSOR SYSTEMS	ECE515	ECE414	3	2	0	2	4
	5	POWER ELECTRONICS	EPO514	EEE411	3	3	1	0	4
	6	ELECTRONIC CIRCUIT ANALYSIS AND DESIGN	ELE557	ELE414	3	3	1	0	4
	7	ELECTRICAL ENGINEERING LABORATORY 2	EEE515	EEE415	1	0	0	3	3
TOTAL					**18**	**16**	**4**	**5**	**25**
SEM 5	1	STATISTICS FOR SCIENCES AND ENGINEERING	STA408	NONE	3	3	1	0	4
	2	ELECTRICAL MACHINES AND DRIVES	EPO554	EPO414	3	3	1	0	4
	3	CONTROL SYSTEMS	ESE551	ESE414	3	3	1	0	4
	4	DIGITAL DESIGN AND COMPUTER ARCHITECTURE	ELE558	ECE414	3	3	1	0	4
	5	COMMUNICATION SYSTEMS ENGINEERING	ECM551	ECM413	3	3	1	0	4
	6	ELECTRICAL ENGINEERING LABORATORY 3	EEE525	EEE515	1	0	0	3	3
TOTAL					**16**	**15**	**5**	**3**	**23**

SEM 6	1	THIRD LANGUAGE (LEVEL 1)	TAC401	NONE	2	2	0	0	2
	2	DIGITAL SIGNAL PROCESSING	ESE553	ESE411	3	3	1	0	4
	3	POWER SYSTEM ANALYSIS	EPO552	EPO414	3	3	1	0	4
	4	ELECTIVE 1			3	3	0	1	4
	5	ELECTIVE MULTIDISCIPLINE			3	3	1	0	4
	6	ELECTRICAL ENGINEERING LABORATORY 4	EEE535	EEE525	1	0	0	3	3
TOTAL					**15**	**14**	**3**	**4**	**21**
SEM 7	1	THIRD LANGUAGE (LEVEL 2)	TAC451	TAC401	2	2	0	0	2
	2	INTEGRATED SYSTEM DESIGN	EEE611	Tiada	3	1	0	4	5
	3	HIGH VOLTAGE ENGINEERING	EPO616	Tiada	3	3	1	0	4
	4	ELECTIVE 2			3	3	0	1	4
	5	ELECTIVE 3			3	3	1	0	4
	6	FINAL YEAR PROJECT 1	EEE600	NONE	2	0	0	4	4
	7	INDUSTRIAL TRAINING	EEE655	NONE	4	0	0	0	0
TOTAL					**20**	**12**	**2**	**9**	**23**
SEM 8	1	TECHNOLOGY ENTREPRENEURSHIP	ENT600	NONE	3	3	1	0	4
	2	THIRD LANGUAGE (LEVEL 3)	TAC501	TAC451	2	2	0	0	2
	3	ELECTRICAL ENGINEER IN SOCIETY	EEE653	NONE	3	3	1	0	4
	4	SELECTED INDUSTRIAL TOPICS	EEE652	NONE	2	2	0	0	2
	5	ELECTIVE 4			3	3	0	1	4
	6	FINAL YEAR PROJECT 2	EEE650	EEE600	4	0	0	8	8
TOTAL					**17**	**13**	**2**	**9**	**24**
GRAND TOTAL					**135**	**120**	**28**	**35**	**183**

LIST OF ELECTIVE COURSES ACCORDING TO AREAS OF SPECIALISATION

ELECTIVE MULTIDISCIPLINE

SEM	FIELD	COURSE	CODE	PRE REQUISITE	CREDIT UNIT	LEC	TUT	PRAC	CONTACT HOUR
SEM 6	HOTEL & TOURISM	ORGANISATIONAL BEHAVIOUR FOR THE HOSPITALITY AND FOOD SERVICE INDUSTRY	HTC630	NONE	3	3	0	0	3
	HOTEL & TOURISM	HOSPITALITY HUMAN RESOURCE MANAGEMENT	HTH666	NONE	3	3	0	0	3
	HOTEL & TOURISM	INFORMATION TECHNOLOGY MANAGEMENT FOR HOSPITALITY BUSINESS	HTH669	NONE	3	3	0	0	3
	BUSINESS & MANAGEMENT	PRINCIPLES AND PRACTICE OF MANAGEMENT	MGT420	NONE	3	3	0	0	3

ELECTIVE 1

SEM	FIELD	COURSE	CODE	PRE REQUISITE	CREDIT UNIT	LEC	TUT	PRAC	CONTACT HOUR
SEM 6	POWER	ELECTRICAL CONVERSION AND ELECTRICAL TRANSPORTATION SYSTEM	EPO623	EPO514	3	3	0	1	4
	ELEKTRONIC	INTEGRATED CIRCUIT DESIGN	ELE556	ELE511	3	3	0	1	4
	SYSTEM	INDUSTRIAL INSTRUMENTATION	ESE554	ESE414	3	3	0	1	4
	COMPUTER	EMBEDDED SYSTEMS	ECE553	NONE	3	3	0	1	4
	COMMUNICATION	ANTENNA DESIGN AND ANALYSIS	ECM642	NONE	3	3	0	1	4
	BIOMEDICAL	BIOMEDICAL MODELING AND SIMULATION	EBM552	NONE	3	3	0	1	4

ELECTIVE 2 & 3

SEM	FIELD	COURSE	CODE	PRE REQUISITE	CREDIT UNIT	LEC	TUT	PRAC	CONTACT HOUR
SEM 7	POWER	ARTIFICIAL INTELLIGENCE IN POWER QUALITY	EPO624	NONE	3	3	0	1	4
	POWER	POWER SYSTEM OPERATION AND CONTROL	EPO553	EPO414	3	3	1	0	4
	ELECTRONIC	VLSI SYSTEM DESIGN	ELE614	ELE556	3	3	0	1	4
	ELECTRONIC	SEMICONDUCTOR FABRICATION	ELE615	ELE511	3	3	1	0	4
	SYSTEM	INDUSTRIAL AUTOMATION AND ROBOTICS	ESE616	NONE	3	3	0	1	4
	SYSTEM	PROCESS CONTROL	ESE611	ESE551	3	3	1	0	4
	COMPUTER	DIGITAL IMAGE PROCESSING	ECE645	NONE	3	3	0	1	4
	COMPUTER	DATA COMMUNICATION AND COMPUTER NETWORK	ECE644	NONE	3	3	1	0	4
	COMMUNICATION	MOBILE RADIO COMMUNICATIONS	ECM643	NONE	3	3	0	1	4
	COMMUNICATION	DIGITAL COMMUNICATION SYSTEM	ECM552	NONE	3	3	1	0	4
	BIOMEDICAL	REHABILITATION ENGINEERING	EBM613	NONE	3	3	0	1	4
	BIOMEDICAL	MEDICAL INSTRUMENTATION	EBM612	NONE	3	3	1	0	4

ELECTIVE 4

SEM	FIELD	COURSE	CODE	PRE REQUISITE	CREDIT UNIT	LEC	TUT	PRAC	CONTACT HOUR
SEM 8	POWER	ELECTRICAL EFFICIENCY AND DEMAND RESPONSE	EPO627	NONE	3	3	0	1	4
	POWER	CLEAN ENERGY AND DECARBONIZATION	EPO636	NONE	3	3	0	1	4
	ELECTRONIC	CMOS ANALOGUE INTEGRATED CIRCUITS	ELE648	ELE556	3	3	0	1	4
	ELECTRONIC	NANOTECHNOLOGY	ELE613	NONE	3	3	0	1	4
	SYSTEM	MODERN CONTROL SYSTEM AND DESIGN	ESE613	ESE551	3	3	0	1	4
	SYSTEM	INTELLIGENT CONTROL SYSTEMS	ESE614	ESE551	3	3	0	1	4
	COMPUTER	MOBILE AND SENSOR COMPUTING	ECE640	NONE	3	3	0	1	4
	COMPUTER	COMPUTATIONAL INTELLIGENCE	ECE646	NONE	3	3	0	1	4
	COMMUNICATION	SATELLITE COMMUNICATION SYSTEMS	ECM644	NONE	3	3	0	1	4
	COMMUNICATION	RADIO FREQUENCY DESIGN	ECM645	NONE	3	3	0	1	4
	BIOMEDICAL	STATISTICS IN BIOMEDICAL ENGINEERING	EBM615	NONE	3	3	0	1	4
	BIOMEDICAL	MEDICAL IMAGING	EBM611	NONE	3	3	0	1	4

COURSE DESCRIPTION

SEMESTER 1

1. EEE411-Circuit Theory
   The course covers the basic network theory. It deals with direct current (DC) and alternating current (AC), basic theorem and electrical quantities relationship in circuit network, both in direct and alternating current and DC transient.

1. ESE411-Signals and Systems
   The course introduces basic concepts of linear system. The emphasis will be on continuous-time signals and systems, Fourier series and Laplace transform. The above concepts are used in solving typical engineering problems.

2. ECM413- Basic Communication Engineering
   This course provides students with a comprehensive treatment of the basic communications engineering to be covered through lectures, class discussions, tutorials and quizzes. These will be intensified through audio visual aids, samples and models wherever required.

3. ECE411- Computer Programming
   This course provides an introduction to programming and its applications in solving general engineering numerical problems.

SEMESTER 2

1. EPO414- Basic Power Engineering
   This course introduces the basis of electric power engineering. Aspects of power engineering included are characteristics of common electric machines, power system structure and apparatus, basic system modelling and basic load studies.

2. ESE414- Basic Instrumentation and Control
   This subject covers measurement standard, transducers and signal conditioning. Second part of the subject will be focused on the aspect of control systems theory which includes mathematical modeling, stability and time domain analysis.

3. ELE414- Electronics
   This course introduces solid state and some basic electronic devices made from it followed by the operating concepts of the electronic devices, their characteristics and applications in simple electronic circuits.

4. ECE414- Digital Systems
   This course introduces the basic building blocks of practical digital systems. It includes techniques necessary for the design of simple digital circuits and the analysis of sequential circuits.

5. EEE415- Electrical Engineering Laboratory 1
   This course provides the laboratory works for the courses such as Basic Instrumentation and Control, Digital System, Basic Communication Engineering, Basic Power Engineering, Electronics and Circuit Theory.

SEMESTER 3

1. EPO555-Electrical Power Utilization
   This course covers distribution system, automation system, substation location characteristic, illumination, electrical installation practice, earthing system, heating, and air conditioning. Application of AutoCAD as a tool for electrical engineering drawing.

2. ELE 511- Material and Semiconductor Devices
   This course provides introduction to engineering material and basic understanding of the semiconductor physics leading to the operation of junction and field-effect devices. Device operation, physical behaviour and electrical properties of solid-state devices are covered.

3. EPO556- Electronic Drives and Applications
   This course provides students with the essential knowledge on electronic drives and their applications. Students will also be exposed to the operation and design of switching controls using programming tools to drive electronic circuits.

SEMESTER 4

1. ECM 515- Electromagnetic Theory
   The course introduces basic electromagnetic theory through development of concepts and formulation of general laws and their application to specific problems.

2. ECE515- Microprocessor Systems
   This course provides students with the essential knowledge on microprocessor systems and program design. The main topics provide guidelines on the operations of a microprocessor.

3. EPO 514-Power Electronics
   This course introduces the basis key aspects of power electronics, components and switching. Aspects of power electronics covered are power semiconductor devices, its operating characteristics and gate drive requirements; power conversion systems including rectifiers, inverters, DC choppers and AC regulator.

4. ELE 557-Electronic Circuit Analysis and Design
   The subject provides the concept of electronic circuit analysis and design that consists of multistage amplifiers, differential amplifiers, frequency response of op-amp, negative feedback amplifiers and operational amplifier integrated circuit design.

5. EEE 515-Electrical Engineering Laboratory 2
   This laboratory course provides students with practical hands on experience with the concepts presented in class for courses such as Power Electronic and Drives and Electronics Circuit Analysis.

SEMESTER 5

1. EPO 554- Electrical Machine and Drives
   This course covers the basic of electrical machine and drives principle inclusive the starting method, braking method and speed control for DC motors and Induction motor.

2. ESE 551- Control Systems

This course introduces students to the analytical methods in frequency and time domain. For the design of linear feedback system, it concentrates on root locus and frequency response techniques. The course of state variable and state equations are introduced so as to give an exposure to both the classical and modern control methods.

3. ELE 558- Digital Design and Computer Architecture
   This course is to provide the student with the concept and skills necessary to design a digital system and computer architecture. The course covers on combinational logic circuits design, sequential logic circuits design, arithmetic building blocks design and memory arrays. It also discusses on computer architecture and micro-architectures.It introduces hardware description language (HDLs) by using commercial EDA tools to model the digital system design.

4. ECM 551- Communication Systems Engineering
   This course provides students with the principles of transmission lines, antenna and wave propagation. It also discusses mobile, satellite and optical communication concepts.

5. EEE 525- Electrical Engineering Lab 3
   This laboratory course provides students with practical hands-on experience with the concepts presented in class for courses such as Electrical Power Generation and Utilisation, Communication Systems Engineering, and Control Systems.

SEMESTER 6

1. ESE 553- Digital Signal Processing
   This subject introduces the principles of digital signal processing. The students will be exposed to MATLAB mathematical software to generate computer implementations of the techniques for signals and systems analysis and design.

2. EPO 552- Power Systems Analysis
   This course aims to provide a solid foundation for the study of power system modelling and its analysis. Fundamentals of fault analysis and system protection are also covered.

3. EEE 535-Electrical Engineering Laboratory 4

This laboratory course provides students with practical hands on experience with the concepts presented in Electronic Circuit Design, Power System Analysis, Digital Signal Processing, Electronic Circuit Design, and Power System Analysis class.

SEMESTER 7

1. EEE600- Final Year Project 1

   The course is intended for students to take an individual project, which will be supervised by a member of the faculty with relevant expertise. The selected project will be a technical topic in electrical and electronics engineering. This course also introduces the students to the principles and techniques of scientific research. Students are required to conduct a library search and literature review for a project selected. In addition, students are expected to do project planning and preliminary experimental, computer simulation and theoretical investigation of the project. At the end of the course the students are expected to prepare a project proposal under the guidance of supervisor to be evaluated.

2. EEE 611- Integrated System Design

   This course implements the Integrated Design Project which involve collaborative design project with end user or customer. Students are required to identify, translate and solve the engineering problems using suitable engineering system. Students also required communicating these solutions in oral presentations and written reports. It is aims to provide a comprehensive design experience for students in a team-oriented format and to expose students to various economic, ethical and social effects related to their design project.

3. EPO616 High Voltage Engineering

   Large system depends on high voltages system used in power transfer. The basics of high voltage laboratory techniques and phenomena, together with the principles governing the design of high voltage insulation, are covered in this course.

4. EEE 655 – Industrial Training

   This course is intended to enable student to experience at least 8 weeks working environment in industries. Student will submit a formal report and logbook that will be based on work done during the industrial training.

SEMESTER 8

1. EEE 653- Electrical Engineer in Society

   This course has been designed to accommodate the "engineer in Society" syllabus of the Institution of Engineers (IEM), Malaysia and Board of Engineers (BEM), Malaysia. Pre-selected engineering management topics from the original IEM/BEM syllabus have been omitted and other relevant topics are covered in the syllabus. Topics includes a wide range of management theories, concepts, Rules and Regulations, Acts, By-laws, Code of Practices, Local and International Standards and other related inter-relationships between the current role of the practicing consultants and supervising engineers, the society and environment at large and current engineering issues faced by engineers, society and environment related to engineering progress and development.

2. EEE 650- Final Year Project II

   This subject is intended to enable student to design, construct and testing of project investigated in Project I. Student will submit a formal project report that will be based on work done during Project I and Project II.

3. EEE 652- Selected Industrial Topics

   This course provides an exposure to current technologies available in Malaysian industries. Every student will choose three different topics on subjects related to his/her discipline. The period for each topic is 18 hours. Each topic will be conducted by lecturer from industry and who is very experienced in his/her own field. Some examples of the coverage for each topic include theoretical applications in industries, case studies, practical experiences, usage of high end equipment, etc.

ELECTIVE COURSES

SEMESTER 6

A) ELECTIVE MULTIDISCIPLINE

1. HTC 630 - Organisational Behaviour for The Hospitality and Foodservice Industry

   Organizational behaviour is a field study that specifically focuses on the impact that people have on organizational survival and effectiveness. This course provides students with a management perspective and the complexity of behavior in

hospitality and foodservice organizations. Its aim is to provide students with an understanding of the importance of individual differences, group dynamics, work attitudes, and their antecedents and consequences at work within the business environment.

2. HTH 666 - Hospitality Human Resource Management

   This course is designed to help students understand the importance of human resources in achieving organizational goals in the hospitality industry. This course also provides an overview of human resource management, with particular emphasis in human resource planning and strategy, personnel selection, equal employment opportunity, training, performance appraisal, compensation, and contemporary issues.

3. HTH 669- Information Technology Management For Hospitality Business

   This course explores the impact of technology and digitalization on the hospitality industry, covering the fundamental functions of property and restaurant management systems while emphasizing industry-specific applications. It highlights the significance of emerging advancements such as e-commerce, intranets, web technology, and telecommunications in enhancing the industry's competitive edge. Additionally, the course examines information technology from both strategic and operational perspectives, demonstrating its practical applications within the service industry.

4. MGT 420- Principles And Practice Of Management

   This course explores the impact of technology and digitalization on the hospitality industry, covering the fundamental functions of property and restaurant management systems while emphasizing industry-specific applications. It highlights the significance of emerging advancements such as e-commerce, intranets, web technology, and telecommunications in enhancing the industry's competitive edge. Additionally, the course examines information technology from both strategic and operational perspectives, demonstrating its practical applications within the service industry.

B) ELECTIVE 1

1. EPO 623 – Electrical Conversion and Electrical Transportation System

   The power electronics applications covered three-phase converter and focused on design of power electronics converter from gate drive circuitry toward its applications. The application of this course covers the power electronics for HVDC system, switch-mode inverter, power electronics in capacitor charging and power electronics for renewable energy sources such as Photovoltaic system. The converter is presented and analysed using MATLAB SIMULINK or PSIM simulation software.

2. ELE556 - Integrated Circuit Design

   The course covers on MOS manufacturing process, semiconductor devices, CMOS characteristics, combinational logic circuits design, sequential logic and arithmetic circuits design. It focuses on digital full custom design flow as well as on the usage of high end EDA tools from the IC design industries.

3. ESE554 – Industrial Instrumentation

   The course introduces the principles of operation of transducers and actuators used in industry. Application of signal conditioning, control element and virtual instrumentation such as data acquisition system are also covered in this course.

4. ECE 553 – Embedded System

   This course is aims to equip the student with the fundamental concept of designing the microcontroller and embedded systems. It will focus on the basic concept of microcontroller, architecture, memory system, high level programming language, I/O interfacing method and real application design.

5. ECM 642 – Antenna Design And Analysis

   This subject aims to furnish a detailed treatment of microwave antennas, which form the backbone of transmission systems. The emphasis will be more towards design rather than analysis.

6. EBM 552 - Biomedical Modeling and Simulation

   This course introduces students to the human anatomy and physiology. The biomedical applications of computer modelling using academic design and analysis software are used to model the human physiology. Emphasis is on applying engineering principles using software packages for experimental design and analysis and mathematical modelling.

SEMESTER 7

ELECTIVE 2&3

1. EPO 624 – Artificial Intelligence In Power Quality

   This subject deals with definitions and standards of power quality, kinds of power quality problems, sources of sags and transient overvoltages, harmonic distortion, principles for controlling harmonics, devices for filtering harmonics, time and frequency domain methods of analysis, Fourier, Walsh, and Hartley transforms, power quality monitoring and improvement.

2. EPO 553 - Power System Operation and Control

   The course serves as a good introduction to computer methods for power system analysis and control. It covers, among others, load-flow analysis, economic load dispatch, frequency and voltage control and power system stability.

3. ELE 614 - VLSI System Design

   The course focuses on the design of complex digital systems with an emphasis on hands-on chip design. It will cover both the bottom-up design approach and top down approach. It will cover the system level design for VLSI. This includes the circuits and performance estimations, combinational and sequential logic circuits design, system design methodology, data path subsystems, array subsystems and special purpose subsystems. The course will use hardware description language (HDL) and electronic design automation (EDA) tools in designing digital systems such as simple microprocessor.

4. ELE615 – Semiconductor Fabrication

   The subject serves as an introduction to semiconductor manufacturing technology. It covers fundamental IC fabrication process steps and the integration of the steps for different microelectronic device technologies. Technology CAD simulation is implemented to aid learning of basic concepts. Technology trend in the semiconductor industry is introduced.

5. ESE 616 - Industrial Automation and Robotics

   This course introduces the principles and operational concepts of industrial automation and robotics that includes various types of sensors, actuators and controllers. The topics related to automation and robot system, movement, kinematics, dynamics and control will be discussed. The students will learn the practical aspects in designing and constructing industrial automation and robotics systems using appropriate tool and components.

6. ESE 611 – Process Control

   The course is to expose the students on the plant process control schemes and strategies. The topic covers the process and instrumentation diagram, process

system dynamics, controller tuning, system analysis and design strategy of control systems involves in industrial process control system. Computer simulation on operation of process control and industrial project design will also be included.

7. ECE 645 – Digital Image Processing
   The purpose of this course is to introduce the concepts and methodologies for digital image processing and to develop a foundation that can be used as the basis for further study and research.

8. ECE 644 - Data Communication and Computer Network

   The purpose of this course is to introduce the concepts and methodologies for data communication and networking system and to develop a foundation that can be used as the basis for further study and research.

9. ECM 643 – Mobile Radio Communications
   Mobile radio systems are used to provide a wireless link among mobile users. This course covers the cellular concept and radio wave propagation. It also provides knowledge in multiple access techniques and GSM architecture and standards.

10. ECM 552 - Digital Communication System

    This course gives students knowledge in digital communication systems at the theoretical and practical level. The course will focus on digital signal transmission, pulse code modulation, digital modulations, information theory and error control coding.

11. EBM 613 – Rehabilitation Engineering
    This course introduces students to rehabilitation engineering and clinical rehabilitation. The principles and terminology of rehabilitation engineering are introduced that covers the clinical rehabilitation practitioner and disability terminology. Emphasis is on the biomedical devices and interface, tool of neurorehabilitation, prosthetics and orthotics approaches and technologies.

12. EBM 612 – Medical Instrumentation
    The course introduces the principles of operation of various types of instrument involved in medical world. The discussion begins with the origin of bioelectric signal from human body. This is then followed by electrodes principles and the importance of amplifier in medical equipment.

SEMESTER 8

ELECTIVE 4

1. EPO 627 – Electrical Efficiency and Demand Response

   This subject introduces the economics aspects in power system in terms of its market requirement, effects of security and transmission to the electricity pricing and discusses the issues of investments in power generation and transmission equipment.

2. EPO 638 – Clean Energy and Decarbonization

   This subject introduces renewable energy sources, its basic concept, underlying sciences and processes. The content relates to the local and global energy scenario, motivations, policies, practices and economic analysis in managing energy demand and addressing the environmental impact pertaining of Renewable Energy sources.

3. ELE 648 – CMOS Analogue Integrated Circuits

This course deals with the analysis and design of analogue CMOS integrated circuits. It covers the basic physics and operation of MOS devices, analogue CMOS subcircuits, CMOS amplifiers, differential amplifiers, and operational amplifiers. The course also introduces the analysis and design of one-stage and two-stage CMOS operational amplifiers, including their performance parameters and compensation techniques. Students will also gain practical experience in analysing and constructing CMOS analogue circuits using EDA tools.

4. ELE 613 – Nanotechnology

   The course is an introduction to nanotechnology covering nanofabrication, nanomaterials and its application.

5. ESE 613 - Modern Control Systems and Design

   This course introduces students to the analytical methods of control system design and analysis using state space techniques involving both SISO/MIMO linear and nonlinear systems. The course provides the student with standard undergraduate background in control theory and basic knowledge of stability concepts. Optimal and adaptive control techniques are introduced for the control system design.

6. ESE 614 – Intelligent Control Systems

   The course introduces the basic concepts, principles and theories of intelligent control system. Two commonly used intelligent control technique tools, fuzzy logic control and artificial neural network control will be describe. The techniques are used to design and analyse the specific engineering problem.

7. ECE 640 - Mobile and Sensor Computing
   This course covers the fundamental concepts, techniques and algorithms in designing mobile sensing applications for Internet of Things. The topics are overview of mobile sensing and computing, mobile sensing, sensor data analysis, multimodal recognition and mobile sensing applications

8. ECE 646 - Computational Intelligence
   The course introduces the principles, theories and implementations of computational intelligence techniques. Two commonly used computational intelligence tools artificial neural network and genetic algorithm will be described and used to design and analyze to solve specific engineering problem. This is to develop a foundation that can be used as the basis for further study and research.

9. ECM 644 - Satellite Communication Systems
   This course introduces an overview of satellite communications which includes satellite launching, satellite communication system concept, satellite link design, modulation technique, and multiple access technique and satellite services.

10. ECM 645 - Radio Frequency Design

    The course introduces design methods for RF and microwave frequencies which is essential for communication engineering. The emphasis will be more on design work rather than theory

11. EBM 615 - Statistic in Biomedical Engineering
    This course will study a selected advanced topic and techniques of current interest in biomedical engineering. Teaching and learning will focus on concepts not included in the existing course syllabus and include recent development and progress in the subject area.

12. EBM 611 – Medical Imaging
    The course introduces the basic principles and design of medical diagnostic imaging equipment. A few medical imaging technologies are covered such as X-rays, gamma rays, and computed tomography, fluoroscopy, mammography, projection radiography, magnetic resonance imaging, ultrasound, biomagnetic diagnostics, laser and optoelectronics.

ACADEMIC REGULATION

(Should also refer to the booklet *Peraturan Akademik Diploma dan Sarjana Muda UiTM, pindaan 2017*)

1) Course registration
   I. Registration must be done online through Student Information Gateway (*i-Student Portal*) by following the procedures prescribed by the University.
   II. Total credit hours for student of Diploma and Degree must be **between 17-23 credit units** except for the semester of industrial training / final year students who will be graduating.
   III. Undergraduate students in their final semester with status of Pass are allowed to take maximum of 24 credit units with the approval of Faculty Dean/Campus Rector for graduation.
   IV. Diploma student with 'P' status is not allowed to register for more than twelve (12) credit units in specific semester
   V. Undergraduate student with 'P' status is not allowed to register for more than fifth teen (15) credit units in specific semester.

a. Add/Drop Course
   i. Add Course
      Students who have already registered for a course can apply to add course through online by following the procedures prescribed by the University.
   ii. Drop Course
      Student who has already registered for a course can apply to drop the respective course through online by following the procedures prescribed by the University.

b. Course Validation
   i. Students are required to validate the registered courses through online and print a copy of the registration within fourteen (14) days after the deadline of add/drop course. If students do not make the validation, the registration is automatically considered as valid and final.

c. Attendance
   i. Students are required to attend lectures and other learning activities such as workshops/tutorials/laboratories/studios/fields/practical training/practicum and clinics as stated in curriculum.
   ii. Students who do not achieve 80% attendances of total contact hours for each course without any written permission from faculty/academic centre/ state UiTM /branch UiTM are not allowed to sit for the final examination of the course.

iii. For the course with no final examination, the course works will not be assessed.

iv. The students in (ii) and (iii) will be given Grade F or Fail with ZZ status and **must pay the process fee of RM100.00.**

d. Examination

i. Students have to check *Penyata Kelayakan Menduduki Peperiksaan (Temporary)* displayed in the UiTM web site (*i-Student Portal*). Any amendments must have the consent from the Program Head/Academic Advisor within fourteen (14) days after the deadline of add/drop course.

ii. Students must validate *Penyata Kelayakan Menduduki Peperiksaan (Temporary)* through i-Student Portal. If students do not make the validation, the script is automatically considered as valid and final.

iii. The official print of *Penyata Kelayakan Menduduki Peperiksaan* must be printed by the students through UiTM Website (i-Student Portal) after the process of registration and validation the *Penyata Kelayakan Menduduki Peperiksaan (Temporary)* are done. Any amendments are NOT allowed.

iv. Student who fails to bring the *Penyata Kelayakan Menduduki Peperiksaan* for the courses which have final examination assessment will not be allowed to sit for the respective examination.

v. Application for exemption from sitting the final exam for certain course should be addressed to the Dean/Rector with the related documents before the date of final examination of the respective course.

vi. Application for exemption from sitting the ongoing examination should be addressed to the Dean/Rector within twenty four (24) hours after the respective examination ends, accompanied with Medical certificate from *Pusat Kesihatan UiTM/ Klinik Kerajaan/ Pusat Kesihatan Kerajaan/ Hospital Kerajaan/ Pegawai Perubatan dari panel perubatan majikan.*

vii. Application can be made in written or using form of *HEA/RP/TMP-01 [Kebenaran Tidak Menduduki Peperiksaan Akhir]*.

viii. If the application is approved, student will be given **XX** status for the respective course

v. If the application is disapproved, the student will be given **YY** status in which the course work marks of the respective course will not be considered. **Students must pay the process fee of RM100.00.**

GRADING/ASSESSMENT POLICY

(Should also refer to the booklet *Peraturan Akademik Diploma dan Sarjana Muda UiTM, pindaan 2017*)

1) Examination Results and course evaluation is given in term of grade and grade value (refer table 5.1)

Table 5.1: Grading Evaluation Table

GRADE	GRADE VALUE	ACHIVEMENT
A+	4.00	Excellence
A	4.00	Excellence
A-	3.67	Excellence
B+	3.33	Credit
B	3.00	Credit
B-	2.67	Credit
C+	2.33	Pass
C	2.00	Pass
C-	1.67	Fail
D+	1.33	Fail
D	1.00	Fail
E	0.67	Fail
F	0.00	Fail

2) The status for each course is given as follows:

LU : Pass
F1 : Fail a course on first attempt
F2 : Fail a course on second attempt
F3 : Fail a course on third attempt
PD : Credit Transfer
PC : Credit Exemption
TL : Incomplete
UD: Audit
FD : Disciplinary Action
XX: Absent from final examination with permission
YY: Absent from final examination without permission
ZZ : Barred from taking final examination for courses with final examination; or not given the assessment marks for courses without the final examination

Note: The grade value for YY and ZZ is 0.00 and process fees of RM100.00 will be given

3) Incomplete Status (TL)
   a) A TL status is for courses such as project exercise/practical training which is not completed within a specific term.
   b) A TL status cannot be more than one (1) consecutive semester. If the student does not complete the assigned exercise/practical training within the specific time frame given, he/she is entitled to an F Grade or Fail.
   c) Any student with a TL status is required to register as student by paying study fees and registering for the course.
4) Examination Results Status
   a) Based on the CGPA achievement, students will be given the examination results status as follows:

ANC: Completed with Vice Chancellor's Award
TS : Completed with Dean's List Award
TM : Completed
LNT : Pass Upgrade
AD : Dean's List Award
LU : Pass
P : Probation (Unsatisfactory)
D : Fail and Terminated

   b) Status of Completed with Vice Chancellor's Award (ANC) , Completed with Dean's List Award (TS) and Dean's List Award (AD) are awarded to excellent students

   c) Status of passed (LU) and Completed (TM) are awarded to students with satisfactory performance.

   d) Status of probation (P) is awarded to students with unsatisfactory performance and it is divided into two categories:
      i. P1: First Probation – acquired CGPA of 1.80 to 1.99 in a semester.
      ii. P2: Second Probation – acquired CGPA of less than 2.00 after obtaining P1 probation in the previous final semester.

   e) Unsatisfactory performance for the Fail and Termination status (D):

D1:	CGPA less than 1.80
D2:	CGPA less than 1.80 after the P1 status
D3:	CGPA less than 2.00 after the P2 status
D4:	Fail in a certain course for the third time
D5:	CGPA of less than 2.00 at the end of maximum period of study period and have courses which are still not completed.

D6:	Passed the entire courses required by the programme and fulfilled all of the programme's requirements but acquired CGPA of less than 2.00.
D7:	Did not sit for the examination of all registered courses without approval of the University.

5) Examination Result Slip
   i. The examination slip that has been endorsed by the Senate will be released through online student information portal (*i-Student Portal*) and printed by student for own record. The self-printed Examination Result Slip is certified as official print where no signature required.
   ii. The University reserves the right to retain the Examination Result Slip if students fail to observe the rules and regulations of the University.

6) Breach of conduct regarding Examination and Evaluation
   i. Students who are found guilty under Article 3 (j), 3 (k) and Article 5, Academic Institution Articles (Student Conduct) 1976, will be penalised based on decision of the University Disciplinary Board.
   ii. Students who are found guilty of an offence by the University Disciplinary Board will be given an F Grade or fail, or an FD status by the Senate.
   iii. Students who have been proven to commit plagiarism in their academic project/assignment will be given an F Grade or fail with an FD status by the Senate.

7) Re-administration of Examination
   The University reserves the right to re-administer an examination as it deems fit the following situations:
      i. A leak in the final examination question.
      ii. A candidate is not able to sit for the final examination because of natural disaster.
      iii. The Vice Chancellor's directive.

INDUSTRIAL TRAINING

(Should refer to Industrial Training Handbook)

As part of the Bachelor of Engineering (Honours) Electrical course requirement, all seventh semester students have to complete three months of compulsory practical attachment in either government or private sector organizations. The Malaysian Engineering Accreditation Council (EAC) has stated that an undergraduate has to undergo at least eight weeks of industrial training as part of their course.

It provides an opportunity for the students to experience real working environment first hand whilst at the same time benefit them in terms of their personal and professional development. Furthermore feedbacks gathered from the participating organizations help the students as well as the faculty in improving the character and professional skills of the graduate.

The training will start immediately upon completion of the final examination in semester 7. In semester 7 the students should have passed their compulsory elective modules so that they are more prepared and have acquired necessary information/knowledge to do the training. In the event of failure to secure a placement the students are allowed to do the training upon completion of the final examinations in semester 8.
The students who have had working experiences in the related areas are allowed to apply for an exemption subjected to approvable from the Head of the Undergraduate Programme.

1) Objectives

    a) Acquaint with the structure of an organization and its management system.
    b) Acquaint with the various equipments used in working environment.
    c) Understanding of the organization work ethical in terms of interpersonal interaction, discipline, rules/regulations and methods of performing assigned tasks.
    d) Promote symbiotic environment that will encourage interaction.
    e) Improve self-confidence through acquired hard skill and soft skill.

2) Student Role

    a) Learn from the observation, experience gained and supervision.
    b) Corporate with the organization and work colleagues.
    c) Form good interaction between all parties including work colleagues, management and visiting lecturers involved.
    d) Be prepared to contribute in any way deemed necessary.
    e) Abide by and adhered to any terms and regulations set upon by the organization.

3) Contribution by the Participating Organization

    a) Prepare a suitable training programme for the students in accordance with the objectives outlined above.
    b) Provide a suitable training staff to supervise and assist in giving a proper guidance as well as assessing the progress of the trainees.

c) Encourage the trainees to be involved in tasks that require responsibility.
d) Guide the trainees as to the health and safety issues.

4) Placement Duration

a) Minimum requirement set forth by the Malaysian Engineering Accreditation Council (EAC) is eight (8) weeks.
b) Once within the duration of the study preferably during the semester break between the seventh (7^{th}) semester and eight (8^{th}) semesters.

FINAL YEAR PROJECT

(Should refer to Final Year Project Handbook)

The Final Year Project is a major component of the undergraduate degree course in Electrical Engineering. The main objective is to develop problem solving, analysis, synthesis and evaluation skills in the field of Electrical Engineering. While working on the project, the students would also be able to develop personal and social skills such as time management, self-confidence and interaction. The evaluation of the Final Year Degree Project indirectly provides the students with training in technical and communication skills.

The Final Year Degree Project is implemented in two semesters, that is, semester 7 (2 credit hours) and semester 8 (4 credit hours) of the study period. Students should prepare their work schedule and adhere to it so that the project would be completed within the two semesters. Students must keep a logbook to record their progress and the supervisor should initial the logbook. Students and supervisor should meet regularly so that the progress of the project could be monitored. Supervisors are advised to ascertain the standard and quality of projects carried out. For the degree level, a good project should include a fair amount of design and synthesis, some form of hardware or software implementation, followed by measurement and data acquisition.

The work progress for both semester 7 and 8 will be assessed by the project supervisor. The project work starts by students handling in their project proposals to the Project Coordinators at the beginning of semester 7. At the end of semester 7, students are required to submit a preliminary report to the supervisors for evaluation.

Upon completion of the project at the end semester 8, students will demonstrate their projects to their project supervisors and there will be a question and answer session during the demonstration. Students are also required to produce a technical paper based on the project. The technical paper and presentation will be evaluated by a panel of evaluators from members of the Faculty. Students are also required to produce a complete report on the project conducted. The length of the report should be between 50 to 100 pages. The report will be evaluated by the supervisor and a panel of evaluators

FACILITIES

The faculty is equipped with sufficient resources, facilities with experienced laboratory assistances catering for the current needs in the curriculum of Electrical Engineering.

List of laboratories at Fakulti Kejututeraan Elektrik			
No.	Lab No.	Electronics Laboratories	Quantity
1	0.51	Printed Circuit Board (PCB) Workshop	1
2	1.28	Surface Mount Technology (SMT) Workshop	1
3	1.44	Soldering, Drilling and Testing (SDT) Workshop	1
4	1.47	Basic Electronics Laboratory	1
5	1.49	Intermediate Electronics Laboratory	1
6	1.50	Advanced Electronics Laboratory 2	1
7	1.56	Digital Electronics Laboratory	1
8	2.10	IC Design Laboratory	1
9	2.12	Applied Electronics Laboratory	1
10	2.13	Electronics System Design Laboratory	1
No.	Lab No.	Power Laboratories	Quantity
11	0.41	Electrical Machines Laboratory 1	1
12	0.45	Power Electronics Laboratory	1
13	0.46	Electrical Energy Utilization Laboratory	1
14	0.47	Power System Laboratory	1
15	0.48	High Voltage Engineering Laboratory	1
16	0.52	Power Quality Analysis Laboratory	1
17	0.53	Electrical Installation Laboratory	1
No.	Lab No.	System Laboratories	Quantity
18	0.40	Pneumatic and Hydraulic Laboratory	1
19	0.43	Robotics Workshop	1
20	1.41	Microcontroller Laboratory	1
21	1.46	Industrial Automation Laboratory	1
22	2.49	Automatic Controls Laboratory	1
23	2.59	Instrumentation and Measurement Laboratory	1
24	3.43	Robotics and Automation Laboratory	1
25	3.44	Biomedical Laboratory	1
No.	Lab No.	Communication Laboratories	Quantity
26	2.05	Microwave Laboratory	1
27	2.06	Mobile Radio Laboratory	1
28	2.09	Optical Fiber Laboratory	1
29	2.60	Digital Communication Laboratory	1
30	2.62	Telecommunication Laboratory	1
31	9.23	RF Shield Laboratory	1

No.	Lab No.	Computer Laboratories	Quantity
32	1.45	Embedded System Design Laboratory	1
33	1.55	Microprocessor Laboratory	1
34	2.14	Software Engineering Laboratory	1
35	2.15	Computing and Simulation Laboratory	1
36	3.40	CISCO Academy	1
No.	Lab No.	Research Laboratories	Quantity
37	3.42a	Electrical Engineering Postgraduate Research Laboratory	1
38	3.42b	Advance Control System and Computing Research Group	1
		TOTAL	38