DEPARTMENT OF ELECTRICAL ENGINEERING

STUDENT HANDBOOK 2019

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Hjh Rashidah Binti Mustapa
Director of Politeknik Ibrahim Sultan

Assalammualaikum w.b.t dan Salam Sejahtera
Salam Muafakat Johor

Politeknik Ibrahim Sultan is a premier polytechnic that offers a variety of programmes to meet the needs and requirements of the industry today. To uphold its responsibilities, PIS will always ensure its courses offered are constantly in line with the mission and vision of the Ministry of Higher Education in developing vibrant, talented and creative human capital.

PIS facilitates teaching and learning needs with adequate and advanced technologies to improve the quality of the graduates for their future advancement. We provide diversified opportunities to the students to be in the vanguard of a new field and help them gain experience by encouraging the students to participate in designing and creating innovation from time to time.

PIS offers Skills Certificate, Diploma and Bachelor's Degree programmes. The Skills Certificate programmes take two (2) years of completion which is equivalent to 4 semesters whilst Diploma programmes will take three (3) years for students to complete.

Every student is required to undergo an Industrial Training. Students will attend their Industrial Training programme in semester three (3) for Certificate programmes and some will be in semester 6 for Diploma programmes. The main objective of Industrial Training is to provide students with the real-world working environment and nurture their self-confidence and teamwork.

As for Bachelor's Degree programmes, students will complete the programme 2+1 (6 semesters). Two (2) year of studies will be in campus and one (1) year in the industry (work-based learning/WBL).

PIS has also introduced Blended Learning courses as the current approach in the teaching and learning process. This teaching and learning method integrates a mixture of online mode and on-site mode of learning with a weightage of 30%-80% course and the rest of the activities' content are managed and completed online. The approach complements the face to face contact learning to expose the students to a more dynamic and meaningful means of learning.

It is hoped that this handbook will provide adequate information about PIS and its programmes. It will serve as a reference book that will guide the students throughout their studies here. It will aid the students in planning their activities, goals and further achievements in the near future.

As the director of Politeknik Ibrahim Sultan, I would like to welcome all of you to PIS and wish you all the best.

Wassalam.

Mazlan bin Karim@Hussein
Head of Department

Assalamu'alaikum and Greetings

I offer gratitude to Almighty Allah and peace and blessings be upon our Prophet Muhammad SAW for being the reason this Student Handbook is published.

It is my pleasure to welcome and congratulate all students for being offered admission to Department of Electrical Engineering / Jabatan Kejuruteraan Elektrik (JKE), Politeknik Ibrahim Sultan (PIS). I hope the opportunity given will be taken wisely and to develop students' knowledge, interest, talents and capabilities.

This handbook is intended to provide guidelines to students in this department in particular to the programme offered, the curriculum and the courses that will be enrolled throughout the study. Three programs offered are Diploma in Electrical and Electronic Engineering - DEE, Diploma in Electronic Engineering (Control) - DJK, and Diploma in Electronic Engineering (Communication) - DEP.

Student Handbook also serves as the main source of reference related to academic affairs and provides the required information by the students especially on the department's administration implementation of the programmes and courses offered.

Hopefully all students will utilize the information provided in this handbook to benefit from all the services to enhance your educational experience and create many valuable memories. On behalf of the department I would like to extend my utmost appreciation and sincere gratitude to all parties involved in the publication of this Student Handbook.

Thank you.

Best wishes, Wassalam.

ABOUT POLITEKNIK IBRAHIM SULTAN

Politeknik Ibrahim Sultan (formerly known as Politeknik Johor Bahru) opened its doors to students in July 1998 at the Technical School before moving to Johor Bahru permanent campus in June 1999. The planning of the Politeknik Ibrahim Sultan began in 1991 with the efforts to identifying a suitable site in Lot 1957, Mukim Plentong. A 100 acres of oil palm plantation site, was finally chosen as the location for PJB permanent campus which was near to the Pasir Gudang industrial area.

Polytechnic Johor Bahru (PJB) officially changed its name to Politeknik Ibrahim Sultan(PIS) on 15th December 2011. PIS consists of six academic departments are Department of Design and Comunication, Department of Mechanical Engineering, Department of Electrical Engineering and Department of Tourism and Hospitality and supported by two others department: General Studies department and Mathematics, Science and Computer department.

PIS has produced a total of 25,744 graduates to date, to meet the nation's human capital market. By offering high-impact program, PIS is able to produce employable graduates with high employability skills and entrepreneurial skills. This has boosted the Polytechnic's image to a higher level.

PIS was awarded the premier polytechnic title on the 25th of February 2010. The status has created a platform for the polytechnic to promote the institution as a leasing institution for the education in technical and vocational training (TVET) in the southern region.

In the beginning of 2012, the ministry has coordinated the entry of students into three Premier Polytechnic: Politeknik Ungku Omar (Perak), Politeknik Johor Bahru (Johor) and Politeknik Sultan Salahuddin Abdul Aziz Shah (Selangor) through Student Entry Management Division, Ministry of Higher Education.

In addition, PIS is also one of the few institutions that offer higher education opportunities to students with disabilities (special needs) (OKU).This will give them the opportunity to receive training appropriate to their capabilities. This is supported by a conducive learning environment complete with high-tech workshops, computer labs, library and wireless internet facilities to make the learning climate more transformative, creative and innovative. In addition, lecturers are committed to be an important asset in developing knowledgeable, highly skilled and competitive students.

Meanwhile, creative design is the major niche area of Politeknik Ibrahim Sultan. The vision of Politeknik Ibrahim Sultan is to become the Centre of Excellence for Education and training in engineering, design and hospitality and aims to produce graduates whom are competent, honourable and responsible in line with the national education philosophy.

VISION

TO BE THE LEADING-EDGE TVET INSTITUTION

MISSION

1. To provide wide access to quality and recognized TVET programmes
2. To empower communities through research, innovation and life-long learning
3. To develop holistic, entrepreneurial and balanced graduates
4. To capitalise on smart partnership with stakeholders
5. To be the forefront in engineering, design technology and hospitality disciplines emphasizing on the niche area of creative design.

CORPORATE LOGO

Blue
Refers to the polytechnic management who are responsible for the underlying unity within the framework and clear direction of the institution.

TiffanyBlue
Refers to polytechnic is under the patronage of the Sultan of Johor.

Grey
Represent the polytechnic continuous academic activities, which is always upgraded
and capable to face any challenge in the future.

TYPOGRAPHIC DESIGN & WORD

P.I.S : the main element, was created and reconstructed by using Goudy Old Style font, is a symbols of education direction policy of Polytechnic Malaysia and the Johor State Government to develop highly educated and skilled human capital.

The capital I and S was a short form of Ibrahim Sultan. They are coloured with tiffany blue to reflect the polytechnic is under the auspices of the Sultan of Johor.

The word POLITEKNIK IBRAHIM SULTAN was created from Bookman Old Style font, clearly represent the name of His Royal Highness of Johor.

It also best represents this polytechnic generally as an education institution with the recognition of the Sultan of Johor.

POLITEKNIK
IBRAHIM SULTAN

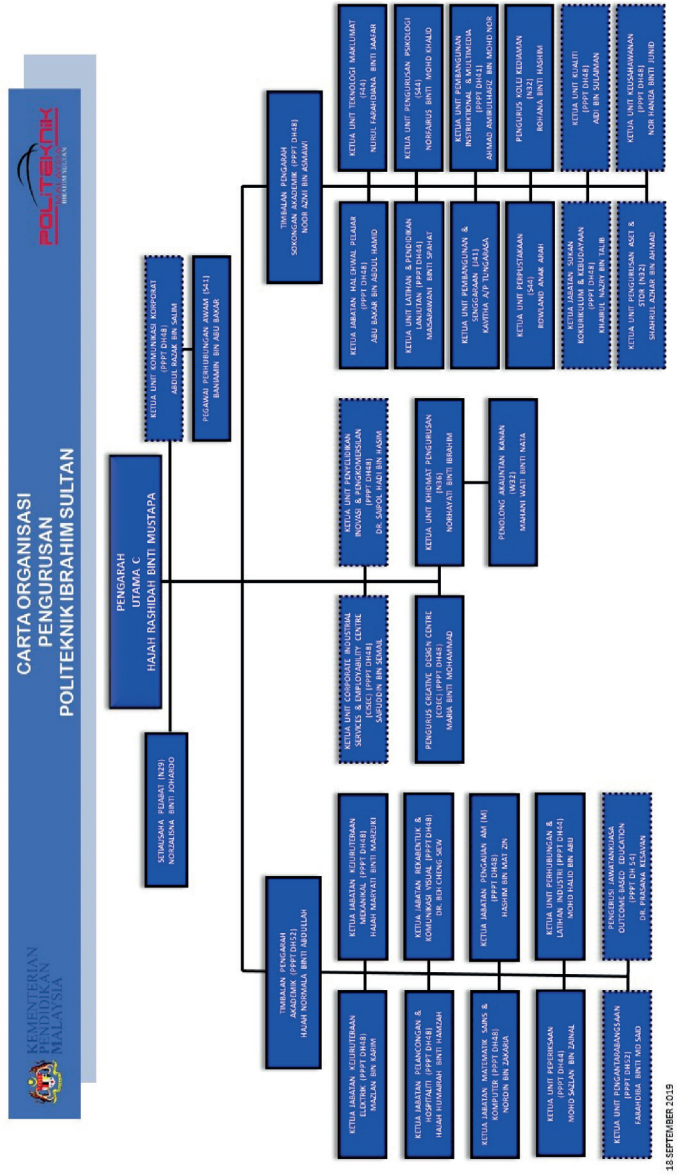
THE PHILOSOPHY OF COMBINATION

The combination of the globe, the map of Johor State and the word of Johor (in Arabic Calligraphy) symbolizes Politeknik Ibrahim Sultan as an institution that supports the overall of the Dasar Pendidikan and global, and will always devoted to uphold accuracy of the east and religious.

The capital 'P' in the word of POLITEKNIK is coloured in grey, is a symbolic of the old Politeknik Johor Bahru (PJB) as one of the important things to remembered and to be kept as a good memory.

MOTTO

"PENERAJU ILMU SEJAGAT" means LEADER Of GLOBAL KNOWLEDGE, refers to an adaptation of all mission and the goal of Politeknik Ibrahim Sultanas an education institution which then become an education center, providing knowledge and skills to create an integrity of the nation's human capital.



ORGANIZATION CHART

ELECTRICAL ENGINEERING DEPARTMENT (JKE) is led by a Head of Department supported by 3 Head of Programmes, 61 academic staff and 3 support staff. The department offers three main programmes which are Diploma in Electrical and Electronic Engineering, Diploma in Electronic Engineering (Control), and Diploma Electronic Engineering (Communication).

General information of JKE

Name of Head of Department	Mazlan Bin Karim @ Hussein
Phone Number to be Contacted	07 - 2612488
No. of Programmes Offered at the Department	3
Name of Programmes	Diploma in Electrical and Electronic Engineering (DEE)
	Diploma in Electronic Engineering (Communication) (DEP)
	Diploma in Electronic Engineering (Control) (DJK)
No. of JKE Staff	65

HEAD OF DEPARTMENT

MAZLAN BIN KARIM @ HUSSEIN

HEAD OF PROGRAMME

ROSSIELYANA BINTI ABDUL RAHIM

ELECTRONIC ENGINEERING (CONTROL)

ANIZAH BINTI HASSAN

ELECTRICAL AND ELECTRONIC ENGINEERING

MOHD FAIRUZ BIN SALLEH

ELECTRONIC ENGINEERING (COMMUNICATION)

CARTA ORGANISASI AKADEMIK/ KURIKULUM
JABATAN KEJURUTERAAN ELEKTRIK
2019

KETUA JABATAN
En. Mazlan Bin Karim @ Hussein

KETUA PROGRAM ELEKTRONIK (KOMUNIKASI)
En. Mohd Fairuz Bin Salleh

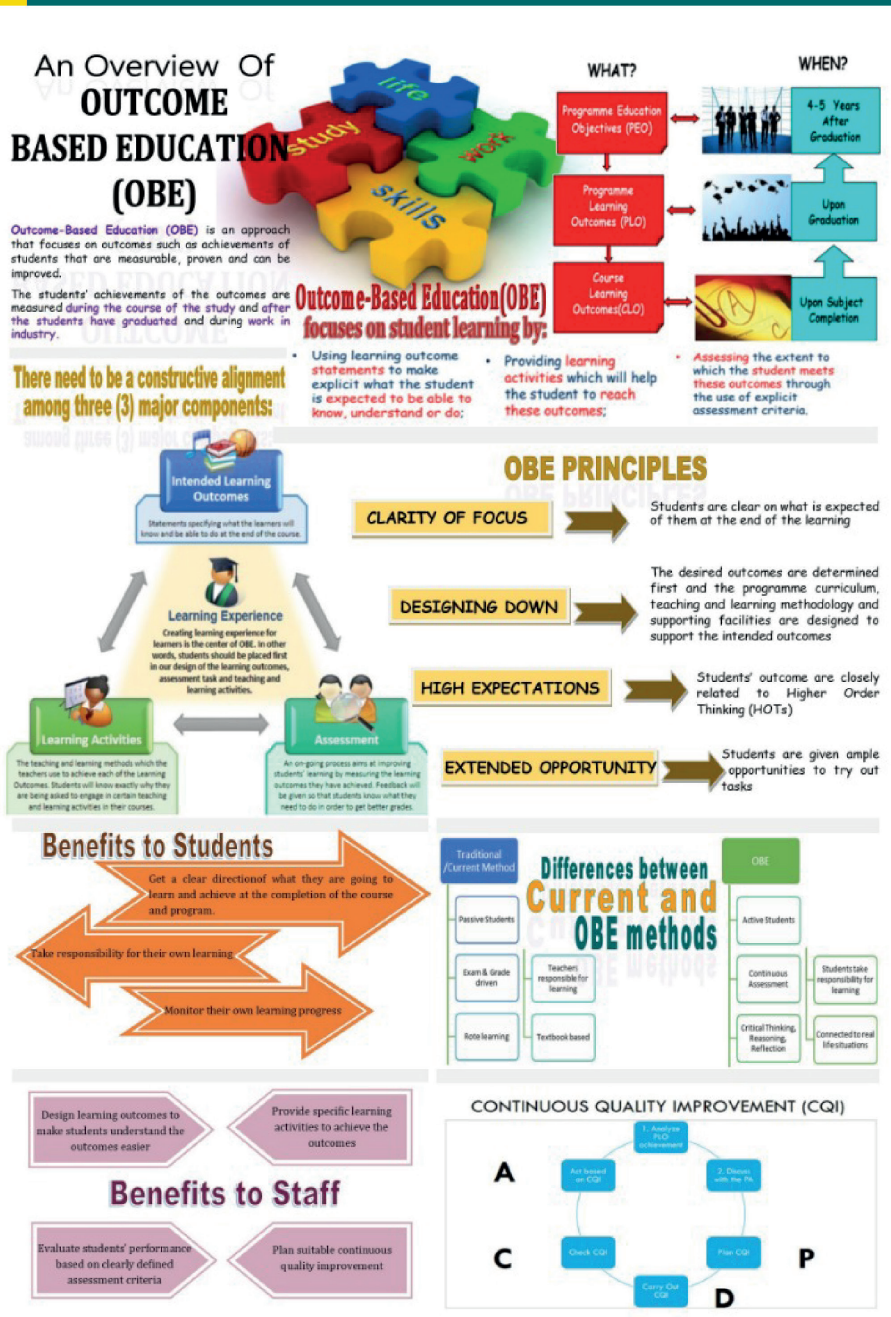
1. En. Sarawanan A/L Letchumanan
2. En. Nor Haizat Bin Omar
3. En. Junekh Eng Tian A/L Juan
4. Pn Norli Binti Jaswadi
5. Pn. Zuraida Binti Osman
6. Pn. Nor Haniza Binti Junid
7. Cik Alinah Binti Saring
8. Pn. Rozita Binti Mas'ud @ Kairi
9. Pn. Nazra Binti Aris
10. Pn. Noranimah Binti Sa'rani
11. En. Mohamed Rizuan Bin Mohamed Noah
12. Pn. Nor'ashikin Binti Mohd Nasir
13. Dr. Nor Hidayu Binti Shahadan
14. Dr. Noor Ainniesafina Binti Zainal
15. Pn Yusmahaida Binti Yusoff
16. Pn. Siti Fatimah Binti Mardan
17. Cik Rohana Binti Hasan
18. Pn. Nurul Daiyana Binti Abd. Hamid
19. Cik Azrin Nur Farhana Binti Abdullah Din @ Azman

KETUA PROGRAM ELEKTRONIK (KAWALAN)
Pn. Rossielyana Binti Abdul Rahim

1. En. Aidi bin Sulaiman
2. Y.M Tengku Nadzion Bin Tengku Ibrahim
3. En. Saipol Hala @ Saipol Hadi Bin Hasim
4. En. Mohamad Noh Bin Ahmad
5. Pn. Francisca anak Kevin Akeu
6. En. Saifuddin bin Semail
7. Pn. Zubydah Binti Mustafa
8. Tn. Hj. Ishak Bin Taman
9. Pn Normah Binti Sapuan
10. Pn. Siti Noraidah Binti Saif
11. Pn. Rosmanira Binti Mamat
12. En. Eliyun Bin Othman
13. Pn. Mala Binti Kadar
14. Pn Surayahani Binti Md. Sahari
15. En. Zaharudin Bin Md Dawam
16. Pn. Salmah Binti Thukiman
17. En. Mohd Azali Bin Zainal Abidin
18. Pn. Shellie Suzana Binti Saad
19. En. Saiful Anuar Bin Abd Karim
20. Pn. Aminah Binti Mohd Yunos

KETUA PROGRAM ELEKTRIK & ELEKTRONIK
Pn. Anizah Binti Hassan

1. Pn. Jamaliah binti Jamian
2. Pn Azlin Binti Yahya
3. Pn. Zuraidah Binti M. Taib
4. Pn. Yusnirah Binti Yusop
5. Pn. Rahmah Binti Khamis
6. Pn. Nor Ziha Binti Mohd Musa
7. Pn. Yuzi Binti Saidun
8. Pn. Siti Nurul Hazlina Binti Mohamad
9. Pn. Mardiah Binti Morsin
10. Pn. Norazlina Binti Jamil
11. En. Kamarudin bin Kamit
12. Pn. Nor Faizah Binti Zailani @ Hj Ahmad
13. Cik Arfah Binti Ahmad Hasbollah
14. En. Mohd Faiz Husny Bin Yusof
15. En. Wan Mohd Rumaizi bin Wan Taib
16. Pn. Siti Noor Sha'adah Binti Ali
17. Cik Adibah Binti Ahmad
18. Pn. Syamzurina binti Md Hasnan
19. En. Muhammad Abdul Haq bin Abdul Aziz
20. Pn. Maisarah Binti Mahizan
21. Pn. Intan Rafidah Binti Abd. Rahim
22. Cik Nur Hafizah Binti Rahim



FACILITIES IN ELECTRICAL ENGINEERING DEPARTMENT

LECTURE HALL
JKE Lecture Hall

LECTURE ROOM
Smart Room
Lecture Room

LABORATORIES / WORKSHOP
Power Electronic & Electrical Technology (EEK & ETE) – Lab 1
Electrical Principles (EPE) - Lab 2
Electronic (EEE) – Lab 3
Computer Hardware (EPK) - Lab 4
Measurement (EMU) - Lab 5
Electronics Repair (EBE) - Lab 6
Computer Programming (EKP) – Lab 7
Computer Aided Design (ECAD 1) - Lab 8
Computer Aided Design (ECAD 2) – Lab 9
Communication Data (EPD) - Lab 10
Telecommunication(ETL) – Lab 11
Project (EPR)
Wiring / Installation (EPP)
Automation & Control System (EAK)
Equipment & Control (EPC)
Electrical Machine (EME)
Power System (ESK)

OTHERS
Seminar Hall
Foyer
Prayer Room

STUDENT ENTRY REQUIREMENT

INTAKE	REQUIREMENT
Sijil Pelajaran Malaysia (SPM)	Malaysian citizen and has PASSED SPM or its equivalents, PASSED *Sejarah* and *Bahasa Inggeris* for SPM 2013 and above. Obtain 5 CREDITS including *Bahasa Melayu, Matematik*, ONE in the following subject (http://www.politeknik.edu.my/portalbpp2/index.asp?pg=program&kat=d) and TWO (2) other subjects that have not been credited. Candidates are not COLOR BLIND and do not have any disability that will hinder practical work.
Polytechnic Certificate	Malaysian citizen and has PASSED SPM with ONE (1) credit. Has a Polytechnic Certificate in the following fields: i. Electrical Engineering ii. Electronic Engineering iii. Electrical & Electronic Engineering
Accreditation of Prior Experiential Learning (APEL)	Malaysian citizen. Has a Level 4 APEL Certificate from MQA and working experience in related field.
Community College Certificate	Malaysian citizen. Has PASSED with ONE(1) credit and has a Community College Certificate in Electric Installation
Penang Regional Development Authority (PERDA) Tech Institute Certificate	Malaysian citizen. Has PASSED with ONE(1) credit and has a PERDA Tech Institute Certificate in Electrical Engineering
Other than SPM	Malaysian citizen and PASSED SPM including *Bahasa Melayu* and *Sejarah* (for SPM 2013 and above). Has certificate in following field: i. Level 3 Polytechnic Certificate, KKM • Certificate in Electrical & Electronic Engineering • Certificate in Electrical Engineering (Control) • Certificate in Electrical Engineering (Power) • Certificate in Electrical Engineering (Communication) • Certificate in Electrical Engineering (Medical) • Certificate in Electrical Engineering (Petroleum) • Certificate in Electronic Engineering (Petroleum) ii. Level 3 Majlis Amanah Rakyat (MARA) Skills Institute Certificate Holders, KKM • Certificate in Electronic Engineering Technology (Industry) • Certificate in Electronic Engineering Technology (Instrumentation) • Certificate in Electronic Engineering Technology (Telecommunication)
Malaysian Skills Certificate	Malaysian citizen. Has PASSED with ONE(1) credit and has a Level 3 Malaysian Skills Certificate in following fields: i. Electrical Chargeman A0 (Low Voltage) (EE-302-3:2014) ii. Electrical Chargeman A1 (Low Voltage) (EE-303-3:2014) iii. Electrical Chargeman A4 (Low Voltage) (EE-304-3:2014)

DIPLOMA IN
ELECTRICAL AND ELECTRONIC ENGINEERING
DEE

ETAC

ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL

WHAT IS ETAC?

ETAC or Engineering Technology Accreditation Council (ETAC) is a delegated body of the Board of Engineering Malaysia (BEM). ETAC provides smooth transition in the accreditation of engineering Technology and Engineering Technician education programs based on Sydney Accord.

In 2015, BEM established ETAC that comprises seven members which are BEM, learned bodies, industry/employer, Public Services Department (PSD), Malaysia Qualification Agency (MQA), Ministry, and public representative. ETAC then has become the recognized accrediting body of engineering technology bachelor degree, engineering diploma and engineering technology diploma programs offered in Malaysia.

ACCREDITATION OBJECTIVES

1. The graduates of the accredited engineering programs meet the minimum academic requirements to be registered as graduate engineer with BEM.
2. The Continual Quality Improvement (CQI) is being practiced by Institution of Higher Learning (IHLs). Accreditation may also services as a tool to benchmark engineering programs offered by IHLs in Malaysia.

ADVANTAGES OF ETAC FOR STUDENT AND ORGANIZATION

1. Assurance that the diploma programs offered meet the high standards set by ETAC.
2. Enable students to further studies at local or overseas institution.
3. Institution will be given opportunities to offer technology and TVET programmes.
4. Graduates with diploma in engineering or technology engineering will be accepted to be Engineering Technician / Works Inspector – registered with BEM.

GUIDELINES FOR THE APPLICATION FOR REGISTRATION AS AN INSPECTOR OF WORKS

http://www.bem.org.my/web/guest/inspectorofof-works-guidelines

http://www.bem.org.my/web/guest/inspectorofof-works

LIST OF DEE LECTURERS

NO	NAME	E-MAIL
1	Anizah Binti Hassan ***(Head of Programme)***	anizahhassan@pis.edu.my
2	Jamaliah binti Jamian	jamaliah@pis.edu.my
3	Azlin Binti Yahya	azlin.yahya.poli@pis.giv.my
4	Zuraidah Binti M. Taib	zuraidah@pis.edu.my
5	Yusnirah Binti Yusop	yusnirah@pis.edu.my
6	Rahmah Binti Khamis	rahmah@pis.edu.my
7	Nor Ziha Binti Mohd Musa	norziha@pis.edu.my
8	Yuzi Binti Saidun	yuzi@pis.edu.my
9	Siti Nurul Hazlina Binti Mohamad	sitinurulhazlina@pis.edu.my
10	Mardiah Binti Morsin	mardiahmorsin@pis.edu.my
11	Norazlina Binti Jamil	norazlinajamil@pis.edu.my
12	Kamarudin bin Kamit	kamarudin@pis.edu.my
13	Nor Faizah Binti Zailani @ Hj Ahmad	norfaizah@pis.edu.my
14	Arfah Binti Ahmad Hasbollah	arfah@pis.edu.my
15	Mohd Faiz Husny Bin Yusof	faizhusny@pis.edu.my
16	Wan Mohd Rumaizi bin Wan Taib	Wanrumaizi.poli@pis.edu.my
17	Siti Noor Sha'adah Binti Ali	sitinoor@pis.edu.my
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20	Muhammad Abdul Haq bin Abdul Aziz	abdulhaq@pis.edu.my
21	Maisarah Binti Mahizan	maisarah@pis.edu.my
22	Intan Rafidah Binti Abd. Rahim	intanrafidah@pis.edu.my
23	Nur Hafizah Binti Rahim	fizah@pis.edu.my

PROGRAMME DETAILS

PROGRAMME NAME: DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING
PROGRAMME CODE: DEE

INTRODUCTION

Electrical Engineering is the field of study which generally deals with the application of electrical and electronics towards designing, testing and development of circuitry and equipment for well-defined engineering activities. It requires the application of scientific and engineering knowledge and methods combined with practical skills in supporting well-defined engineering activities to prepare students for their future role in the industry.

The electrical engineering diploma graduates of the Polytechnic's Ministry of Education Malaysia are exposed to a comprehensive curriculum consisting of courses in personal development, mathematics, science, electrical disciplines and workplace competencies requirements. Graduates of the electrical engineering diploma programme will be equipped with specialized knowledge and skills which include power engineering, green technology, energy efficiency, computer technology, communication, medical electronics, optoelectronic and industrial automation.

The Diploma in Electrical and Electronic Engineering is a three-year full-time programme comprising of five semesters coursework with one full semester of industrial training.

SYNOPSIS

The Diploma in Electrical and Electronic Engineering programme is designed to cover the broad discipline of electrical and electronic engineering which includes electrical and electronic principles, computer fundamental and programming, computer aided design, semiconductor devices, communication systems, wiring installation, power system, electrical machine and programmable logic controller. The green technology elements are also incorporate in the curriculum to provide awareness towards the importance of the sustainable energy.

JOB PROSPECT

This programme provides the knowledge and skills in electrical engineering that can be applied to a broad range of careers in most power generation provider and manufacturing industries. The knowledge and skills that the students acquire from the programme will enable them to participate in the job market as:

a. Electrical/Electronic Technician
b. Electrical Engineering Service Advisor
c. Technical Assistant
d. Electrical/Electronic Engineering Supervisor
e. Assistant Engineer

EDUCATIONAL GOAL

To produce holistic and competent TVET graduates capable of contributing to the national development.

PROGRAMME AIM

This programme believes that all individuals have potential to be a resourceful and adaptable technician to support the nation aspiration in providing engineering talent.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The engineering programme should produce balanced TVET graduates who are:

NO	PEO	CONTENT
1	**PEO1**	Practicing technician in electrical engineering related field
2	**PEO2**	Contributing to society with professional ethic and responsibilities
3	**PEO3**	Engaging in enterprising activities that apply engineering knowledge and technical skills
4	**PEO4**	Engaging in activities to enhance knowledge for successful career advancement

PROGRAMME LEARNING OUTCOMES (PLO)

Upon completion of the programme, students should be able to:

NO	PLO	CONTENT
1	**PLO1**	apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices
2	**PLO2**	identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)
3	**PLO3**	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 (DK5)
4	**PLO4**	conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements
5	**PLO5**	apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)
6	**PLO6**	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 (DK7)
7	**PLO7**	understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)
8	**PLO8**	understand and commit to professional ethics and responsibilities and norms of technician practice
9	**PLO9**	function effectively as an individual, and as a member in diverse technical teams
10	**PLO10**	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
11	**PLO11**	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 projects in multidisciplinary environments
12	**PLO12**	recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

Notes:

KNOWLEDGE PROFILE (DK)

DK	CONTENT
DK1	A descriptive, formula-based understanding of the natural sciences applicable in a sub-discipline
DK2	Procedural mathematics, numerical analysis, statistics applicable in a subdiscipline
DK3	A coherent procedural formulation of engineering fundamentals required in an accepted sub-discipline
DK4	Engineering specialist knowledge that provides the body of knowledge for an accepted sub-discipline
DK5	Knowledge that supports engineering design based on the techniques and procedures of a practice area
DK6	Codified practical engineering knowledge in recognised practice area
DK7	Knowledge of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts

MATRIX OF PROGRAMME LEARNING OUTCOME (PLO) VS PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PROGRAM LEARNING OUTCOME (PLO)		PROGRAMME EDUCATIONAL OBJECTIVE (PEO)			
		PEO1	PEO2	PEO3	PEO4
PLO1	apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices;	/			
PLO2	identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4);	/			
PLO3	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 (DK5);	/			
PLO4	conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements;	/			
PLO5	apply appropriate techniques, resources, and modern engineering and IT tools to well- defined engineering problems, with an awareness of the limitations (DK6);	/			
PLO6	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 (DK7);		/		
PLO7	understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7);		/		
PLO8	understand and commit to professional ethics and responsibilities and norms of technician practice;		/		
PLO9	function effectively as an individual, and as a member in diverse technical teams;			/	
PLO10	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;			/	
PLO11	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 projects in multidisciplinary environments;			/	
PLO12	recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge;				/

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 2																					
Compulsory	MPU21012	Pengajian Malaysia	1	0	2	0	2									√				√	
	MPU24XX1	Kelab/Persatuan	0	2	0	0	1										√			√	
	MPU24XX1	Unit Beruniform 2																			MPU24XX1
Common Core	DBM20023	Engineering Mathematics 2	2	0	2	0	3	√					√					√			DBM10013
Discipline Core	DET20033	Electrical Circuits	2	2	0	0	3	√				√					√				DET10013
	DEE20023	Semiconductor Devices	2	2	0	0	3	√				√						√			
	DEE20033	Digital Electronics	2	2	0	0	3	√				√	√				√				
	DEC20012	Programming Fundamentals	1	2	0	0	2	√				√	√							√	
TOTAL			**24**				**17**														

COURSES VERSUS PROGRAMME OUTCOMES MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 1																					
Compulsory	DUE10012	Communicative English 1	1	0	2	0	2											√		√	
	MPU24XX1 MPU24XX1	Sukan Unit Beruniform 1	0	2	0	0	1										√			√	
Common Core	DUW10022	Occupational, Safety and Health for Engineering	2	0	0	0	2	√								√		√			
	DBM10013	Engineering Mathematics 1	2	0	2	0	3	√					√					√			
	DBS10012	Engineering Science	2	1	0	0	2	√				√									
Discipline Core	DET10013	Electrical Technology	2	2	0	0	3	√				√					√				
	DET10022	Electrical Wiring	1	3	0	0	2	√				√				√					
	DEE10013	Measurement Devices	2	2	0	0	3	√				√						√			
TOTAL			**26**				**18**														

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 4																					
Compulsory	DUE50032	Communicative English 3	1	0	2	0	2											√		√	DUE30022
	MPU22012	Entrepreneurship	1	0	2	0	2											√	√		
Discipline Core	DEC40053	Embedded System Application	2	2	0	0	3			√	√	√	√						√		DEC20012
	DEJ40033	Programmable Logic Controller (PLC) and Automation	2	2	0	0	3		√			√	√		√						
	DEC30023	Computer Networking Fundamentals	2	2	0	0	3				√	√	√			√					
	DEE40082	Project 1	1	2	0	0	2		√		√	√	√	√				√	√	√	
Electives		Elective 1	0	0	0	0	2														
TOTAL			**21**				**17**														

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 3																					
Compulsory	DUE30022	Communicative English 2	1	0	2	0	2											√		√	DUE10012
Common Core	DBM30043	Electrical Engineering Mathematics	2	0	2	0	3	√					√					√			DBM20023
Discipline Core	DEE30043	Electronic Circuits	2	2	0	0	3	√				√						√			
	DEE30061	Computer Aided Electrical Drawing	0	2	0	0	1	√				√	√			√					
	DEE30052	Electronic Equipment Repair	1	3	0	0	2		√			√	√	√							DEE20023
	DEE30071	Electronic Computer Aided Design	0	2	0	0	1	√				√	√								
	DEP30013	Communication System Fundamentals	2	2	0	0	3	√				√	√				√				
	DET30053	Power System	2	2	0	0	3	√				√			√						DET20033
TOTAL			**27**				**18**														

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS					PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O	CREDIT VALUES													
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning
								PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
Industrial Training	DUT60610	Engineering Industrial Training	0	0	0	10														
TOTAL			0			10														
TOTAL CREDIT VALUE			95																	

SEMESTER 6

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS					PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O	CREDIT VALUES													
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning
								PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
Compulsory	MPU23052 / MPU23042	Sains Teknologi dan Kejuruteraan Islam* / Nilai Masyarakat Malaysia**	1	0	2	0	2													
Discipline Core	DEG30013	Fundamental of Renewable Energy	2	2	0	0	3	√												
	DET40073	Power Electronics	2	2	0	0	3				√	√			√	√		√		
	DEE50102	Project 2	0	3	0	0	2			√	√	√		√	√	√		√	√	DEE40082
	DET30043	Electrical Machine	2	2	0	0	3	√				√		√						
Electives		Elective 2	0	0	0	0	2									√				√
TOTAL			18				15													

SEMESTER 5

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
10	DEO40023	Optoelectronic	3	0	0	0	3		√					√							
11	DEP40053	Fibre Optic Communication System	2	2	0	0	3			√	√	√			√						
12	DEQ40032	Energy Efficiency Engineering 1	2	0	0	0	2				√			√							
13	DEU40032	Biomedical Signal Measurement	1	2	0	0	2		√			√					√				
14	DEC50103	Operating Systems	2	2	0	0	3				√	√	√			√					
15	DEC50113	Computer System Diagnosis and Maintenance	2	2	0	0	3		√			√	√	√							
16	DEC50122	Embedded Robotic	1	2	0	0	2			√	√	√	√						√		DEC20012
17	DEC50132	Internet Based Controller	1	2	0	0	2	√				√	√		√						
18	DEC50143	CMOS Integrated Circuit Design and Fabrication	2	2	0	0	3			√		√	√		√						DEE20023 & DEE20033

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
1	DEC40062	Visual Basic Programming	1	2	0	0	2			√		√	√						√		
2	DEC40073	Database System	2	2	0	0	3				√	√	√						√		
3	DEC40082	Interactive Multimedia Application	1	2	0	0	2			√	√	√	√					√			
4	DEC40092	Computer Vision Programming	1	2	0	0	2				√	√	√							√	
5	DEE40092	Audio Video Systems and Production	1	2	0	0	2	√				√	√							√	
6	DEE40113	Signal and System	2	2	0	0	3		√			√	√					√			DBM20023
7	DEG40023	Renewable Energy System	2	2	0	0	3		√			√		√							DEG30013
8	DEJ40043	Control Systems	2	2	0	0	3		√			√		√							DEJ30013
9	DEJ40052	Operations Management	2	2	0	0	2	√				√				√					

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
28	DEP50072	Satellite and Radar Communication Systems	2	0	0	0	2				√									√	
29	DEQ40023	Energy Management System and Energy Auditing	2	2	0	0	3		√			√	√			√					
30	DEQ50043	Energy Efficiency Engineering 2	2	0	0	0	3		√			√	√	√							DEQ40032
31	DET50063	Motor Control and Drives	2	2	0	0	3		√			√						√			DET40073
32	DET50083	Power System Protection	2	2	0	0	3				√	√		√							DET30053
33	DET50093	Electrical Maintenance and Repair	2	2	0	0	3		√			√		√							
34	DEU50013	Medical System Practice	2	2	0	0	3		√			√			√						
35	DEU50043	Medical Imaging	2	2	0	0	3				√	√			√						
6	DEU50053	Biomedical Instrumentation	2	2	0	0	3				√	√		√							

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
19	DEC50152	CMOS VLSI Layout Design	1	2	0	0	2			√		√	√		√						
20	DEE50122	Circuit Analysis	2	0	1	0	2		√								√				
21	DEG50032	Energy Efficiency And Management	2	0	0	0	2				√			√							
22	DEG50043	Green Energy System Integration	2	2	0	0	3		√			√	√							√	DEG40023
23	DEJ50063	Process Measurement	1	2	0	0	3	√				√					√				
24	DEO50033	Optosemiconductor	3	0	0	0	3				√				√						DEO40023
25	DEP50033	Data Communication and Networking	2	2	0	0	3		√			√	√			√					DEP30013
26	DEP50043	Microwave Devices	2	2	0	0	3				√	√	√	√							
27	DEP50063	Wireless Communication	2	2	0	0	3				√	√	√		√						

FREE ELECTIVES[a]

Field			DUD10012
CLASSIFICATION			1
COURSE CODE			DUD10012
COURSE NAME			Design Thinking
CONTACT HOURS	L		1
CONTACT HOURS	P		0
CONTACT HOURS	T		0
CONTACT HOURS	O		1
CREDIT VALUES			2
PROGRAMME LEARNING OUTCOME (PLO)	CLS1	Knowledge PLO1	
	CLS2	Problem Analysis PLO2	√
	CLS2	Design/Development of Solutions PLO3	
	CLS2	Investigation PLO4	
	CLS3a / CLS3c	Modern Tool Usage PLO5	
	CLS3b	The Engineer and Society PLO6	
	CLS5	Environment and Sustainability PLO7	
	CLS5	Ethics PLO8	
	CLS3d	Individual and Teamwork PLO9	
	CLS3b	Communications PLO10	√
	CLS4	Project Management and Finance PLO11	
	CLS4	Life Long Learning PLO12	
PREREQUISITE / CO-REQUISITE			

PROGRAMME STRUCTURE

SEMESTER 1

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR L	HOUR P	HOUR T	CREDIT
1	DUE10012	Communicative English 1	-	Compulsory	1	0	2	2
2	MPU24XX1 MPU24XX1	Sukan **OR** Unit Beruniform 1	-	Compulsory	0	2	0	1
3	DUW10022	Occupational, Safety and Health for Engineering	-	Common	2	0	0	2
4	DBM10013	Engineering Mathematics 1	-	Common	2	0	2	3
5	DBS10012	Engineering Science	-	Common	2	1	0	2
6	DET10013	Electrical Technology	-	Discipline	2	2	0	3
7	DET10022	Electrical Wiring	-	Discipline	1	3	0	2
8	DEE10013	Measurement Devices	-	Discipline	2	2	0	3
				CONTACT HOURS	12	10	4	18
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	26			

SEMESTER 2

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR L	HOUR P	HOUR T	CREDIT
1	MPU21012	Pengajian Malaysia	-	Compulsory	1	0	2	2
2	MPU24XX1 MPU24XX1	Kelab/Persatuan **OR** Unit Beruniform 2	*MPU24XX1*	Compulsory	0	2	0	1
3	DBM20023	Engineering Mathematics 2	*DBM10013*	Common	2	0	2	3
4	DET20033	Electrical Circuits	*DET10013*	Discipline	2	2	0	3
5	DEE20023	Semiconductor Devices	-	Discipline	2	2	0	3
6	DEE20033	Digital Electronics	-	Discipline	2	2	0	3
7	DEC20012	Programming Fundamentals	-	Discipline	1	2	0	2
				CONTACT HOURS	10	10	4	
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	24			17

SEMESTER 3

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUE30022	Communicative English 2	***DUE10012***	Compulsory	1	0	2	2
2	DBM30043	Electrical Engineering Mathematics	***DBM20023***	Discipline	2	0	2	3
3	DEE30043	Electronic Circuits	-	Discipline	2	2	0	3
4	DEE30052	Electronic Equipment Repair	***DEE20023***	Discipline	1	3	0	2
5	DEE30071	Electronic Computer Aided Design	-	Discipline	0	2	0	1
6	DEE30061	Computer Aided Electrical Drawing	-	Discipline	0	2	0	1
7	DEP30013	Comm. System Fundamentals	-	Discipline	2	2	0	3
8	DET30053	Power System	***DET20033***	Discipline	2	2	0	3
				CONTACT HOURS	10	13	4	18
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	27			

SEMESTER 4

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	MPU22012	Entrepreneurship	-	Compulsory	1	0	2	2
2	DUE50032	Communicative English 3	***DUE30022***	Compulsory	1	0	2	2
3	DEC30023	Computer Networking Fundamentals	-	Discipline	2	2	0	3
4	DEC40053	Embedded System Application	***DEC20012***	Discipline	2	2	0	3
5	DEJ40033	PLC & Automation	-	Discipline	2	2	0	3
6	DEE40082	Project 1	-	Discipline	1	2	0	2
7	DEC50122	Embedded Robotic	***DEC20012***	Elective	1	2	0	2
				CONTACT HOURS	10	12	2	17
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	24			

SEMESTER 5

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	MPU23052 MPU23042	Sains Teknologi dan Kejuruteraan Islam* **OR** Nilai Masyarakat Malaysia**	-	Compulsory	1	0	2	2
2	DET30043	Electrical Machine	-	Discipline	2	2	0	3
3	DEE50102	Project 2	***DEE40082***	Discipline	0	3	0	2
4	DET40073	Power Electronics	-	Discipline	2	2	0	3
5	DEG30013	Fundamental of Renewable Energy	-	Discipline	2	2	0	3
6	DEE50122	Circuit Analysis	-	Elective	2	0	1	2
				CONTACT HOURS	9	9	3	15
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	21			

SEMESTER 6

BIL.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUT600610	Engineering Industrial Training	Total Credit 85	Industrial Training	20 Weeks			10
				TOTAL OF CREDIT / CUMMULATIVE	10			10

	Total Credit	%
i. (a) Compulsory	14	15%
(b) Compulsory (Bahasa Kebangsaan A)[b]	2[b]	0%
ii. Common Core	13	14%
iii. Discipline Core	54	57%
Total Credit	81	
v. (a) Electives	4	4%
(b) Free Electives[a]	2[a]	0%
vi. Industrial Training	10	11%
Grand Total Credit	**95**	**100%**

Engineering & Engineering Technology Courses	Total Hours	%
i. Lecture	32	42%
ii. Practical	45	58%
iii. Tutorial	0	0%
Total Contact Hours	77	**100%**

Legend:

L : Lecture, **P** : Practical / Lab, **T** : Tutorial, **O** : Others
(The numbers indicated under L, P, T & O represent the contact hours per week, to be used as a guide for time table preparation)

*For Muslim Students
**For Non Muslim Students

Notes:

1. The minimum and maximum credit value of Electives must be referred to the programme standard or professional bodies.

2. [a]**Free Electives** are courses which are not included in any programme structure but if taken, will contribute towards students' CGPA, provided that institutions adhere to the Jabatan Pendidikan Politeknik & Kolej Komuniti Free Electives Guidelines.

3. [b]**MPU22042 Bahasa Kebangsaan A** is **COMPULSORY** for students who did not attain credit in Bahasa Melayu at Sijil Pelajaran Malaysia (SPM) level and will contribute to students' CGPA.

4. Co-curriculum pathways:
   a. Path 1 : Sport and Club
   b. Path 2 : Uniform Unit (Students are required to **PASS** Uniform Unit 1 as a prerequisite to Uniform Unit 2)

5. Clusters:
   a. CLS1 : Knowledge & Understanding
   b. CLS2 : Cognitive Skills
   c. CLS3a : Practical Skills
   d. CLS3b : Interpersonal & Communication Skills
   e. CLS3c : Digital & Numeracy Skills
   f. CLS3d : Leadership, Autonomy & Responsibility
   g. CLS4 : Personal & Entrepreneurial Skills
   h. CLS5 : Ethics & Professionalism

1. To meet the requirement of Diploma in Electrical and Electronic Engineering a student must complete the three-year full-time programme comprising of five semesters coursework with one full semester of industrial training with the total of **95 credits hour**.
2. Elective courses offered are subjected to departmental amendments.

COURSE SYNOPSIS AND COURSE LEARNING OUTCOME (CLO)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOME (CLO)	ASSESSMENT METHODS
1	DUE10012 Communicative English 1	COMMUNICATIVE ENGLISH 1 focuses on developing students' speaking skills to enable them to communicate effectively and confidently in group discussions and in a variety of social interactions. It is designed to provide students with appropriate reading skills to comprehend a variety of texts. The students are equipped with effective presentation skills as a preparation for academic and work purposes CREDIT(S): 2 PREREQUISITE(S): None	CLO 1 Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3, CLS 3b) CLO2 Demonstrate awareness of values and opinions embedded in texts on currents issues. (A3, CLS 3b) CLO3 Present a topic of interest that carries identifiable values coherently using effective verbal and non-verbal communication skills. (A2, CLS4)	Group Discussion Test Oral Presentation Assignment
1	MPU24XX1 MPU24XX1 Sukan OR Unit Beruniform 1	SUKAN adalah aktiviti yang mengandungi latihan kemahiran berguna secara rekreasi dan peraturan-peraturan tertentu dalam mengejar kecemerlangan bagi penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. **ATAU** UNIT BERUNIFORM 1 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. KREDIT: 1 PRASYARAT: Tiada	CLO1: mempamerkan kemahiran khusus bagi kursus berkaitan (P2, CLS 4) CLO2: menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)	Tunjukcara Mini Projek
1	DUW10022 Occupational, Safety and Health for Engineering	OCCUPATIONAL SAFETY AND HEALTH FOR ENGINEERING course is designed to impart understanding of the self-regulatory concepts and provisions under the Occupational Safety & Health Act (OSHA). This course presents the responsibilities of workers in implementing and complying with the safety procedures at work. Understanding of notifications of accidents, dangerous occurrence, poisoning and diseases and liability for offences will be imparted upon students. This course will also provide an understanding of the key issues in OSH Management, Incident Prevention, Fire Safety, Hazard Identification Risk Control and Risk Assessment (HIRARC), Workplace Environment and Ergonomics and guide the students gradually into this multi-disciplinary science. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia (C2, PLO 1) CLO2: initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment (A3, PLO 8) CLO3: forms communications skills in a team to respond for an accident action at workplace (A3, PLO 10)	Quiz Theory Test Case Study 1 Presentation Case Study 2 Final Examination
1	DBM10013 Engineering Mathematics 1	ENGINEERING MATHEMATICS 1 exposes students to the basic algebra including resolve partial fractions. This course also covers the concept of trigonometry and the method to solve trigonometry problems by using basic identities, compound angle and double angle formulae. Students will be introduced to the theory of complex number and concept of vector and scalar. Students will explore advanced matrices involving 3x3 matrix. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Use mathematical statement to describe relationship between various physical phenomena (C3, CLS1). CLO2: Show mathematical solutions using the appropriate techniques in mathematics (C3, CLS 3c). CLO3: Use mathematical expression in describing real engineering problems precisely, concisely and logically (A3, CLS 3b).	Quiz Test End of Chapter Presentation Final Examination
1	DBS10012 Engineering Science	ENGINEERING SCIENCE course introduces the physical concepts required in engineering disciplines. Students will learn the knowledge of fundamentals physics in order to identify and solve engineering physics problems. Students will be able to perform experiments and activities to mastery physics concepts. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Use basic physics concept to solve engineering physics problems (C3, CLS 1) CLO2: Apply knowledge of fundamental physics in activities to mastery physics concept (C3, CLS 1) CLO3: Perform appropriate activities related to physics concept (P3, CLS 3a)	Lab work Theory Test Mini Project

1	DET10013 Electrical Technology	ELECTRICAL TECHNOLOGY course will introduce students to the principles related to DC electrical circuits. It covers the fundamental laws, theorems and circuit techniques of the electrical technology basic fundamental. This course also covers inductors, capacitor, magnetic and electromagnetic circuits. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: theorems and law using various method and approach. (C3, PLO1) CLO2: Construct DC circuit and measure related electrical parameters using appropriate electrical equipment. (P4, PLO5) CLO3: Demonstrate ability to work in team to complete assigned task within the stipulated time frame. (A3, PLO9)	Test Quiz Practical Test Practical Work Practical Work (Generic Skill) End of Chapter Final Examination
1	DET10022 Electrical Wiring	ELECTRICAL WIRING course exposes students to the various aspects of wiring installation according to the MS IEC 60364 standard. Students will be able to relate theoretical aspect in practical work on electrical wiring during workshop session. This course also provides students with the knowledge and skill in doing different types of wiring installation, wiring protection, wiring inspection, wiring testing and sustainable energy practices in electrical wiring. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to MS IEC 60364(C3, PLO1) CLO2: Construct single phase domestic wiring according to MS IEC 60364. (P4, PLO5) CLO3: Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms during performing single phase domestic wiring task. (A3, PLO8)	Quiz Mini Project Practical Test Practical Work Affective
1	DEE10013 Measurement Devices	MEASUREMENT DEVICES introduces students to the basic concept of electrical instrument and measurement. It covers the basic principles of measurement, safety precautions and meter calibration. Students will also use measurement devices such as analogue meters, DC meters, analogue and digital multimeters, oscilloscopes, signal generators and power meters during practical session. This course also covers the basic concept and simple application of DC CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the concept of measurement in electrical and electronic equipment using appropriate theorem (C3, PLO1) CLO2: perform meter calibrating and measuring technique using the correct measuring equipment (P4, PLO5) CLO3 : demonstrate good communication skill in oral presentation within a stipulated time frame (A3 , PLO 10)	Test Quiz Practical Test Practical Work End of Chapter End of Chapter (Generic Skills) Final Examination

2	MPU21012 Pengajian Malaysia	PENGAJIAN MALAYSIA membincangkan sejarah dan politik, perlembagaan Malaysia dan system pemerintahan negara, kemasyarakatan dan perpaduan, pembangunan negara dan isu-isu keperihatinan negara. Kursus ini adalah bertujuan untuk melahirkan graduan yang mempunyai iedentiti kebangsaan dan semangat patriotisme yang unggul. CREDIT(S): 2 PREREQUISITE(S): None	CLO 1: Menerangkan nilai sejarah bangsa dan negara di Malaysia. (A3, CLS 5) CLO 2: Menghubungkait sikap dan tanggungjawab yang signifikan dengan system pemerintahan negara. (A4, CLS 5) CLO 3: Membentuk minda ingin tahu menerusi aktiviti kemasyarakatan atau patriotism dalam kalangan pelajar. (A3, CLS 4)	Pembentangan Main Peranan Projek 1 Projek 2
2	MPU24XX1 MPU24XX1 Kelab/Persatuan OR Unit Beruniform 2	KELAB memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. **ATAU** UNIT BERUNIFORM 2 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. KREDIT: 1 PRASYARAT: MPU24XX1 SUKAN ATAU UNIT BERUNIFORM 1	CLO1: mempamerkan kemahiran khusus bagi kursus berkaitan (P2, CLS 4) CLO2: menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)	Tunjukcara Mini Projek
2	DBM20023 Engineering Mathematics 2	ENGINEERING MATHEMATICS 2 exposes students to the basic laws of indices and logarithms. This course introduces the basic rules of differentiation concepts to solve problems that relates maximum, minimum and calculate the rates of changes This course discusses integration concepts in order to strengthen student's knowledge for solving area and volume bounded region problems. In addition, students will learn application of both techniques of differentiation and integration. CREDIT(S): 3 PREREQUISITE(S): DBM10013 Measurement Devices	CLO1: Use algebra and calculus knowledge to describe relationship between various physical phenomena (C3, CLS 1) CLO2: Solve the mathematical problems by CLO2: using appropriate and relevant fundamental calculus techniques (C3, CLS 3c) CLO3: Use mathematical language to express mathematical ideas and arguments CLO3: precisely, concisely and logically in calculus (A3, CLS 3b)	Quiz Test End of Chapter Presentation Final Examination

2	DET20033 Electrical Circuits	ELECTRICAL CICUITS is designed to provide students with the knowledge related to AC of electrical circuits. It emphasized on the principles of an alternating current AC waveform and sinusoidal steady state circuit analysis. This course also covers the applications of three phase system and operation of various types of transformers. CREDIT(S): 3 PREREQUISITE(S): DET10013 Electrical Technology	CLO1: apply the concept and principle in solving problems of electrical circuits using the appropriate AC electrical laws and theorem (C3, PLO 1) CLO2: construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments (P4, PLO 5) CLO3: demonstrate ability to work in team to complete assigned tasks within the stipulated time frame (A3, PLO 9)	Test Quiz Practical Test Practical Work Practical Work (Generic Skills) End of Chapter Final Examination
2	DEE20023 Semiconductor Devices	SEMICONDUCTOR DEVICES introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistors and field effect transistors. The content encompasses devices structure to biasing basic applications. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem (C3, PLO1) CLO2: construct the various applications of semiconductor devices circuit by using schematic diagrams (P4, PLO 5) CLO3: demonstarate good communication skill in oral presentation within a stipulated time frame (A3, PLO 10)	Quiz Test Practical Work Practical Test End of Chapter Practical Work (Generic Skills) Final Examination
2	DEE20033 Digital Electronics	DIGITAL ELECTRONICS introduces the theories on the basic of digital systems. This course emphasizes on the digital system fundamentals and applications. This course mainly covers number systems, code systems, logic gates, Boolean operations, flip-flops, counters and registers. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit (C3, PLO 1) CLO2: construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop (P4, PLO 5) CLO3: demonstrate ability to work in team to complete assigned task during practical work sessions (A3, PLO 9)	Quiz Test Practical Test Practical Work End of Chapter Final Examination

2	DEC20012 Programming Fundamentals	PROGRAMMING FUNDAMENTALS course provides the skills necessary for the effective of application of computation and computer programming in engineering applications. Students will develop their programming skills through a variety of assignments and labs and by reviewing case studies and example programs. The learning outcome is proficiency in writing small to medium programs in a procedural programming language. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: apply knowledge of basic concepts and fundamentals of structured programming in solving a variety of engineering and scientific problems using a high level programming language (C3, PLO 1) CLO2: build programs written in C language for assigned mini project during practical work sessions (P4, PLO 5) CLO3: demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project (A3, PLO 12)	Test Quiz Practical Work Mini Project Mini Project (Generic Skills)
3	DUE30022 Communicative English 2	COMMUNICATIVE ENGLISH 2 emphasizes the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints. CREDIT(S): 2 PREREQUISITE(S): Communicative English 1	CLO1: Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience. (A3, CLS 3b) CLO2: Describe processes, procedures and instructions clearly by highlighting information of concern. (A3, CLS 4) CLO3: Demonstrate effectively communication and social skills in handling enquiries and complaints amicably and professionally. (A3. CLS 3b)	Presentation Role Play Test Assignment
3	DBM30043 Electrical Engineering Mathematics	ELECTRICAL ENGINEERING MATHEMATICS exposes students to the statistical and probability concepts and their applications in interpreting data. The course also introduces numerical methods concept to solve simultaneous equations by using Gaussian Elimination method, LU Decomposition using Doolittle and Crout methods. polynomial problems using Simple Fixed Point Iteration methods and Newton Raphson method. In additional, the course also discusses Ordinary Differential Equation (ODE). In order to strengthen the students in solving engineering	CLO1: Demonstrate an understanding of the common body of knowledge in mathematics (C3, CLS 1) CLO2: Demonstrate problems solving skills in engineering problems (C3, CLS 3c) CLO3: Use mathematical expression in describing real engineering problems precisely, concisely and logically (A3, CLS 3b)	Quiz Test End of Chapter Presentation Final Examination

		problems, Laplace Transform by using the Table of Laplace is also included. It is designed to build students' teamwork and problems solving skill. CREDIT(S): 3 PREREQUISITE(S): DBM20023 Engineering Mathematics 2		
3	DEE30043 Electronic Circuits	ELECTRONIC CIRCUITS emphasizes the concept of electronic device applications. The course covers the fundamental of electronic circuit application which include power supply unit, oscillator, operational amplifier, timer, filters and AD/DA converters. The content cover circuit configurations, operation and application of the electronic circuits. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the principles of electronic circuits devices by using block diagram or circuit diagram. (C3, PLO 1) CLO2: construct the various applications of electronic circuits based on the theory and principle operation of the circuits (P4, PLO 5) CLO3: demonstrate good written communication skill through essay writing in group within a stipulated time frame (A3 , PLO 10)	Quiz Test Practical Test Practical Work End of Chapter End of Chapter (Generic Skills) Final Examination
3	DEE30052 Electronic Equipment Repair	ELECTRONIC EQUIPMENT REPAIR provides the knowledge and skills on troubleshooting and repairing the electronics equipment. This course focuses on the identification of faults in regulated dc power supply, audio equipment and television system. This course also provides knowledge and skills on troubleshooting and repairing broken cell phones. CREDIT(S): 2 PREREQUISITE(S): DEE20023 Semiconductor Devices	CLO1: diagnose fault of electronic equipment related to electronic equipment repair using the correct diagnosis technique and tools (C4, PLO 2) CLO2: fix the post-consumer's electronic equipment fault using the correct diagnosis technique (P4, PLO 5) CLO3: demonstrate good social responsibility in solving well defined engineering problems during performing electronic system and appliances maintenance task (A3 , PLO 6)	Quiz Test Practical Work Practical Work (Generic Skills) End of Chapter

3	DEE30071 Electronic Computer Aided Design (ECAD)	ELECTRONIC COMPUTER AIDED DESIGN covers the basic concept and fundamentals of electronic circuit simulation. It also covers the applications of electronic packages for electronic circuit simulation at the circuit level and the logic level. Emphasis is given to the simulation for analogue, digital logic and mixed-signal circuits using various types of simulation analysis. Printed Circuit Board (PCB) layout is then produced for the circuits. The simulation and the PCB layout are done using electronic software package such as Protel / Altium Designer, ORCAD, PSpice, Circuit Maker or Electronic Workbench. CREDIT(S): 1 PREREQUISITE(S): None	CLO1: apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations (C3, PLO 1) CLO2 : construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software (P4, PLO 5)	Practical Test Practical Work Practical End of Chapter
3	DEE30061 Computer Aided Electrical Drawing	COMPUTER AIDED ELECTRICAL DRAWING provides knowledge and exposure on the usage of AutoCAD software. The course focuses on the application of the software to produce drawings of graphics, electrical / electronic component symbols, circuit schematics and electrical wiring layout diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software. CREDIT(S): 1 PREREQUISITE(S): None	CLO1: apply computer aided design concept, applications and capabilities in electrical engineering environment (C3, PLO 1) CLO2: construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American/British technical symbol standard (P4, PLO 5) CLO3: adhere to professionalism and ethics in drawing electrical consumer wiring diagram in practical work according to Energy Commission (EC) and MS IEC 60364 standard (A3, PLO 8)	Practical Test End of Chapter Practical Work Practical Work (Generic Skills)
3	DEP30013 Communication System Fundamentals	COMMUNICATION SYSTEM FUNDAMENTALS introduces the students to the concepts of communication system. This course covers the principles of communications, analog and digital modulation techniques, multiplexing and transmission medium. It also exposes the students to the basic of data communication system.	CLO1: apply the concept of electronic communication system by using appropriate diagram and standard formula (C3, PLO 1) CLO2: assemble the related communication equipment systematically in performing the measurement of appropriate signals parameter (P4, PLO 5)	Quiz Test Practical Test Practical Work Practical Work (Generic Skills) End of Chapter Final Examination

		CREDIT(S): 3 PREREQUISITE(S): None	CLO3 : demonstrate the ability to work in a team to complete the assigned tasks during practical work sessions (A3 , PLO 9)	
3	DET30053 Power System	POWER SYSTEM course will provide students with the concepts of non-renewable and renewable energy. It also annotates on the environmentally friendly electrical power generation, transmission, distribution and consumerization of the electrical power. CREDIT(S): 3 PREREQUISITE(S): DET20033 Electrical Circuits	CLO1: Apply the concepts of eco- friendly power generation resources to improve an environmentally conscious of a quality power generation, transmission and distribution system and its efficiency. CLO2: Perform the practical works on electrical power generation, transmission and distribution system using an appropriate energy-efficient equipment. (P4, PLO5) CLO3: Demonstrate the awareness toward the sustainable energy generation and environmental friendly methods of transmission and distribution system. (A3, PLO7)	Quiz Test Practical Test Practical Work Essay (Generic Skills) Essay
4	MPU22012 Entrepreneurship	ENTREPRENEURSHIP focuses on the fundamentals and concept of entrepreneurship in order to inculcate the value and interest in students to choose entrepreneurship as a career. This course can help students to initiate creative and innovative entrepreneurial ideas. It also emphasizes a preparation of a business plan framework through business model canvas. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Propose the value proposition of entrepreneurial idea using Business Model Canvas (A3, CLS 3b) CLO2: Develop a viable business plan by organizing business objectives according to priorities (A4, CLS 4) CLO3: Organise the online presence business in social media marketing platform (A3,CLS 4)	Product Pitching Business Plan Presentation Online Business Report
4	DUE50032 Communicative English 3	COMMUNICATIVE ENGLISH 3 aims to develop the necessary skills in students to analyse and enterpret graphs and charts from data collected as well as to apply the job hunting mechanics effectively in their related fields, Students will learn to gather data and present them through the use of graphs and charts. Students will also learn basic of job hunting mechanics which include using various job search strategies, making enquiries, and preparing relevant resumes and cover letters. The student will develop communication skills to introduces	CLO 1: Present gathered data in graphs and charts effectively using appropriate language forms and functions (A2, CLS 3b) CLO2: Prepare a high impact resume and a cover letter, highlighting competencies and strengths that meet employer's expectations. (A4, CLS 4) CLO3: Demonsrate effective communication and social skills	Presentation Mock Interview Test Assignment 1 Assignment 2

		themselves, highlight their strengths and abilities, present ideas, express opinions and respond appropriately during job interviews. CREDIT(S): 2 PREREQUISITE(S): Communicative English 2	in handling job interviews confidently. (A3, CLS 3b)	
4	DEC30023 Computer Networking Fundamentals	COMPUTER NETWORK FUNDAMENTALS introduce students to the concepts and principles of data transmission and computer networks. This course enables students to correctly use standard terminology in describing the main Local Area Network (LAN) topologies, hardware and software components used in networking. This course provides students with the knowledge and skills to build a network infrastructure using copper cabling, and wireless devices wisely. Students also learn to troubleshoot and secure the network. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: investigate a computer network structure to determine the network protocol, network services, network problem and network security when implementing specific networking requirements (C4, PLO 4) CLO2: construct a simple LAN or WLAN in accordance to IEEE or TIA/EIA-568-A/B wiring standard and network troubleshooting using network simulation or tools (P4, PLO 5) CLO3: demonstrate awareness of the norm practice of professional bodies such as IEEE or TIA/EIA-568-A/B during practical work session (A3, PLO 8)	Quiz Test Practical Test Practical Work Practical Work (Generic Skills) End of Chapter Final Examination
4	DEC40053 Embedded System Application	EMBEDDED SYSTEM APPLICATIONS cover the basic concept and application of microcontroller system based on Peripheral Interface Controller (PIC) microcontroller. Students will learn software and hardware development on PIC16F/PIC18F microcontroller development system and understand how to do interfacing with external devices using suitable internal chip features. Students are exposed to the new Microcontroller Unit (MCU) simulation software such as Proteus CREDIT(S): 3 PREREQUISITE(S): DEC20012 Programming Fundamentals	CLO1: investigate internal features of PIC16F/PIC18F to interface properly with external devices (C4, PLO 4) CLO2: design embedded system application based on PIC16F/PIC18F microcontroller effectively (C6, PLO 3) CLO3: construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively (P4, PLO 5) CLO4 : demonstrate knowledge of engineering project management principles through a written report on an assigned mini project (A3 , PLO 11)	Quiz Test Practical Work Mini Project Mini Project (Generic Skills) Final Examination

4	DEJ40033 PLC & Automation	PROGRAMMABLE LOGIC CONTROLLER (PLC) AND AUTOMATION provides knowledge regarding the concept and principle of automation system. This course emphasizes the relationship between conventional/hardwired/relay ladder logic (RLL) and PLC system, application of various industrial input and output devices of PLC, designing process, programming, constructing and PLC maintenance method. This course also provides knowledge and skills in designing environmentally friendly of automation control system based on conventional/hardwired/relay ladder logic (RLL) and PLC. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: evaluate environmentally-friendly automation control system using electromechanical devices and PLC (C5, PLO 2) CLO2: display the ability to construct, troubleshoot and do maintenance of hardwired and PLC systems using appropriate equipment (P4, PLO 5) CLO3 : demonstrate an understanding of PLC environmentally-friendly automation system norm by following PLC IEC standard during practical work session (A3 , PLO 7)	Quiz Test Practical Work Practical Work (Generic Skill) End of Chapter Final Examination
4	DEE40082 Project 1	PROJECT 1 provides knowledge regarding the implementation and development methods of a project based on hardware or software or a combination of hardware and software. This course provides exposure to the project management and finance, techniques to develop project and proposal preparation. CREDIT(S): 2 PREREQUISITE(S):None	CLO1: investigate well defined problem in order to make improvements on a chosen project (C4, PLO 4) CLO2: evaluate engineering problem and conduct research in order to make improvements on a chosen project whether the project is on the hardware, software or hardware-software interface type (C5, PLO 2) CLO3: perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically (P4, PLO 5) CLO4: display good project management and finance through a Gantt Chart (milestone) and final proposal (A3, PLO 11) CLO5: demonstrate continuous learning, information management and independent acquisition of new knowledge and skill to support the development of the project through the final proposal (A3, PLO 12)	Investigation report Logbook Final Proposal

			CLO6: display written communication skill through a final proposal (A3, PLO 10) CLO7: describe the impact of the proposed project to the society in the final proposal (A3 , PLO 6)	
4	DEC50122 Embedded Robotic	EMBEDDED ROBOTIC presents the combination of mobile robots and embedded systems, from introductory to intermediate level. It is structured in three parts, which are embedded systems, mobile robot, and mobile robot applications. These parts are essential to students in mastering the crucial steps of building a complete working robotic system. They will help them to develop robots that not only can move, but intelligent as well. CREDIT(S): 2 PREREQUISITE(S): DEC20012 Programming Fundamentals	CLO1: investigate the concept and fundamentals of mobile robotic, embedded controller, sensors and actuators based on land mobile robot design (C4, PLO 4) CLO2: design the concept of robot positioning, identification and communication in mobile robot control according to a standard robot organization regulation (C6, PLO 3) CLO3: manipulate the application of sensor and actuator, robot identification and communication during practical work based on land mobile robot design (P4, PLO 5) CLO4: demonstrate good ability in managing a well-defined engineering-based project in a cost effective manner (A3, PLO11)	Quiz Test Practical Work Mini Project Mini Project (Generic Skills)
5	MPU23052 Sains Teknologi dan Kejuruteraan Islam	SAINS TEKNOLOGI DAN KEJURUTERAAN DALAM ISLAM memberi pengetahuan tentang konsep Islam sebagai al-Din dan seterusnya membincangkan konsep sains, teknologi dan kejuruteraan dalam Islam serta impaknya, pencapaiannya dalam tamadun Islam, prinsip serta peranan syariah dan etika Islam, Peranan keaedah fiqh serta aplikasinya. CREDIT(S): 2 PREREQUISITE(S): None	CLO 1: Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian. (A2, CSs 4) CLO 2: Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam. (A3, CLS 5) CLO 3: Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam. (A4, CLS4)	Tunjukcara Pembentangan E folio Tugasan berdasarkan masalah.

5	MPU23042 Nilai Masyarakat Malaysia	Membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran-cabaran dalam membentuk masyarakat Malaysia. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Membincangkan konsep integrasi di Malaysia. (A2, CLS 4) CLO: Menerangkan etika dan nilai berkaitan pembentukan integrasi di Malaysia (A3, CLS 5) CLO3: Menghubungkait minda ingin tahu dengan cabaran dan kejayaan integrasi di Malaysia. (A4, CLS 4)	Perbincangan Pembentangan E-folio Tugas berasaskan masalah
5	DET30043 Electrical Machine	ELECTRICAL MACHINE course expose students to the basic construction, principle of operation and control of various type of motor and generator. This course provides students with the basic knowledge and skills to solve various problem related to motors and generators. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Apply the concept, principle operation and motor control of electrical machine to solve the related problems using standard formula. (C3, PLO1) CLO2: Measure and record electrical and mechanical parameters related to ac and dc electrical machine using appropriate electrical equipments. (P4, PLO5) CLO3: Demonstrate ability to work in team to complete assigned tasks. (A3, PLO9)	Test Quiz Practical Work Practical Test Practical Work (Generic Skills) End of Chapter
5	DEE50102 Project 2	PROJECT 2 is the continuation of DEE40082 PROJECT 1 course. The course focuses on methods of circuit construction, testing, troubleshooting, debugging, repair and also completion of the project which was planned during the previous semester. This course also requires students to manage an economical engineering based project, prepare a project report in a given format and deliver a project presentation at the end of the semester. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course. CREDIT(S): 2 PREREQUISITE(S): DEE40082 Project 1	CLO1: investigate the various alternative preliminary design and software programming for the previous chosen project (C4, PLO 4) CLO2: design project prototype (for hardware and interfacing project) with suitable and attractive casing or complete system programme (for software project) with user interface (C6, PLO 3) CLO3: perform systematically the relevant test and measurement to determine circuit fault and functionality and construct project casing (hardware project) or test run, debug and	Logbook Model/System Final Report (Generic Skills) Presentation (Generic Skills)

			execute system programme (software project) using modern tools (P4, PLO 5) CLO4: display element of environment and sustainability awareness in project implementation (A3, PLO 7) CLO5: display effective communication skill in report writing and during presentation (A3, PLO 10) CLO6: display good ability in project management and finance using a Gantt Chart (milestone chart) and an effective costing respectively (A3, PLO 11)	
5	DET40073 Power Electronics	POWER ELECTRONICS course is aimed to equip students with the knowledge and skills related to power electronic devices and its application in power conversion. This course also will focus on the operational principle of rectifiers, choppers, inverters and AC voltage controller circuits. Emphasis is given more on producing the output voltage waveforms of the converter. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Analyze and investigate the well-defined operational behaviors, principle and basic concepts of power electronics by using schematics circuits. (C4, PLO4) CLO2: Construct converters circuits and make observation on displayed waveforms using appropriate methods and equipment. (P4, PLO5) CLO3: Demonstrate the ability to practice leadership skills to complete assigned power electronics tasks. (A3, PLO9)	Quiz Practical Work Test Practical Work (Generic Skills) End of Chapter Final Examination
5	DEG30013 Fundamental of Renewable Energy	FUNDAMENTAL OF RENEWABLE ENERGY course is aimed to provide students with the knowledge and skills related to meet the demands of the new economy that will rely on the primary source. The focus is on the renewable energy sources such as solar, wind, bioenergy, geothermal, hydroelectric, tidal and fuel cell. The importance and public benefits of renewable energy used and the environmental impact of renewable energy technologies will also be discussed. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Apply principles of renewable energy technology in addressing clean, safe and sustainable energy supply according to energy and environment policy (C3, PLO1) CLO2: Measure input and output parameters of renewable energy system using appropriate tools and equipment (P4, PLO 5) CLO3: Demonstrate understanding of environment & sustainability practices in renewable energy	Quiz Practical Work Test Practical Work (Generic Skills) Practical Test End of Chapter Final exam

			field through a given task session (A3, PLO 7)	
5	DEE50122 Circuit Analysis	CIRCUIT ANALYSIS provides knowledge and exposure on how to analyze electrical circuits that have alternating current (AC) voltage or current sources using various circuit analysis techniques and theorems. Application of mathematic theorem of Laplace Transform is also introduced as another method of AC circuit analysis and the use of mathematic theorem of Fourier Series to analyze electrical waveforms. CREDIT(S): 2 PREREQUISITE(S): DET20033 Electrical Circuits	CLO1: evaluate problems related to AC circuit analysis, Laplace transform and application and Fourier Series signal analysis using the appropriate table, formula and theorems (C5, PLO 2) CLO2: display ability to work in team to propose the best solution to the assigned group tasks (A3 , PLO 9)	Quiz Test End of Chapter End of Chapter (Generic Skills) Final Examination

Elective courses offered are subjected to departmental amendments.

LIST OF DEP LECTURERS

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PROGRAMME DETAILS

PROGRAMME NAME: DIPLOMA IN ELECTRONIC ENGINEERING (COMMUNICATION)
PROGRAMME CODE: DEP

INTRODUCTION

Electrical engineering is the field of study which generally deals with the application of electrical and electronics towards designing, testing and development of circuitry and equipment for well-defined engineering activities. It requires the application of scientific and engineering knowledge and methods combined with practical skills in supporting well-defined engineering activities to prepare students for their future role in the industry.

The electrical engineering diploma graduates of the Polytechnic's Ministry of Education Malaysia are exposed to a comprehensive curriculum consisting of courses in personal development, mathematics, science, electrical disciplines and workplace competencies requirements. Graduates of the electrical engineering diploma programme will be equipped with specialized knowledge and skills which include power engineering, green technology, energy efficiency, computer technology, communication, medical electronics, optoelectronic and industrial automation.

The Diploma in Electronic Engineering (Communication) is a three-year full-time programme comprising of five semesters coursework with one full semester of industrial training.

SYNOPSIS

The Diploma in Electronic Engineering (Communication) covers broad discipline of electronics engineering, with specialization in communication technology which includes, electrical and electronic fundamentals, computer fundamentals and programming, communication system fundamentals, semiconductor devices, and computer aided design, while emphasizing the area of specialization. The specialization courses include telecommunication network, fibre optic communication system, data communication and networking, wireless communication and microwave devices.

JOB PROSPECT

This programme provides the knowledge and skills in communication engineering that can be applied to a broad range of careers in most electronic communication field. The knowledge and skills that the students acquire from the programme will enable them to participate in the job market as:

a. *Assistant Engineer*
b. *Assistant Radio Frequency Engineer*
c. *Technical Executive*
d. *Marketing Executive*
e. *Technical Supervisor*
f. *Assistant Technical Designer*
g. *Assistant Network Engineer*
h. *Assistant Network Administrator*
i. *Assistant Drive Test Engineer*
j. *Assistant Drive Test Analyser Engineer*
k. *Network planner*
l. *Electrical/Electronic Technician*

EDUCATIONAL GOAL

To produce holistic and competent TVET graduates capable of contributing to the national development.

PROGRAMME AIM

This programme believes that all individuals have potential to be a resourceful and adaptable technician to support the nation aspiration in providing engineering talent.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The engineering programme should produce balanced TVET graduates who are:

NO	PEO	CONTENT
1	**PEO1**	Practicing technician in electrical engineering related field
2	**PEO2**	Contributing to society with professional ethic and responsibilities
3	**PEO3**	Engaging in enterprising activities that apply engineering knowledge and technical skills
4	**PEO4**	Engaging in activities to enhance knowledge for successful career advancement

PROGRAMME LEARNING OUTCOMES (PLO)

Upon completion of the programme, students should be able to:

NO	PLO	CONTENT
1	**PLO1**	apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices
2	**PLO2**	identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)
3	**PLO3**	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 (DK5)
4	**PLO4**	conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements
5	**PLO5**	apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)
6	**PLO6**	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 (DK7)
7	**PLO7**	understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)
8	**PLO8**	understand and commit to professional ethics and responsibilities and norms of technician practice
9	**PLO9**	function effectively as an individual, and as a member in diverse technical teams
10	**PLO10**	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
11	**PLO11**	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 projects in multidisciplinary environments
12	**PLO12**	recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

Notes:

KNOWLEDGE PROFILE (DK)

DK	CONTENT
DK1	A descriptive, formula-based understanding of the natural sciences applicable in a sub-discipline
DK2	Procedural mathematics, numerical analysis, statistics applicable in a subdiscipline
DK3	A coherent procedural formulation of engineering fundamentals required in an accepted sub-discipline
DK4	Engineering specialist knowledge that provides the body of knowledge for an accepted sub-discipline
DK5	Knowledge that supports engineering design based on the techniques and procedures of a practice area
DK6	Codified practical engineering knowledge in recognised practice area
DK7	Knowledge of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts

MATRIX OF PROGRAMME LEARNING OUTCOME (PLO) VS PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PROGRAM LEARNING OUTCOME (PLO)		PROGRAMME EDUCATIONAL OBJECTIVE (PEO)			
		PEO1	PEO2	PEO3	PEO4
PLO1	apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices;	/			
PLO2	identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4);	/			
PLO3	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 (DK5);	/			
PLO4	conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements;	/			
PLO5	apply appropriate techniques, resources, and modern engineering and IT tools to well- defined engineering problems, with an awareness of the limitations (DK6);	/			
PLO6	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 (DK7);		/		
PLO7	understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7);		/		
PLO8	understand and commit to professional ethics and responsibilities and norms of technician practice;		/		
PLO9	function effectively as an individual, and as a member in diverse technical teams;			/	
PLO10	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;			/	
PLO11	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 projects in multidisciplinary environments;			/	
PLO12	recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge;				/

COURSES VERSUS PROGRAMME OUTCOMES MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS L	P	T	O	CREDIT VALUES	SEMESTER 1	CLS1	Knowledge	PLO1	CLS2	Problem Analysis	PLO2	CLS2	Design/Development of Solutions	PLO3	CLS2	Investigation	PLO4	CLS3a	CLS3c	Modern Tool Usage	PLO5	CLS3b	The Engineer and Society	PLO6	CLS5	Environment and Sustainability	PLO7	CLS5	Ethics	PLO8	CLS3d	Individual and Teamwork	PLO9	CLS3b	Communications	PLO10	CLS4	Project Management and Finance	PLO11	CLS4	Life Long Learning	PLO12	PREREQUISITE / CO-REQUISITE	TOTAL	26	18
Compulsory	DUE10012	Communicative English 1	1	0	2	0	2																																											
	MPU24XX1 MPU24XX1	Sukan Unit Beruniform 1	0	2	0	0	1																										√															
Common Core	DUW10022	Occupational. Safety and Health for Engineering	2	0	0	0	2		√																					√																		
	DBM10013	Engineering Mathematics 1	2	0	2	0	3		√													√										√	√															
	DBS10012	Engineering Science	2	1	0	0	2		√			√								√																													
Discipline Core	DET10013	Electrical Technology	2	2	0	0	3		√			√								√																													
	DET10022	Electrical Wiring	1	3	0	0	2		√			√								√												√																	
	DEE10013	Measurement Devices	2	2	0	0	3		√			√								√																													

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 3																					
Compulsory	DUE30022	Communicative English 2	1	0	2	0	2											√		√	DUE10012
Common Core	DBM30043	Electrical Engineering Mathematics	2	0	2	0	3	√					√					√			DBM20023
Discipline Core	DEE30043	Electronic Circuits	2	2	0	0	3	√				√						√			
	DEE30052	Electronic Equipment Repair	1	3	0	0	2		√			√	√	√							DEE20023
	DEE30071	Electronic Computer Aided Design	0	2	0	0	1	√				√	√								
	DEP30013	Communication System Fundamentals	2	2	0	0	3	√				√	√				√				
Specialisation	DEP30083	Telecommunication Network	2	2	0	0	3	√				√						√			
TOTAL			**25**				**17**														

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 2																					
Compulsory	MPU21012	Pengajian Malaysia	1	0	2	0	2									√				√	
	MPU24XX1	Kelab/Persatuan	0	2	0	0	1										√			√	
	MPU24XX1	Unit Beruniform 2																			MPU24XX1
Common Core	DBM20023	Engineering Mathematics 2	2	0	2	0	3	√					√					√			DBM10013
Discipline Core	DET20033	Electrical Circuits	2	2	0	0	3	√				√					√				DET10013
	DEE20023	Semiconductor Devices	2	2	0	0	3	√				√						√			
	DEE20033	Digital Electronics	2	2	0	0	3	√				√	√				√				
	DEC20012	Programming Fundamentals	1	2	0	0	2	√				√	√							√	
TOTAL			**24**				**17**														

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)											PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 4																				
Compulsory	DUE50032	Communicative English 3	1	0	2	0	2										√		√	DUE30022
	MPU22012	Entrepreneurship	1	0	2	0	2										√	√		
Discipline Core	DEC40053	Embedded System Application	2	2	0	0	3			√	√	√	√					√		DEC20012
Specialisation	DEP40053	Fibre Optic Communication System	2	2	0	0	3			√	√	√			√					
	DEE40113	Signal and System	2	2	0	0	3		√			√	√				√			DBM20023
	DEE40082	Project 1	1	2	0	0	2		√		√	√	√	√			√	√	√	
Electives		Elective 1	0	0	0	0	2													
TOTAL			**21**				**17**													

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)											PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 5																				
Compulsory	MPU23052 MPU23042	Sains Teknologi dan Kejuruteraan Islam* Nilai Masyarakat Malaysia**	1	0	2	0	2								√				√	
Discipline Core	DEE30061	Computer Aided Electrical Drawing	0	2	0	0	1	√				√	√		√					
Specialisation	DEP50033	Data Communication and Networking	2	2	0	0	3		√			√	√		√					DEP30013
	DEP50043	Microwave Devices	2	2	0	0	3				√	√	√	√						
	DEP50063	Wireless Communication	2	2	0	0	3				√	√	√		√					
	DEE50102	Project 2	0	3	0	0	2			√	√	√	√		√		√	√		DEE40082
Electives		Elective 2	0	0	0	0	2													
TOTAL			**20**				**16**													
SEMESTER 6																				
Industrial Training	DUT600610	Engineering Industrial Training	0	0	0	0	10					√	√			√	√	√	√	
TOTAL			**0**				**10**													
TOTAL CREDIT VALUE							**95**													

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
11	DEQ40023	Energy Management System and Energy Auditing	2	2	0	0	3		√			√	√			√					
12	DEQ40032	Energy Efficiency Engineering 1	2	0	0	0	2				√			√							
13	DET40073	Power Electronics	2	2	0	0	3				√	√	√				√				
14	DEU40032	Biomedical Signal Measurement	1	2	0	0	2		√			√					√				
15	DEC50103	Operating Systems	2	2	0	0	3				√	√	√			√					
16	DEC50113	Computer System Diagnosis and Maintenance	2	2	0	0	3		√			√	√	√							
17	DEC50122	Embedded Robotic	1	2	0	0	2			√	√	√	√						√		DEC20012
18	DEC50132	Internet Based Controller	1	2	0	0	2	√				√	√		√						
19	DEC50143	CMOS Integrated Circuit Design and Fabrication	2	2	0	0	3			√		√	√		√						DEE20023 &DEE20033
20	DEC50152	CMOS VLSI Layout Design	1	2	0	0	2			√		√	√		√						

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
1	DEC40062	Visual Basic Programming	1	2	0	0	2			√		√	√						√		
2	DEC40073	Database System	2	2	0	0	3				√	√	√						√		
3	DEC40082	Interactive Multimedia Application	1	2	0	0	2			√	√	√	√					√			
4	DEC40092	Computer Vision Programming	1	2	0	0	2				√	√	√							√	
5	DEE40092	Audio Video Systems and Production	1	2	0	0	2	√				√	√							√	
6	DEG40023	Renewable Energy System	2	2	0	0	3		√			√		√							DEG30013
7	DEJ40033	Programmable Logic Controller (PLC) and Automation	2	2	0	0	3		√			√			√						
8	DEJ40043	Control Systems	2	2	0	0	3		√			√		√							DEJ30013
9	DEJ40052	Operations Management	2	2	0	0	2	√				√				√					
10	DEO40023	Optoelectronic	3	0	0	0	3		√					√							

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
31	DEU50013	Medical System Practice	2	2	0	0	3		√			√			√						
32	DEU50043	Medical Imaging	2	2	0	0	3				√	√			√						
33	DEU50053	Biomedical Instrumentation	2	2	0	0	3				√	√		√							

FREE ELECTIVES[a]																					
1	DUD10012	Design Thinking	1	0	0	1	2		√									√			

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
21	DEE50122	Circuit Analysis	2	0	1	0	2		√								√				
22	DEG50032	Energy Efficiency And Management	2	0	0	0	2				√			√							
23	DEG50043	Green Energy System Integration	2	2	0	0	3		√			√	√							√	
24	DEJ50063	Process Measurement	1	2	0	0	3	√				√					√				
25	DEO50033	Optosemiconductor	3	0	0	0	3				√				√						DEO40023
26	DEP50072	Satellite and Radar Communication Systems	2	0	0	0	2				√									√	
27	DEQ50043	Energy Efficiency Engineering 2	2	0	0	0	3		√			√	√	√							DEQ40032
28	DET50063	Motor Control and Drives	2	2	0	0	3		√			√						√			DET40073
29	DET50083	Power System Protection	2	2	0	0	3				√	√		√							DET30053
30	DET50093	Electrical Maintenance and Repair	2	2	0	0	3		√			√		√							

PROGRAMME STRUCTURE

SEMESTER 1

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUE10012	Communicative English 1	-	Compulsory	1	0	2	2
2	MPU24XX1 MPU24XX1	Sukan **OR** Unit Beruniform 1	-	Compulsory	0	2	0	1
3	DUW10022	Occupational, Safety and Health for Engineering	-	Common	2	0	0	2
4	DBM10013	Engineering Mathematics 1	-	Common	2	0	2	3
5	DBS10012	Engineering Science	-	Common	2	1	0	2
6	DET10013	Electrical Technology	-	Discipline	2	2	0	3
7	DET10022	Electrical Wiring	-	Discipline	1	3	0	2
8	DEE10013	Measurement Devices	-	Discipline	2	2	0	3
				CONTACT HOURS	12	10	4	18
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	26			

SEMESTER 2

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	MPU21012	Pengajian Malaysia	-	Compulsory	1	0	2	2
2	MPU24XX1 MPU24XX1	Kelab/Persatuan **ATAU** Unit Beruniform 2	***MPU24XX1***	Compulsory	0	2	0	1
3	DBM20023	Engineering Mathematics 2	***DBM10013***	Common	2	0	2	3
4	DET20033	Electrical Circuits	***DET10013***	Discipline	2	2	0	3
5	DEE20023	Semiconductor Devices	-	Discipline	2	2	0	3
6	DEE20033	Digital Electronics	-	Discipline	2	2	0	3
7	DEC20012	Programming Fundamentals	-	Discipline	1	2	0	2
				CONTACT HOURS	10	10	4	
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	24			17

SEMESTER 3

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUE30022	Communicative English 2	***DUE10012***	Compulsory	1	0	2	2
2	DBM30043	Electrical Engineering Mathematics	***DBM20023***	Common	2	0	2	3
3	DEE30043	Electronic Circuits	-	Discipline	2	2	0	3
4	DEE30052	Electronic Equipment Repair	***DEE20023***	Discipline	1	3	0	2
5	DEE30071	Electronic Computer Aided Design (ECAD)	-	Discipline	0	2	0	1
6	DEP30013	Communication System Fundamentals	-	Discipline	2	2	0	3
7	DEP30083	Telecommunication Network	-	Specialisation	2	2	0	3
				CONTACT HOURS	10	11	4	
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	25			17

SEMESTER 4

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUE50032	Communicative English 3	***DUE30022***	Compulsory	1	0	2	2
2	MPU22012	Entrepreneurship	-	Compulsory	1	0	2	2
3	DEC40053	Embedded System Application	***DEC20012***	Discipline	2	2	0	3
4	DEP40053	Fibre Optic Communication System	-	Specialisation	2	2	0	3
5	DEE40113	Signal and System	***DBM20023***	Specialisation	2	2	0	3
6	DEE40082	Project 1	-	Specialisation	1	2	0	2
7	DEC50122	Embedded Robotic	***DEC20012***	Elective	1	2	0	2
				CONTACT HOURS	10	12	2	
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	24			17

SEMESTER 5

BIL.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	MPU23052 MPU23042	Sains Teknologi dan Kejuruteraan Islam* **ATAU** Nilai Masyarakat Malaysia**	-	Compulsory	1	0	2	2
2	DEE30061	Computer Aided Electrical Drawing	-	Discipline	0	2	0	1
3	DEP50033	Data Communication and Networking	***DEP30013***	Specialisation	2	2	0	3
4	DEP50043	Microwave Devices	-	Specialisation	2	2	0	3
5	DEP50063	Wireless Communication	-	Specialisation	2	2	0	3
6	DEE50102	Project 2	***DEE40082***	Specialisation	0	3	0	2
7	DEP50072	Satellite and Radar Communication System	-	Elective	2	0	0	2
				CONTACT HOURS	**9**	**11**	**2**	**16**
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE	**22**			

SEMESTER 6

BIL.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUT600610	Engineering Industrial Training	Total Credit 85	Industrial Training	20 Weeks			10
				TOTAL OF CREDIT / CUMMULATIVE	**10**			**10**

	Total Credit	%
i. (a) Compulsory	14	15%
(b) Compulsory (Bahasa Kebangsaan A)[b]	2[b]	0%
ii. Common Core	13	14%
iii. Discipline Core	32	34%
iv. Specialisation	22	23%
Total Credit	81	
v. (a) Electives	4	4%
(b) Free Electives[a]	2[a]	0%
vi. Industrial Training	10	11%
Grand Total Credit	**95**	**100%**

Engineering & Engineering Technology Courses	**Total Hours**	%
i. Lecture	32	42%
ii. Practical	45	58%
iii. Tutorial	0	0%
Total Contact Hours	**77**	**100%**

Legend:

L : Lecture, **P** : Practical / Lab, **T** : Tutorial, **O** : Others
(The numbers indicated under L, P, T & O represent the contact hours per week, to be used as a guide for time table preparation)

*For Muslim Students
**For Non Muslim Students

Notes:

1. The minimum and maximum credit value of Electives must be referred to the programme standard or professional bodies.

2. [a]**Free Electives** are courses which are not included in any programme structure but if taken, will contribute towards students' CGPA, provided that institutions adhere to the Jabatan Pendidikan Politeknik & Kolej Komuniti Free Electives Guidelines.

3. [b]**MPU22042 Bahasa Kebangsaan A** is **COMPULSORY** for students who did not attain credit in Bahasa Melayu at Sijil Pelajaran Malaysia (SPM) level and will contribute to students' CGPA.

4. Co-curriculum pathways:
   a. Path 1 : Sport and Club
   b. Path 2 : Uniform Unit (Students are required to **PASS** Uniform Unit 1 as a prerequisite to Uniform Unit 2)

5. Clusters:
   a. CLS1 : Knowledge & Understanding
   b. CLS2 : Cognitive Skills
   c. CLS3a : Practical Skills
   d. CLS3b : Interpersonal & Communication Skills
   e. CLS3c : Digital & Numeracy Skills
   f. CLS3d : Leadership, Autonomy & Responsibility
   g. CLS4 : Personal & Entrepreneurial Skills
   h. CLS5 : Ethics & Professionalism

1. To meet the requirement of Diploma in Electronic Engineering (Communication) a student must complete the three-year full-time programme comprising of five semesters coursework with one full semester of industrial training with the total of **95 credits hour**.
2. Elective courses offered are subjected to departmental amendments.

COURSE SYNOPSIS AND COURSE LEARNING OUTCOME (CLO)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOME (CLO)	ASSESSMENT METHODS)
1	DUE10012 Communicative English 1	COMMUNICATIVE ENGLISH 1 focuses on developing students' speaking skills to enable them to communicate effectively and confidently in group discussions and in a variety of social interactions. It is designed to provide students with appropriate reading skills to comprehend a variety of texts. The students are equipped with effective presentation skills as a preparation for academic and work purposes CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3, CLS 3b) CLO2: Demonstrate awareness of values and opinions embedded in texts on currents issues. (A3, CLS 3b) CLO3: Present a topic of interest that carries identifiable values coherently using effective verbal and non-verbal communication skills. (A2, CLS4)	Group Discussion Test Oral Presentation Assignment
1	MPU24XX1 Sukan OR Unit Beruniform 1	SUKAN adalah aktiviti yang mengandungi latihan kemahiran berguna secara rekreasi dan peraturan-peraturan tertentu dalam mengejar kecemerlangan bagi penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. **ATAU** UNIT BERUNIFORM 1 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. KREDIT: 1 PRASYARAT: Tiada	CLO1: Mempamerkan kemahiran khusus bagi kursus berkaitan (P2, CLS 4) CLO2: Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)	Tunjukcara Mini Projek

1	DUW10022 Occupational, Safety and Health for Engineering	OCCUPATIONAL SAFETY AND HEALTH FOR ENGINEERING course is designed to impart understanding of the self-regulatory concepts and provisions under the Occupational Safety & Health Act (OSHA). This course presents the responsibilities of workers in implementing and complying with the safety procedures at work. Understanding of notifications of accidents, dangerous occurrence, poisoning and diseases and liability for offences will be imparted upon students. This course will also provide an understanding of the key issues in OSH Management, Incident Prevention, Fire Safety, Hazard Identification Risk Control and Risk Assessment (HIRARC), Workplace Environment and Ergonomics and guide the students gradually into this multi-disciplinary science. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia (C2, PLO 1) CLO2: Initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment (A3, PLO 8) CLO3: Forms communications skills in a team to respond for an accident action at workplace (A3, PLO 10)	Quiz Theory Test Case Study 1 Presentation Case Study 2 Final Examination
1	DBM10013 Engineering Mathematics 1	ENGINEERING MATHEMATICS 1 exposes students to the basic algebra including resolve partial fractions. This course also covers the concept of trigonometry and the method to solve trigonometry problems by using basic identities, compound angle and double angle formulae. Students will be introduced to the theory of complex number and concept of vector and scalar. Students will explore advanced matrices involving 3x3 matrix. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Use mathematical statement to describe relationship between various physical phenomena (C3, CLS1). CLO2: Show mathematical solutions using the appropriate techniques in mathematics (C3, CLS 3c). CLO3: Use mathematical expression in describing real engineering problems precisely, concisely and logically (A3, CLS 3b).	Quiz Test End of Chapter Presentation Final Examination
1	DBS10012 Engineering Science	ENGINEERING SCIENCE course introduces the physical concepts required in engineering disciplines. Students will learn the knowledge of fundamentals physics in order to identify and solve engineering physics problems. Students will be able to perform experiments and activities to mastery physics concepts. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Use basic physics concept to solve engineering physics problems (C3, CLS 1) CLO2: Apply knowledge of fundamental physics in activities to mastery physics concept (C3, CLS 1) CLO3: Perform appropriate activities related to physics concept (P3, CLS 3a)	Lab work Theory Test Mini Project

1	DET10013 Electrical Technology	ELECTRICAL TECHNOLOGY course will introduce students to the principles related to DC electrical circuits. It covers the fundamental laws, theorems and circuit techniques of the electrical technology basic fundamental. This course also covers inductors, capacitor, magnetic and electromagnetic circuits. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Theorems and law using various method and approach. (C3, PLO1) CLO2: Construct DC circuit and measure related electrical parameters using appropriate electrical equipments. (P4, PLO5) CLO3: Demonstrate ability to work in team to complete assigned task within the stipulated time frame. (A3, PLO9)	Test Quiz Practical Test Practical Work Practical Work (Generic Skill) End of Chapter Final Examination
1	DET10022 Electrical Wiring	ELECTRICAL WIRING course exposes students to the various aspects of wiring installation according to the MS IEC 60364 standard. Students will be able to relate theoretical aspect in practical work on electrical wiring during workshop session. This course also provides students with the knowledge and skill in doing different types of wiring installation, wiring protection, wiring inspection, wiring testing and sustainable energy practices in electrical wiring. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to MS IEC 60364. (C3, PLO1) CLO2: Construct single phase domestic wiring according to MS IEC 60364. (P4, PLO5) CLO3: Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms during performing single phase domestic wiring task. (A3, PLO8)	Quiz Mini Project Practical Test Practical Work Affective
1	DEE10013 Measurement Devices	MEASUREMENT DEVICES introduces students to the basic concept of electrical instrument and measurement. It covers the basic principles of measurement, safety precautions and meter calibration. Students will also use measurement devices such as analogue meters, DC meters, analogue and digital multimeters, oscilloscopes, signal generators and power meters during practical session. This course also covers the basic concept and simple application of DC. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Apply the concept of measurement in electrical and electronic equipment using appropriate theorem (C3, PLO 1) CLO2: Perform meter calibrating and measuring technique using the correct measuring equipment (P4, PLO 5) CLO3: Demonstrate good communication skill in oral presentation within a stipulated time frame (A3, PLO 10)	Test Quiz Practical Test Practical Work End of Chapter End of Chapter (Generic Skills) Final Examination

2	**MPU21012** **Pengajian Malaysia**	PENGAJIAN MALAYSIA membincangkan sejarah dan politik, perlembagaan Malaysia dan system pemerintahan negara, kemasyarakatan dan perpaduan, pembangunan negara dan isu-isu keperihatinan negara. Kursus ini adalah bertujuan untuk melahirkan graduan yang mempunyai iedentiti kebangsaan dan semangat patriotisme yang unggul. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Menerangkan nilai sejarah bangsa dan negara di Malaysia. (A3, CLS 5) CLO2: Menghubungkait sikap dan tanggungjawab yang signifikan dengan system pemerintahan negara. (A4, CLS 5) CLO3: Membentuk minda ingin tahu menerusi aktiviti kemasyarakatan atau patriotism dalam kalangan pelajar. (A3, CLS 4)	Pembentangan Main Peranan Projek 1 Projek 2
2	**MPU24XX1** **Kelab/Persatuan ATAU** **Unit Beruniform 2**	KELAB memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. **ATAU** UNIT BERUNIFORM 2 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. KREDIT: 1 PRASYARAT: MPU24XX1 SUKAN ATAU UNIT BERUNIFORM 1	CLO1: Mempamerkan kemahiran khusus bagi kursus berkaitan (P2, CLS 4) CLO2: Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)	Tunjukcara Mini Projek
2	**DBM20023** **Engineering Mathematics 2**	ENGINEERING MATHEMATICS 2 exposes students to the basic laws of indices and logarithms. This course introduces the basic rules of differentiation concepts to solve problems that relates maximum, minimum and calculate the rates of changes This course discusses integration concepts in order to strengthen student's knowledge for solving area and volume bounded region problems. In addition, students will learn application of both techniques of differentiation and integration. CREDIT(S): 3 PREREQUISITE(S): DBM10013 Measurement Devices	CLO1: Use algebra and calculus knowledge to describe relationship between various physical phenomena (C3, CLS 1) CLO2: Solve the mathematical problems by CLO2: using appropriate and relevant fundamental calculus techniques (C3, CLS 3c) CLO3: Use mathematical language to express mathematical ideas and arguments CLO3: precisely, concisely and logically in calculus (A3, CLS 3b)	Quiz Test End of Chapter Presentation Final Examination

2	**DET20033** **Electrical Circuits**	ELECTRICAL CICUITS is designed to provide students with the knowledge related to AC of electrical circuits. It emphasized on the principles of an alternating current AC waveform and sinusoidal steady state circuit analysis. This course also covers the applications of three phase system and operation of various types of transformers. CREDIT(S): 3 PREREQUISITE(S): DET10013 Electrical Technology	CLO1: Apply the concept and principle in solving problems of electrical circuits using the appropriate AC electrical laws and theorem (C3, PLO 1) CLO2: Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments (P4, PLO 5) CLO3: Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame (A3, PLO 9)	Test Quiz Practical Test Practical Work End of Chapter Final Examination
2	**DEE20023** **Semiconductor Devices**	SEMICONDUCTOR DEVICES introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistors and field effect transistors. The content encompasses devices structure to biasing basic applications. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem (C3, PLO1) CLO2: Construct the various applications of semiconductor devices circuit by using schematic diagrams (P4, PLO 5) CLO3: Demonstarate good communication skill in oral presentation within a stipulated time frame (A3, PLO 10)	Quiz Test Practical Work Practical Test End of Chapter Final Examination
2	**DEE20033** **Digital Electronics**	DIGITAL ELECTRONICS introduces the theories on the basic of digital systems. This course emphasizes on the digital system fundamentals and applications. This course mainly covers number systems, code systems, logic gates, Boolean operations, flip-flops, counters and registers. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit (C3, PLO 1) CLO2: Construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop (P4, PLO 5) CLO3; Demonstrate ability to work in team to complete assigned task during practical work sessions (A3, PLO 9)	Quiz Test Practical Test Practical Work End of Chapter Final Examination

2	DEC20012 Programming Fundamentals	PROGRAMMING FUNDAMENTALS course provides the skills necessary for the effective of application of computation and computer programming in engineering applications. Students will develop their programming skills through a variety of assignments and labs and by reviewing case studies and example programs. The learning outcome is proficiency in writing small to medium programs in a procedural programming language. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Apply knowledge of basic concepts and fundamentals of structured programming in solving a variety of engineering and scientific problems using a high level programming language (C3, PLO 1) CLO2: Build programs written in C language for assigned mini project during practical work sessions (P4, PLO 5) CLO3: Demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project (A3, PLO 12)	Test Quiz Practical Work Mini Project
3	DUE30022 Communicative English 2	COMMUNICATIVE ENGLISH 2 emphasises the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints. CREDIT(S): 2 PREREQUISITE(S): Communicative English 1	CLO1: Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience. (A3, CLS 3b) CLO2: Describe processes, procedures and instructions clearly by highlighting information of concern. (A3, CLS 4) CLO3: Demonstrate effectively communication and social skills in handling enquiries and complaints amicably and professionally. (A3. CLS 3b)	Presentation Role Play Test Assignment

3	DBM30043 Electrical Engineering Mathematics	ELECTRICAL ENGINEERING MATHEMATICS exposes students to the statistical and probability concepts and their applications in interpreting data. The course also introduces numerical methods concept to solve simultaneous equations by using Gaussian Elimination method, LU Decomposition using Doolittle and Crout methods. polynomial problems using Simple Fixed Point Iteration methods and Newton Raphson method. In additional, the course also discusses Ordinary Differential Equation (ODE). In order to strengthen the students in solving engineering problems, Laplace Transform by using the Table of Laplace is also included. It is designed to build students' teamwork and problems solving skill. CREDIT(S): 3 PREREQUISITE(S): DBM20023 Engineering Mathematics 2	CLO1: Demonstrate an understanding of the common body of knowledge in mathematics (C3, CLS 1) CLO2: Demonstrate problems solving skills in engineering problems (C3, CLS 3c) CLO3: Use mathematical expression in describing real engineering problems precisely, concisely and logically (A3, CLS 3b)	Quiz Test End of Chapter Presentation Final Examination
3	DEE30043 Electronic Circuits	ELECTRONIC CIRCUITS emphasizes the concept of electronic device applications. The course covers the fundamental of electronic circuit application which include power supply unit, oscillator, operational amplifier, timer, filters and AD/DA converters. The content cover circuit configurations, operation and application of the electronic circuits. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Apply the principles of electronic circuits devices by using block diagram or circuit diagram. (C3, PLO 1) CLO2: Construct the various applications of electronic circuits based on the theory and principle operation of the circuits (P4, PLO 5) CLO3: Demonstrate good written communication skill through essay writing in group within a stipulated time frame (A3, PLO 10)	Quiz Test Practical Work Practical Test End of Chapter End of Chapter (Generic Skill) Final Examination

3	DEE30052 Electronic Equipment Repair	ELECTRONIC EQUIPMENT REPAIR provides the knowledge and skills on troubleshooting and repairing the electronics equipment. This course focuses on the identification of faults in regulated dc power supply, audio equipment and television system. This course also provides knowledge and skills on troubleshooting and repairing broken cell phones. CREDIT(S): 2 PREREQUISITE(S): DEE20023 SEMICONDUCTOR DEVICES	CLO1: Diagnose fault of electronic equipment related to electronic equipment repair using the correct diagnosis technique and tools (C4, PLO 2) CLO2: Fix the post-consumer's electronic equipment fault using the correct diagnosis technique (P4, PLO 5) CLO3: Demonstrate good social responsibility in solving well defined engineering problems during performing electronic system and appliances maintenance task (A3, PLO 6)	Quiz Test Practical Work Practical Work (Generic Skills) End of Chapter
3	DEE30071 Electronic Computer Aided Design (ECAD)	ELECTRONIC COMPUTER AIDED DESIGN covers the basic concept and fundamentals of electronic circuit simulation. It also covers the applications of electronic packages for electronic circuit simulation at the circuit level and the logic level. Emphasis is given to the simulation for analogue, digital logic and mixed- signal circuits using various types of simulation analysis. Printed Circuit Board (PCB) layout is then produced for the circuits. The simulation and the PCB layout are done using electronic software package such as Protel / Altium Designer, ORCAD, PSpice, Circuit Maker or Electronic Workbench. CREDIT(S): 1 PREREQUISITE(S): None	CLO1: Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations (C3, PLO 1) CLO2: Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software (P4, PLO 5)	Practical Test End of Chapter Practical Work

3	DEP30013 Communication System Fundamentals	COMMUNICATION SYSTEM FUNDAMENTALS introduces the students to the concepts of communication system. This course covers the principles of communications, analog and digital modulation techniques, multiplexing and transmission medium. It also exposes the students to the basic of data communication system. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Apply the concept of electronic communication system by using appropriate diagram and standard formula (C3, PLO 1) CLO2: Assemble the related communication equipment systematically in performing the measurement of appropriate signals parameter (P4, PLO 5) CLO3: Demonstrate the ability to work in a team to complete the assigned tasks during practical work sessions (A3, PLO 9)	Quiz Test Practical Work Practical Test End of Chapter Practical Work (Generic Skill) Final Examination
3	DEP30083 Telecommunication Network	TELECOMMUNICATION NETWORK provides students with the basic knowledge of telecommunication network of Next Generation Networks (NGN). This course focuses on NGN architectures, protocols and services, including technologies and regulation. Students are also expose to NGN convergence between the traditional telecommunications and the internet to facilitate voice and data communications. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Apply the basic concept of telecommunication network by using appropriate block diagram and designated formula. (C3, PLO 1) CLO2: Assemble the related telecommunication equipment in performing the measurement of appropriate signal parameter. (P4, PLO 5) CLO3: Demonstrate good communication skill in oral presentation on assigned assignments. (A3, PLO 10)	Quiz Test Practical Work Practical Test Essay (Generic Skill) Essay Final Examination
4	DUE50032 Communicative English 3	COMMUNICATIVE ENGLISH 3 aims to develop the necessary skills in students to analyse and interpret graphs and charts from data collected as well as to apply the job hunting mechanics effectively in their related fields, Students will learn to gather data and present them through the use of graphs and charts. Students will also learn basic of job hunting mechanics which include using various job search strategies, making enquiries, and preparing relevant resumes and cover letters. The student will develop communication skills to introduces themselves, highlight their strengths and abilities, present ideas, express opinions and respond appropriately during job interviews. CREDIT(S): 2 PREREQUISITE(S): DUE30022 Communicative English 2	CLO1: Present gathered data in graphs and charts effectively using appropriate language forms and functions (A2, CLS 3b) CLO2: Prepare a high impact resume and a cover letter, highlighting competencies and strengths that meet employer's expectations. (A4, CLS 4) CLO3: Demonstrate effective communication and social skills in handling job interviews confidently. (A3, CLS 3b)	Presentation Mock Interview Test Assignment 1 Assignment 2

4	**MPU22012 Entrepreneurship**	ENTREPRENEURSHIP focuses on the fundamentals and concept of entrepreneurship in order to inculcate the value and interest in students to choose entrepreneurship as a career. This course can help students to initiate creative and innovative entrepreneurial ideas. It also emphasizes a preparation of a business plan framework through business model canvas. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Propose the value proposition of entrepreneurial idea using Business Model Canvas (A3, CLS 3b) CLO2: Develop a viable business plan by organizing business objectives according to priorities (A4, CLS 4) CLO3: Organize the online presence business in social media marketing platform (A3, CLS 4)	Product Pitching Business Plan Presentation Online Business Report
4	**DEC40053 Embedded System Application**	EMBEDDED SYSTEM APPLICATIONS cover the basic concept and application of microcontroller system based on Peripheral Interface Controller (PIC) microcontroller. Students will learn software and hardware development on PIC16F/PIC18F microcontroller development system and understand how to do interfacing with external devices using suitable internal chip features. Students are exposed to the new Microcontroller Unit (MCU) simulation software such as Proteus. CREDIT(S): 3 PREREQUISITE(S): DEC20012 Programming Fundamentals	CLO1: Investigate internal features of PIC16F/PIC18F to interface properly with external devices (C4, PLO 4) CLO2: Design embedded system application based on PIC16F/PIC18F microcontroller effectively (C6, PLO 3) CLO3: Construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively (P4, PLO 5) CLO4: Demonstrate knowledge of engineering project management principles through a written report on an assigned mini project (A3, PLO 11)	Quiz Test Practical Work Mini Project Mini Project (Generic Skill) Final Examination

4	**DEP40053 Fibre Optic Communication System**	FIBER OPTIC COMMUNICATION SYSTEM introduces students to the basic concept of fiber optic in communication systems with environmental sustainability. This course covers fiber optic characteristics, components in fiber optic system, losses in fiber optic cable and the fundamental concept of optical measurement. This course also provides knowledge in splicing techniques with safety awareness, multiplexing techniques and design consideration in fiber optic communication link. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Investigate the fiber optic communication system by implementing the knowledge of the element and component that established the link and aspect that influence the performance of fiber optic link (C4, PLO 4) CLO2: Design a fiber optic link using mathematical concept and design tool by considering the properties and elements of fiber optic link (C6, PLO 3) CLO3: Assemble the related fiber optic communication equipment in performing the measurement of appropriate signals parameter (P4, PLO 5) CLO4: Demonstrate contribution of fiber optic in communication system towards environment and sustainability through End of Chapter Question (A3, PLO 7)	Test Quiz End of Chapter Practical Work Final Examination
4	**DEE40113 Signal and System**	SIGNAL AND SYSTEM provides knowledge on the signals and systems, the Linear Time-Invariant (LTI) systems, the Laplace transform the Z-transform and Fourier analysis. The course focuses on the mathematical description of signals and systems, the input-output relationship for Linear Time-Invariant (LTI) systems, the Laplace transform and Z-transform and their application techniques for analyzing the systems and Fourier analysis of signals and systems. CREDIT(S): 3 PREREQUISITE(S): DBM20023 Engineering Mathematics 2	CLO1: Evaluate continuous-time and discrete-time signal and system problems (C5, PLO 2) CLO2: Manipulate software to analyse the signals and systems correctly based on the given procedure (P4, PLO 5) CLO3: Display good communication skills through discussion on End of Chapter (A3, PLO 10)	Test Quiz End of Chapter Practical Work Final Examination

4	DEE40082 Project 1	PROJECT 1 provides knowledge regarding the implementation and development methods of a project based on hardware or software or a combination of hardware and software. This course provides exposure to the project management and finance, techniques to develop project and proposal preparation. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Investigate well defined problem in order to make improvements on a chosen project (C4, PLO 4) CLO2: Evaluate engineering problem and conduct research in order to make improvements on a chosen project whether the project is on the hardware, software or hardware-software interface type (C5, PLO 2) CLO3: Perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically (P4, PLO 5) CLO4: Display good project management and finance through a Gantt Chart (milestone) and final proposal (A3, PLO 11) CLO5: Demonstrate continuous learning, information management and independent acquisition of new knowledge and skill to support the development of the project through the final proposal (A3, PLO 12) CLO6: Display written communication skill through a final proposal (A3, PLO 10) CLO7: Describe the impact of the proposed project to the society in the final proposal (A3, PLO 6)	Investigation Report Logbook Final Proposal

4	DEC50122 Embedded Robotic	EMBEDDED ROBOTIC presents the combination of mobile robots and embedded systems, from introductory to intermediate level. It is structured in three parts, which are embedded systems, mobile robot, and mobile robot applications. These parts are essential to students in mastering the crucial steps of building a complete working robotic system. They will help them to develop robots that not only can move, but intelligent as well. CREDIT(S): 2 PREREQUISITE(S): DEC20012 Programming Fundamentals	CLO1: Investigate the concept and fundamentals of mobile robotic, embedded controller, sensors and actuators based on land mobile robot design (C4, PLO 4) CLO2: Design the concept of robot positioning, identification and communication in mobile robot control according to a standard robot organization regulation (C6, PLO 3) CLO3: Manipulate the application of sensor and actuator, robot identification and communication during practical work based on land mobile robot design (P4, PLO 5) CLO4: Demonstrate good ability in managing a well-defined engineering-based project in a cost effective manner (A3, PLO 11)	Quiz Test Practical Work Practical Test Mini Project Mini Project (Generic Skill)
5	MPU23052 Sains Teknologi dan Kejuruteraan Islam	SAINS TEKNOLOGI DAN KEJURUTERAAN DALAM ISLAM memberi pengetahuan tentang konsep Islam sebagai al-Din dan seterusnya membincangkan konsep sains, teknologi dan kejuruteraan dalam Islam serta impaknya, pencapaiannya dalam tamadun Islam, prinsip serta peranan syariah dan etika Islam, Peranan keaedah fiqh serta aplikasinya. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian. (A2, CSs 4) CLO2: Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam. (A3, CLS 5) CLO3: Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam. (A4, CLS4)	Tunjukcara Pembentangan E folio Tugasan berdasarkan masalah.

5	**MPU23042** **Nilai Masyarakat Malaysia**	NILAI MASYARAKAT MALAYSIA membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran-cabaran dalam membentuk masyarakat Malaysia. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Membincangkan konsep integrasi di Malaysia. (A2, CLS 4) CLO2: Menerangkan etika dan nilai berkaitan pembentukan integrasi di Malaysia (A3, CLS 5) CLO3: Menghubungkait minda ingin tahu dengan cabaran dan kejayaan integrasi di Malaysia. (A4, CLS 4)	Perbincangan Pembentangan E-folio Tugas berasaskan masalah
5	**DEE30061** **Computer Aided Electrical Drawing**	COMPUTER AIDED ELECTRICAL DRAWING provides knowledge and exposure on the usage of AutoCAD software. The course focuses on the application of the software to produce drawings of graphics, electrical / electronic component symbols, circuit schematics and electrical wiring layout diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software. CREDIT(S): 1 PREREQUISITE(S): None	CLO1: Apply computer aided design concept, applications and capabilities in electrical engineering environment (C3, PLO 1) CLO2: Construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American/British technical symbol standard (P4, PLO 5) CLO3: Adhere to professionalism and ethics in drawing electrical consumer wiring diagram in practical work according to Energy Commission (EC) and MS IEC 60364 standard (A3, PLO 8)	Practical Test End of Chapter Practical Work Practical Work (Generic Skills)

5	**DEP50033** **Data Communication and Networking**	DATA COMMUNICATION AND NETWORKING exposes the student to the principle of data communication and networking. This course covers basic concept of data communication and networking fundamental for a quality data transmission. Students are expose to Open Systems Interconnection (OSI) Model and Network Protocol. Students are also introduced to Local Area Network and public digital network. CREDIT(S): 3 PREREQUISITE(S): DEP30013 Communication System Fundamentals	CLO1: Evaluate the performance of data and computer networks while implementing the knowledge, concepts, technology and terms related to data communication and networking (C5, PLO 2) CLO2: Construct a simple LAN and WLAN in accordance to IEEE or TIA/EIA-568-A/B and the related data communication and networking equipment systematically in performing data transmission (P4, PLO 5) CLO3: Demonstrate awareness of communication standard during practical work sessions (A3, PLO 8)	Quiz Test Practical Work Practical Work (Generic Skill) Essay Final Examination
5	**DEP50043** **Microwave Devices**	MICROWAVE DEVICES introduces the existence, characteristic and the effect of electromagnetic wave to the surrounding. This course also focuses on the devices used in microwave communication system such as waveguide (transmission lines), basic accessories, sources, microwave antennas as well as the techniques of measurement used in microwave system. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Investigate microwave propagation problems using mathematical concept and design tools by implementing the knowledge of electromagnetic field to the operation of devices used in microwave system (C4, PLO 4) CLO2: Assemble the related microwave communication equipment in performing the measurement of appropriate output variable (P4, PLO 5) CLO3: Demonstrate appropriate good social interaction and responsibility while handling microwave equipment or transmission system (A3, PLO 6)	Quiz Test Practical Work Practical Work (Generic Skill) End of Chapter Final Examination

5	**DEP50063 Wireless Communication**	WIRELESS COMMUNICATION introduces student to the basic of wireless communication includes several specialized topics. Students are expose to wireless networking, evolution of mobile communication, cellular network channels, techniques used to enhance capacity and speed, interferences, radio wave propagation and multiple access techniques. This course also exposes the student to the awareness of wireless technology to the health and environmental. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Investigate the principle of wireless in implementing the concept and system of wireless communication using appropriate technique and designated formula (C4, PLO 4) CLO2: Assemble the related wireless communication equipment systematically in performing the assigned practical work (P4, PLO 5) CLO3: Express the awareness of wireless technology in environment and sustainability on assigned essay questions (A3, PLO 7)	Quiz Test Practical Work Essay (Generic Skill) Essay Final Examination
5	**DEE50102 Project 2**	PROJECT 2 is the continuation of DEE40082 PROJECT 1 course. The course focuses on methods of circuit construction, testing, troubleshooting, debugging, repair and also completion of the project which was planned during the previous semester. This course also requires students to manage an economical engineering based project, prepare a project report in a given format and deliver a project presentation at the end of the semester. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course. CREDIT(S): 2 PREREQUISITE(S): DEE40082 Project 1	CLO1: Investigate the various alternative preliminary design and software programming for the previous chosen project (C4, PLO 4) CLO2: Suitable and attractive casing or complete system programme (for software project) with user interface (C6, PLO 3) CLO3: Perform systematically the relevant test and measurement to determine circuit fault and functionality and construct project casing (hardware project) or test run, debug and execute system programme (software project) using modern tools (P4, PLO 5) CLO4: Display element of environment and sustainability awareness in project implementation (A3, PLO 7) CLO5: Display effective communication skill in report writing and during presentation (A3, PLO 10) CLO6: Display good ability in project management and finance using a Gantt Chart (milestone chart) and an effective costing respectively (A3, PLO 11)	Logbook Model/System Final Report (Generic Skills) Presentation (Generic Skills)

5	**DEP50072 Satellite and Radar Communication System**	SATELLITE AND RADAR COMMUNICATION SYSTEM introduces to students the concept of satellite and radar, satellite orbits, space satellite subsystem, satellite communication system, radar fundamentals and different types of radar system. It also covers end to end satellite and radar communication system in various generations and latest technologies. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Investigate the performance of satellite and radar in communication system by using designated concept and formula (C4, PLO 4) CLO2: demonstrate continuous learning ability while engaging new technical knowledge on assigned essay questions (A3, PLO 12)	Test Quiz Essay Final Examination

Elective courses offered are subjected to departmental amendments.

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PROGRAMME DETAILS

PROGRAMME NAME: DIPLOMA IN ELECTRONIC ENGINEERING (CONTROL)
PROGRAMME CODE: DJK

INTRODUCTION

Electrical engineering is the field of study which generally deals with the application of electrical and electronics towards designing, testing and development of circuitry and equipment for well-defined of engineering activities. It requires the application of scientific and engineering knowledge and methods combined with technical skills in supporting well-defined engineering activities to prepare students for their future role in the industry

The Electrical Engineering Diploma graduates of the Polytechnic's Ministry of Education Malaysia are exposed to a comprehensive curriculum consisting of courses in personal development, mathematics, science, electrical discipline and workplace competencies requirement. Graduates of the electrical engineering diploma programme will be equipped with specialized knowledge and skills other than core course which include power engineering, green technology, energy efficiency, computer technology, communication, medical electronics, optoelectronic and industrial automation.

The Diploma in Electronic Engineering (Control) is a three-year full-time programme comprising of five semesters course work with one full semester of industrial training.

SYNOPSIS

The Diploma in Electronic Engineering (Control) programme is designed to cover the current wide discipline of electronic engineering, with the added specialization of electronics used in the field of control system and industrial automation. The broadbased electronic foundation of which includes electrical and electronic principles, computer aided design, fundamental programming and simulation. The green elements are also incorporate in the curriculum to provide awareness toward the importance of the sustainable energy.

JOB PROSPECT

This programme provides the knowledge and skills in Electronics Engineering (Control) that can be applied to a broad range of careers in the industry. The knowledge and skills that the students acquire from the programmed will enable them to participate in the job market as:

a. Process Control Technical Assistant
b. Industrial Automation Technical Assistant
c. Technical Site Support
d. Electrical/Electronic Technician

e. Assistant Engineer
f. Self-employed

EDUCATIONAL GOAL

To produce holistic and competent TVET graduates capable of contributing to the national development.

PROGRAMME AIM

This programme believes that all individuals have potential to be a resourceful and adaptable technician to support the nation aspiration in providing engineering talent.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The engineering programme should produce balanced TVET graduates who are:

NO	PEO	CONTENT
1	**PEO1**	Practicing technician in electrical engineering related field
2	**PEO2**	Contributing to society with professional ethic and responsibilities
3	**PEO3**	Engaging in enterprising activities that apply engineering knowledge and technical skills
4	**PEO4**	Engaging in activities to enhance knowledge for successful career advancement

PROGRAMME LEARNING OUTCOMES (PLO)

Upon completion of the programme, students should be able to:

NO	PLO	CONTENT
1	**PLO1**	apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices
2	**PLO2**	identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)
3	**PLO3**	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 (DK5)
4	**PLO4**	conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements
5	**PLO5**	apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)
6	**PLO6**	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 (DK7)
7	**PLO7**	understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)
8	**PLO8**	understand and commit to professional ethics and responsibilities and norms of technician practice
9	**PLO9**	function effectively as an individual, and as a member in diverse technical teams
10	**PLO10**	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
11	**PLO11**	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 projects in multidisciplinary environments
12	**PLO12**	recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

Notes:

KNOWLEDGE PROFILE (DK)

DK	CONTENT
DK1	A descriptive, formula-based understanding of the natural sciences applicable in a sub-discipline
DK2	Procedural mathematics, numerical analysis, statistics applicable in a subdiscipline
DK3	A coherent procedural formulation of engineering fundamentals required in an accepted sub-discipline
DK4	Engineering specialist knowledge that provides the body of knowledge for an accepted sub-discipline
DK5	Knowledge that supports engineering design based on the techniques and procedures of a practice area
DK6	Codified practical engineering knowledge in recognised practice area
DK7	Knowledge of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts

MATRIX OF PROGRAMME LEARNING OUTCOME (PLO) VS PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PROGRAM LEARNING OUTCOME (PLO)		PROGRAMME EDUCATIONAL OBJECTIVE (PEO)			
		PEO1	PEO2	PEO3	PEO4
PLO1	apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices;	/			
PLO2	identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4);	/			
PLO3	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 (DK5);	/			
PLO4	conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements;	/			
PLO5	apply appropriate techniques, resources, and modern engineering and IT tools to well- defined engineering problems, with an awareness of the limitations (DK6);	/			
PLO6	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 (DK7);		/		
PLO7	understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7);		/		
PLO8	understand and commit to professional ethics and responsibilities and norms of technician practice;		/		
PLO9	function effectively as an individual, and as a member in diverse technical teams;			/	
PLO10	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;			/	
PLO11	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 projects in multidisciplinary environments;			/	
PLO12	recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge;				/

COURSES VERSUS PROGRAMME OUTCOMES MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O			CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4
									Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning
									PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
SEMESTER 1																					
Compulsory	DUE10012	Communicative English 1	1	0	2	0	2											✓		✓	
	MPU24XX1	Sukan	0	2	0	0	1												✓		
	MPU24XX1	Unit Beruniform 1																			
Common Core	DUW10022	Occupational, Safety and Health for Engineering	2	0	0	0	2	✓									✓	✓			
	DBM10013	Engineering Mathematics 1	2	0	2	0	3	✓					✓					✓			
	DBS10012	Engineering Science	2	1	0	0	2	✓					✓								
Discipline Core	DET10013	Electrical Technology	2	2	0	0	3	✓											✓		
	DET10022	Electrical Wiring	1	3	0	0	2	✓										✓			
	DEE10013	Measurement Devices	2	2	0	0	3	✓					✓								
TOTAL			26				18														

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O			CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4
									Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning
									PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
SEMESTER 2																					
Core Common	DBM10033	Engineering Mathematics 2	3	0	2	0	4	✓						✓							
Core Discipline	DEE10033	Electrical Circuits	3	0	0	0	3	✓					✓								
	DEE30033	Digital Electronics	3	0	0	0	3	✓					✓	✓							
	DEE30053	Semiconductor Devices	3	0	0	0	3	✓					✓								
	DEC30013	Programmable Logic Controller	1	0	2	0	2	✓					✓	✓							
Compulsory	MPU24XX1	Unit Beruniform 2	0	2	0	0	1													✓	
	MPU24XX1	Kelab/Persatuan	0	2	0	0	1														✓
	MPU10013	Hubungan Etnik	2	0	0	0	2														✓
TOTAL			15				19														

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 4																					
Compulsory	DUE50032	Communicative English 3	1	0	2	0	2											√		√	DUE30022
	MPU22012	Entrepreneurship	1	0	2	0	2											√	√		
Discipline Core	DEC40053	Embedded System Application	2	2	0	0	3			√	√	√	√						√		DEC20012
Specialisation	DEJ40033	Programmable Logic Controller (PLC) and Automation	2	2	0	0	3		√			√			√						
	DEJ40043	Control Systems	2	2	0	0	3		√			√		√							DEJ30013
	DEE40082	Project 1	1	2	0	0	2		√		√	√	√	√				√	√	√	
Electives		Elective 1	0	0	0	0	2														
TOTAL			**21**				**17**														

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
SEMESTER 3																					
Compulsory	DUE30022	Communicative English 2	1	0	2	0	2											√		√	DUE10012
Common Core	DBM30043	Electrical Engineering Mathematics	2	0	2	0	3	√					√					√			DBM20023
Discipline Core	DEE30043	Electronic Circuits	2	2	0	0	3	√				√						√			
	DEE30061	Computer Aided Electrical Drawing	0	2	0	0	1	√				√	√			√					
	DEE30052	Electronic Equipment Repair	1	3	0	0	2		√			√	√	√							DEE20023
	DEE30071	Electronic Computer Aided Design	0	2	0	0	1	√				√	√								
Specialisation	DEJ30013	Basic Control System	2	2	0	0	3	√				√					√				
	DEJ30023	Instrumentation	2	2	0	0	3	√				√						√			
TOTAL			**27**				**18**														

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS					PROGRAMME LEARNING OUTCOME (PLO)			
			L	P	T	O					
			CREDIT VALUES								
								CLS1	Knowledge	PLO1	
								CLS2	Problem Analysis	PLO2	
								CLS2	Design/Development of Solutions	PLO3	
								CLS2	Investigation	PLO4	
								CLS3a	Modern Tool Usage	PLO5	
								CLS3c			
								CLS3b	The Engineer and Society	PLO6	
								CLS5	Environment and Sustainability	PLO7	
								CLS5	Ethics	PLO8	
								CLS3d	Individual and Teamwork	PLO9	
								CLS3b	Communications	PLO10	
								CLS4	Project Management and Finance	PLO11	
								CLS4	Life Long Learning	PLO12	
			PREREQUISITE / CO-REQUISITE								
SEMESTER 6											
Industrial Training	DUT600610	Engineering Industrial Training	0	0	0	10					
TOTAL			0				10				
TOTAL CREDIT VALUE							95				

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS					PROGRAMME LEARNING OUTCOME (PLO)			
			L	P	T	O					
			CREDIT VALUES								
								CLS1	Knowledge	PLO1	
								CLS2	Problem Analysis	PLO2	
								CLS2	Design/Development of Solutions	PLO3	
								CLS2	Investigation	PLO4	
								CLS3a	Modern Tool Usage	PLO5	
								CLS3c			
								CLS3b	The Engineer and Society	PLO6	
								CLS5	Environment and Sustainability	PLO7	
								CLS5	Ethics	PLO8	
								CLS3d	Individual and Teamwork	PLO9	
								CLS3b	Communications	PLO10	
								CLS4	Project Management and	PLO11	
								CLS4	Life Long Learning	PLO12	
			PREREQUISITE / CO-REQUISITE								
SEMESTER 5											
Compulsory	MPU23052	Sains Teknologi dan Kejuruteraan Islam*	1	0	2	0	2				
	MPU23042	Nilai Masyarakat Malaysia**	2	0	0	0	2				
Discipline Core	DEC30023	Computer Networking Fundamentals	2	2	0	0	3				
	DET40073	Power Electronics	2	2	0	0	3				
Specialisation	DEJ50063	Process Measurement	1	2	0	0	3	√			
	DEE50102	Project 2	0	3	0	0	2		√		
Electives		Elective 2	0	0	0	0	2				
TOTAL			17				15				

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
10	DEC50152	CMOS VLSI Layout Design	1	2	0	0	2			√		√	√		√						
11	DEE40092	Audio Video Systems and Production	1	2	0	0	2	√				√	√							√	
12	DEE40113	Signal and System	2	2	0	0	3		√			√	√					√			DBM20023
13	DEE50122	Circuit Analysis	2	0	1	0	2		√								√				
14	DEG40023	Renewable Energy System	2	2	0	0	3		√			√		√							DEG30013
15	DEG50032	Energy Efficiency And Management	2	0	0	0	2				√			√							
16	DEG50043	Green Energy System Integration	2	2	0	0	3		√			√	√							√	DEG40023
17	DEJ40052	Operations Management	2	2	0	0	2	√				√				√					
18	DEO40023	Optoelectronic	3	0	0	0	3		√					√							

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
1	DEC40062	Visual Basic Programming	1	2	0	0	2			√		√	√						√		
2	DEC40073	Database System	2	2	0	0	3				√	√	√						√		
3	DEC40082	Interactive Multimedia Application	1	2	0	0	2			√	√	√	√					√			
4	DEC40092	Computer Vision Programming	1	2	0	0	2				√	√	√							√	
5	DEC50103	Operating Systems	2	2	0	0	3				√	√	√			√					
6	DEC50113	Computer System Diagnosis and Maintenance	2	2	0	0	3		√			√	√	√							
7	DEC50122	Embedded Robotic	1	2	0	0	2			√	√	√	√						√		DEC20012
8	DEC50132	Internet Based Controller	1	2	0	0	2	√				√	√		√						
9	DEC50143	CMOS Integrated Circuit Design and Fabrication	2	2	0	0	3			√		√	√		√						DEE20023& DEE20033

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
28	DET50063	Motor Control and Drives	2	2	0	0	3		√			√						√			DET40073
29	DET50083	Power System Protection	2	2	0	0	3				√	√		√							DET30053
30	DET50093	Electrical Maintenance and Repair	2	2	0	0	3		√			√		√							
31	DEU40032	Biomedical Signal Measurement	1	2	0	0	2		√			√					√				
32	DEU50053	Biomedical Instrumentation	2	2	0	0	3				√	√		√							
33	DEU50013	Medical System Practice	2	2	0	0	3		√			√			√						
34	DEU50043	Medical Imaging	2	2	0	0	3				√	√			√						
FREE ELECTIVES[a]																					
1	DUD10012	Design Thinking	1	0	0	1	2		√									√			

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				CREDIT VALUES	PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE
			L	P	T	O		PLO1	PLO2	PLO3	PLO4	PLO5		PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
								Knowledge	Problem Analysis	Design/Development of Solutions	Investigation	Modern Tool Usage		The Engineer and Society	Environment and Sustainability	Ethics	Individual and Teamwork	Communications	Project Management and Finance	Life Long Learning	
								CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4	
ELECTIVE COURSES																					
19	DEO50033	Optosemiconductor	3	0	0	0	3				√				√						DEO40023
20	DEP40053	Fibre Optic Communication System	2	2	0	0	3			√	√	√			√						
21	DEP50033	Data Communication and Networking	2	2	0	0	3		√			√	√			√					DEP30013
22	DEP50043	Microwave Devices	2	2	0	0	3				√	√	√	√							
23	DEP50063	Wireless Communication	2	2	0	0	3				√	√	√		√						
24	DEP50072	Satellite and Radar Communication Systems	2	0	0	0	2				√									√	
25	DEQ40032	Energy Efficiency Engineering 1	2	0	0	0	2				√			√							
26	DEQ40023	Energy Management System and Energy Auditing	2	2	0	0	3		√			√	√			√					
27	DEQ50043	Energy Efficiency Engineering 2	2	0	0	0	3		√			√	√	√							DEQ40032

PROGRAMME STRUCTURE

SEMESTER 1

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUE10012	Communicative English 1	-	Compulsory	1	0	2	2
2	MPU24XX1 MPU24XX1	Sukan **OR** Unit Beruniform 1	-	Compulsory	0	2	0	1
3	DUW10022	Occupational, Safety and Health for Engineering	-	Common	2	0	0	2
4	DBM10013	Engineering Mathematics 1	-	Common	2	0	2	3
5	DBS10012	Engineering Science	-	Common	2	1	0	2
6	DET10013	Electrical Technology	-	Discipline	2	2	0	3
7	DET10022	Electrical Wiring	-	Discipline	1	3	0	2
8	DEE10013	Measurement Devices	-	Discipline	2	2	0	3
CONTACT HOURS					12	10	4	18
TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE					26			

SEMESTER 2

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	MPU21012	Pengajian Malaysia	-	Compulsory	1	0	2	2
2	MPU24XX1 MPU24XX1	Kelab/Persatuan **OR** Unit Beruniform 2	***MPU24XX1***	Compulsory	0	2	0	1
3	DBM20023	Engineering Mathematics 2	***DBM10013***	Common	2	0	2	3
4	DET20033	Electrical Circuits	***DET10013***	Discipline	2	2	0	3
5	DEE20023	Semiconductor Devices	-	Discipline	2	2	0	3
6	DEE20033	Digital Electronics	-	Discipline	2	2	0	3
7	DEC20012	Programming Fundamentals	-	Discipline	1	2	0	2
CONTACT HOURS					10	10	4	
TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE					24			17

SEMESTER 3

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUE30022	Communicative English 2	***DUE10012***	Compulsory	1	0	2	2
2	DBM30043	Electrical Engineering Mathematics	***DBM20023***	Common	2	0	2	3
3	DEE30043	Electronic Circuits	-	Discipline	2	2	0	3
4	DEE30052	Electronic Equipment Repair	***DEE20023***	Discipline	1	3	0	2
5	DEE30061	Computer Aided Electrical Drawing	-	Discipline	0	2	0	1
6	DEE30071	Electronic Computer Aided Design (ECAD)	-	Discipline	0	2	0	1
7	**DEJ30013**	Basic Control System	-	Specialisation	2	2	0	3
8	**DEJ30023**	Instrumentation	-	Specialisation	2	2	0	3
CONTACT HOURS					8	17	4	18
TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE					29			

SEMESTER 4

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUE50032	Communicative English 3	***DUE30022***	Compulsory	1	0	2	2
2	MPU22012	Entrepreneurship	-	Compulsory	1	0	2	2
3	DEC40053	Embedded System Application	***DEC20012***	Discipline	2	2	0	3
4	DEJ40033	PLC & Automation	-	Specialisation	2	2	0	3
5	DEJ40043	Control System	***DEJ30013***	Specialisation	2	2	0	3
6	DEE40082	Project 1	-	Specialisation	1	2	0	2
7	DEC50122	Embedded Robotic	-	Elective	1	2	0	2
CONTACT HOURS					10	12	2	17
TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE					24			

SEMESTER 5

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	MPU23052 MPU23042	Sains Teknologi dan Kejuruteraan Islam* **OR** Nilai Masyarakat Malaysia**	-	Compulsory	1	0	2	2
2	DEC30023	Computer Networking Fundamentals	-	Discipline	2	2	0	3
3	DEE50102	Project 2	***DEE40082***	Specialisation	0	3	0	2
4	DET40073	Power Electronics	-	Discipline	2	2	0	3
5	DEJ50063	Process Measurement	-	Specialisation	2	2	0	3
6	DEE50122	Circuit Analysis	-	Elective	2	0	1	2
				CONTACT HOURS	**9**	**9**	**3**	**15**
				TOTAL OF CONTACT HOUR / CREDIT / CUMMULATIVE		**21**		

SEMESTER 6

NO.	COURSE CODE	COURSE NAME	PREREQUISITE	CLASSIFICATION	HOUR			
					L	P	T	CREDIT
1	DUT600610	Engineering Industrial Training	Total Credit 85	Industrial Training	20 Weeks			10
				TOTAL OF CREDIT / CUMMULATIVE		**10**		**10**

	Total Credit	%
i. (a) Compulsory	14	15%
(b) Compulsory (Bahasa Kebangsaan A)[b]	2[b]	0%
ii. Common Core	13	14%
iii. Discipline Core	35	37%
iv. Specialisation	19	20%
Total Credit	81	
v. (a) Electives	4	4%
(b) Free Electives[a]	2[a]	0%
vi. Industrial Training	10	11%
Grand Total Credit	**95**	**100%**

Engineering & Engineering Technology Courses	Total Hours	%
i. Lecture	31	41%
ii. Practical	45	59%
iii. Tutorial	0	0%
Total Contact Hours	**76**	**100%**

Legend:

L : Lecture, **P** : Practical / Lab, **T** : Tutorial, **O** : Others
(The numbers indicated under L, P, T & O represent the contact hours per week, to be used as a guide for time table preparation)

*For Muslim Students
**For Non Muslim Students

Notes:

1. The minimum and maximum credit value of Electives must be referred to the programme standard or professional bodies.

2. [a]**Free Electives** are courses which are not included in any programme structure but if taken, will contribute towards students' CGPA, provided that institutions adhere to the Jabatan Pendidikan Politeknik & Kolej Komuniti Free Electives Guidelines.

3. [b]**MPU22042 Bahasa Kebangsaan A** is **COMPULSORY** for students who did not attain credit in Bahasa Melayu at Sijil Pelajaran Malaysia (SPM) level and will contribute to students' CGPA.

4. Co-curriculum pathways:
   a. Path 1 : Sport and Club
   b. Path 2 : Uniform Unit (Students are required to **PASS** Uniform Unit 1 as a prerequisite to Uniform Unit 2)

5. Clusters:
   a. CLS1 : Knowledge & Understanding
   b. CLS2 : Cognitive Skills
   c. CLS3a : Practical Skills
   d. CLS3b : Interpersonal & Communication Skills
   e. CLS3c : Digital & Numeracy Skills
   f. CLS3d : Leadership, Autonomy & Responsibility
   g. CLS4 : Personal & Entrepreneurial Skills
   h. CLS5 : Ethics & Professionalism

1. To meet the requirement of Diploma in Electronic Engineering (Control) a student must complete the three-year full-time programme comprising of five semesters coursework with one full semester of industrial training with the total of **95 credits hour**.
2. Elective courses offered are subjected to departmental amendments.

COURSE SYNOPSIS AND COURSE LEARNING OUTCOME (CLO)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOME (CLO)	ASSESSMENT METHODS
1	DUE10012 Communicative English 1	COMMUNICATIVE ENGLISH 1 focuses on developing students' speaking skills to enable them to communicate effectively and confidently in group discussions and in a variety of social interactions. It is designed to provide students with appropriate reading skills to comprehend a variety of texts. The students are equipped with effective presentation skills as a preparation for academic and work purposes CREDIT(S): 2 PREREQUISITE(S): None	CLO 1 Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3, CLS 3b) CLO2 Demonstrate awareness of values and opinions embedded in texts on currents issues. (A3, CLS 3b) CLO3 Present a topic of interest that carries identifiable values coherently using effective verbal and nonverbal communication skills. (A2, CLS4)	Group Discussion Test Oral Presentation Assignment
1	MPU24XX1/MPU24XX1 Sukan OR Unit Beruniform 1	SUKAN adalah aktiviti yang mengandungi latihan kemahiran berguna secara rekreasi dan peraturan-peraturan tertentu dalam mengejar kecemerlangan bagi penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. **ATAU** UNIT BERUNIFORM 1 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. KREDIT: 1 PRASYARAT: Tiada	CLO1: mempamerkan kemahiran khusus bagi kursus berkaitan (P2, CLS 4) CLO2: menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)	Tunjukcara Mini Projek

1	DUW10022 Occupational, Safety and Health for Engineering	OCCUPATIONAL SAFETY AND HEALTH FOR ENGINEERING course is designed to impart understanding of the self-regulatory concepts and provisions under the Occupational Safety & Health Act (OSHA). This course presents the responsibilities of workers in implementing and complying with the safety procedures at work. Understanding of notifications of accidents, dangerous occurrence, poisoning and diseases and liability for offences will be imparted upon students. This course will also provide an understanding of the key issues in OSH Management, Incident Prevention, Fire Safety, Hazard Identification Risk Control and Risk Assessment (HIRARC), Workplace Environment and Ergonomics and guide the students gradually into this multi-disciplinary science. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia (C2, PLO 1) CLO2: initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment (A3, PLO 8) CLO3: forms communications skills in a team to respond for an accident action at workplace (A3, PLO 10)	Quiz Theory Test Case Study 1 Presentation Case Study 2 Final Examination
1	DBM10013 Engineering Mathematics 1	ENGINEERING MATHEMATICS 1 exposes students to the basic algebra including resolve partial fractions. This course also covers the concept of trigonometry and the method to solve trigonometry problems by using basic identities, compound angle and double angle formulae. Students will be introduced to the theory of complex number and concept of vector and scalar. Students will explore advanced matrices involving 3x3 matrix. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: Use mathematical statement to describe relationship between various physical phenomena (C3, CLS1). CLO2: Show mathematical solutions using the appropriate techniques in mathematics (C3, CLS 3c). CLO3: Use mathematical expression in describing real engineering problems precisely, concisely and logically (A3, CLS 3b).	Quiz Test End of Chapter Presentation Final Examination
1	DBS10012 Engineering Science	ENGINEERING SCIENCE course introduces the physical concepts required in engineering disciplines. Students will learn the knowledge of fundamentals physics in order to identify and solve engineering physics problems. Students will be able to perform experiments and activities to mastery physics concepts. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Use basic physics concept to solve engineering physics problems (C3, CLS 1) CLO2: Apply knowledge of fundamental physics in activities to mastery physics concept (C3, CLS 1) CLO3: Perform appropriate activities related to physics concept (P3, CLS 3a)	Lab work Theory Test Mini Project

1	DET10013 Electrical Technology	ELECTRICAL TECHNOLOGY course will introduce students to the principles related to DC electrical circuits. It covers the fundamental laws, theorems and circuit techniques of the electrical technology basic fundamental. This course also covers inductors, capacitor, magnetic and electromagnetic circuits. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: theorems and law using various method and approach.(C3, PLO1) CLO2: Construct DC circuit and measure related electrical parameters using appropriate electrical equipments. (P4, PLO5) CLO3: Demonstrate ability to work in team to complete assigned task within the stipulated time frame. (A3, PLO9)	Test Quiz Practical Test Practical Work Practical Work (Generic Skill) End of Chapter Final Examination
1	DET10022 Electrical Wiring	ELECTRICAL WIRING course exposes students to the various aspects of wiring installation according to the MS IEC 60364 standard. Students will be able to relate theoretical aspect in practical work on electrical wiring during workshop session. This course also provides students with the knowledge and skill in doing different types of wiring installation, wiring protection, wiring inspection, wiring testing and sustainable energy practices in electrical wiring. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to MS IEC 60364. (C3, PLO1) CLO2: Construct single phase domestic wiring according to MS IEC 60364. (P4, PLO5) CLO3: Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms during performing single phase domestic wiring task. (A3, PLO8)	Quiz Mini Project Practical Test Practical Work
1	DEE10013 Measurement Devices	MEASUREMENT DEVICES introduces students to the basic concept of electrical instrument and measurement. It covers the basic principles of measurement, safety precautions and meter calibration. Students will also use measurement devices such as analogue meters, DC meters, analogue and digital multimeters, oscilloscopes, signal generators and power meters during practical session. This course also covers the basic concept and simple application of DC CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the concept of measurement in electrical and electronic equipment using appropriate theorem (C3, PLO1) CLO2: perform meter calibrating and measuring technique using the correct measuring equipment (P4, PLO5) CLO3: demonstrate good communication skill in oral presentation within a stipulated time frame (A3, PLO 10)	Test Quiz Practical Test Practical Work End of Chapter Final Examination

2	MPU21012 Pengajian Malaysia	PENGAJIAN MALAYSIA membincangkan sejarah dan politik, perlembagaan Malaysia dan system pemerintahan negara, kemasyarakatan dan perpaduan, pembangunan negara dan isu-isu keperihatinan negara. Kursus ini adalah bertujuan untuk melahirkan graduan yang mempunyai iedentiti kebangsaan dan semangat patriotisme yang unggul. CREDIT(S): 2 PREREQUISITE(S): None	CLO 1: Menerangkan nilai sejarah bangsa dan negara di Malaysia. (A3, CLS 5) CLO 2: Menghubungkait sikap dan tanggungjawab yang signifikan dengan system pemerintahan negara. (A4, CLS 5) CLO 3: Membentuk minda ingin tahu menerusi aktiviti kemasyarakatan atau patriotism dalam kalangan pelajar. (A3, CLS 4)	Pembentangan Main Peranan Projek 1 Projek 2
2	MPU24XX1/MPU24XX1 Kelab/Persatuan OR Unit Beruniform 2	KELAB memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. **ATAU** UNIT BERUNIFORM 2 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. KREDIT: 1 PRASYARAT: MPU24XX1 SUKAN ATAU UNIT BERUNIFORM 1	CLO1: mempamerkan kemahiran khusus bagi kursus berkaitan (P2, CLS 4) CLO2: menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)	Tunjukcara Mini Projek
2	DBM20023 Engineering Mathematics 2	ENGINEERING MATHEMATICS 2 exposes students to the basic laws of indices and logarithms. This course introduces the basic rules of differentiation concepts to solve problems that relates maximum, minimum and calculate the rates of changes This course discusses integration concepts in order to strengthen student's knowledge for solving area and volume bounded region problems. In addition, students will learn application of both techniques of differentiation and integration. CREDIT(S): 3 PREREQUISITE(S): DBM10013 Measurement Devices	CLO1: Use algebra and calculus knowledge to describe relationship between various physical phenomena (C3, CLS1) CLO2: Solve the mathematical problems by using appropriate and relevant fundamental calculus techniques (C3, CLS 3c) CLO3: Use mathematical language to express mathematical ideas and arguments precisely, concisely and logically in calculus (A3, CLS 3b)	Quiz Test End of Chapter Presentation Final Examination

2	DET20033 Electrical Circuits	ELECTRICAL CICUITS is designed to provide students with the knowledge related to AC of electrical circuits. It emphasized on the principles of an alternating current AC waveform and sinusoidal steady state circuit analysis. This course also covers the applications of three phase system and operation of various types of transformers. CREDIT(S): 3 PREREQUISITE(S): DET10013 Electrical Technology	CLO1: apply the concept and principle in solving problems of electrical circuits using the appropriate AC electrical laws and theorem (C3, PLO 1) CLO2: construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments (P4, PLO 5) CLO3: demonstrate ability to work in team to complete assigned tasks within the stipulated time frame (A3, PLO 9)	Test Quiz Practical Test Practical Work Practical Work (Generic Skills) End of Chapter Final Examination
2	DEE20023 SEMICONDUCTOR DEVICES	SEMICONDUCTOR DEVICES introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistors and field effect transistors. The content encompasses devices structure to biasing basic applications. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem (C3, PLO1) CLO2: construct the various applications of semiconductor devices circuit by using schematic diagrams (P4, PLO 5) CLO3: demonstarate good communication skill in oral presentation within a stipulated time frame (A3, PLO 10)	Quiz Test Practical Work Practical Test End of Chapter (Generic Skills) End of Chapter Final Examination
2	DEE20033 DIGITAL ELECTRONICS	DIGITAL ELECTRONICS introduces the theories on the basic of digital systems. This course emphasizes on the digital system fundamentals and applications. This course mainly covers number systems, code systems, logic gates, Boolean operations, flip-flops, counters and registers. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit (C3, PLO 1) CLO2: construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop (P4, PLO 5) CLO3: demonstrate ability to work in team to complete assigned task during practical work sessions (A3, PLO 9)	Quiz Test Practical Work Practical Test Practical Work (Generic Skills) End of Chapter Final Examination

2	DEC20012 PROGRAMMING FUNDAMENTALS	PROGRAMMING FUNDAMENTALS course provides the skills necessary for the effective of application of computation and computer programming in engineering applications. Students will develop their programming skills through a variety of assignments and labs and by reviewing case studies and example programs. The learning outcome is proficiency in writing small to medium programs in a procedural programming language. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: apply knowledge of basic concepts and fundamentals of structured programming in solving a variety of engineering and scientific problems using a high level programming language (C3, PLO 1) CLO2: build programs written in C language for assigned mini project during practical work sessions (P4, PLO 5) CLO3: demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project (A3, PLO 12)	Test Quiz Practical Work Mini Project Mini Project (Generic Skills)
3	DUE30022 Communicative English 2	COMMUNICATIVE ENGLISH 2 emphasises the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints. CREDIT(S): 2 PREREQUISITE(S): DUE10012 Communicative English 1	CLO1: Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience. (A3, CLS 3b) CLO2: Describe processes, procedures and instructions clearly by highlighting information of concern. (A3, CLS 4) CLO3: Demonstrate effectively communication and social skills in handling enquiries and complaints amicably and professionally. (A3. CLS 3b)	Presentation Role Play Test Assignment

3	DEE30061 Computer Aided Electrical Drawing	COMPUTER AIDED ELECTRICAL DRAWING provides knowledge and exposure on the usage of AutoCAD software. The course focuses on the application of the software to produce drawings of graphics, electrical / electronic component symbols, circuit schematics and electrical wiring layout diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software. CREDIT(S): 1 PREREQUISITE(S): None	CLO1: apply computer aided design concept, applications and capabilities in electrical engineering environment (C3, PLO 1) CLO2: construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American/British technical symbol standard (P4, PLO 5) CLO3: adhere to professionalism and ethics in drawing electrical consumer wiring diagram in practical work according to Energy Commission (EC) and MS IEC 60364 standard (A3, PLO 8)	Practical Test End of Chapter Practical Work Practical Work (Generic Skills)
3	DEE30071 Electronic Computer Aided Design (ECAD)	ELECTRONIC COMPUTER AIDED DESIGN covers the basic concept and fundamentals of electronic circuit simulation. It also covers the applications of electronic packages for electronic circuit simulation at the circuit level and the logic level. Emphasis is given to the simulation for analogue, digital logic and mixed- signal circuits using various types of simulation analysis. Printed Circuit Board (PCB) layout is then produced for the circuits. The simulation and the PCB layout are done using electronic software package such as Protel / Altium Designer, ORCAD, PSpice, Circuit Maker or Electronic Workbench. CREDIT(S): 1 PREREQUISITE(S): None	CLO1: apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations (C3, PLO 1) CLO2: construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software (P4, PLO 5)	Practical Work Practical End of Chapter Practical Test
3	DEJ30013 Basic Control System	BASIC CONTROL SYSTEM introduces students to the fundamental ideas of classical control theory such as the basic concept of control system, transfer function and time domain analysis. Student will also be introduced to the concept of controller in control system. The goal is to instill the students' interests in the fields of control system and to provide a solid background for engineering applications in control system techniques. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the concept and principles of control system fundamental in various type of control system engineering applications (C3, PLO 1) CLO2: display an ability to handle control system equipment using proper techniques and procedures (P3, PLO 5) CLO3: demonstrate effectively as a part of team while doing practical work based on related procedures (A3, PLO 9)	Quiz Test Practical Test Practical Work Practical Work (Generic Skills) End of Chapter Final Examination

3	DEJ30023 Instrumentation	INSTRUMENTATION provides knowledge regarding the concept and basic pneumatic system, electro-pneumatic system, hydraulic system and instrumentation drawing and equipment used in the processing industries. The emphasis of the course is to identify and provide knowledge of the general symbols, components in pneumatic and hydraulic systems as well as useful information on types of equipment used in a processing system. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the knowledge and principle of transducer, pneumatic and hydraulic system in process instrumentation control to create sustainable system (C3, PLO 1) CLO2: construct and test the processing control system application based on the theory and principle operation of the system (P4, PLO 5) CLO3: demonstrate good communication skill in group presentation based on engineering activities (A3, PLO 10)	Test Quiz Practical Work Practical Test End of Chapter End of Chapter (Generic Skills) Final Examination
4	**DUE50032 Communicative English 3**	COMMUNICATIVE ENGLISH 3 aims to develop the necessary skills in students to analyse and interpret graphs and charts from data collected as well as to apply the job hunting mechanics effectively in their related fields, Students will learn to gather data and present them through the use of graphs and charts. Students will also learn basic of job hunting mechanics which include using various job search strategies, making enquiries, and preparing relevant resumes and cover letters. The student will develop communication skills to introduces themselves, highlight their strengths and abilities, present ideas, express opinions and respond appropriately during job interviews. CREDIT(S): 2 PREREQUISITE(S): Communicative English 2	CLO 1: Present gathered data in graphs and charts effectively using appropriate language forms and functions (A2, CLS 3b) CLO2: Prepare a high impact resume and a cover letter, highlighting competencies and strengths that meet employer's expectations. (A4, CLS 4) CLO3: Demonstrate effective communication and social skills in handling job interviews confidently. (A3, CLS 3b)	Presentation Mock Interview Test Assignment 1 Assignment 2
4	**MPU22012 Entrepreneurship**	ENTREPRENEURSHIP focuses on the fundamentals and concept of entrepreneurship in order to inculcate the value and interest in students to choose entrepreneurship as a career. This course can help students to initiate creative and innovative entrepreneurial ideas. It also emphasizes a preparation of a business plan framework through business model canvas. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Propose the value proposition of entrepreneurial idea using Business Model Canvas (A3, CLS 3b) CLO2: Develop a viable business plan by organizing business objectives according to priorities (A4, CLS 4) CLO3: Organize the online presence business in social media marketing platform (A3, CLS 4)	Product Pitching Business Plan Presentation Online Business Report

4	**DEC40053 Embedded System Application**	EMBEDDED SYSTEM APPLICATIONS cover the basic concept and application of microcontroller system based on Peripheral Interface Controller (PIC) microcontroller. Students will learn software and hardware development on PIC16F/PIC18F microcontroller development system and understand how to do interfacing with external devices using suitable internal chip features. Students are exposed to the new Microcontroller Unit (MCU) simulation software such as Proteus. CREDIT(S): 3 PREREQUISITE(S): DEC20012 Programming Fundamentals	CLO1: Investigate internal features of PIC16F/PIC18F to interface properly with external devices (C4, PLO 4) CLO2: Design embedded system application based on PIC16F/PIC18F microcontroller effectively (C6, PLO 3) CLO3: Construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively (P4, PLO 5) CLO4: Demonstrate knowledge of engineering project management principles through a written report on an assigned mini project (A3, PLO 11)	Quiz Test Practical Work Mini Project Mini Project (Generic Skill) Final Examination
4	**DEJ40033 PLC & Automation**	PROGRAMMABLE LOGIC CONTROLLER (PLC) AND AUTOMATION provides knowledge regarding the concept and principle of automation system. This course emphasizes the relationship between conventional/hardwired/relay ladder logic (RLL) and PLC system, application of various industrial input and output devices of PLC, designing process, programming, constructing and PLC maintenance method. This course also provides knowledge and skills in designing environmentally friendly of automation control system based on conventional/hardwired/relay ladder logic (RLL) and PLC CREDIT(S): 3 PREREQUISITE(S): None	CLO1: evaluate environmentally-friendly automation control system using electromechanical devices and PLC (C5, PLO 2) CLO2: display the ability to construct, troubleshoot and do maintenance of hardwired and PLC systems using appropriate equipment (P4, PLO 5) CLO3: demonstrate an understanding of PLC environmentally-friendly automation system norm by following PLC IEC standard during practical work session (A3 , PLO 7)	Test Quiz Practical Work Practical Work (Generic Skills) End of Chapter Final Examination

4	**DEJ40043 Control System**	CONTROL SYSTEMS introduces students to the concept and technique of classical control system. The main focus is to enable students to describe in detail the necessary mathematical tools used in the analysis of a system. Students will be exposed to the principles of analogue electronic controller and tuning of PID controllers, the concept of system stability and performance, frequency response analysis and Root Locus rules CREDIT(S): 3 PREREQUISITE(S): DEJ30013 Basic Control System	CLO1: analyze well-defined of control system problems (C4, PLO 2) CLO2: organize work efficiently with proper technique and procedure while handling the related process equipment in control system (P4, PLO 5) CLO3: demonstrate good social responsibility in solving well defined engineering problems through practical work (A3, PLO 6)	Quiz Test Practical Work Practical Work (Generic Skills) Essay Final Examination
4	**DEE40082 Project 1**	PROJECT 1 provides knowledge regarding the implementation and development methods of a project based on hardware or software or a combination of hardware and software. This course provides exposure to the project management and finance, techniques to develop project and proposal preparation. CREDIT(S): 2 PREREQUISITE(S): None	CLO1: Investigate well defined problem in order to make improvements on a chosen project (C4, PLO 4) CLO2: Evaluate engineering problem and conduct research in order to make improvements on a chosen project whether the project is on the hardware, software or hardware-software interface type (C5, PLO 2) CLO3: Perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically (P4, PLO 5) CLO4: Display good project management and finance through a Gantt Chart (milestone) and final proposal (A3, PLO 11) CLO5: Demonstrate continuous learning, information management and independent acquisition of new knowledge and skill to support the development of the project through the final proposal (A3, PLO 12) CLO6: Display written communication skill through a final proposal (A3, PLO 10) CLO7: Describe the impact of the proposed project to the society in the final proposal (A3, PLO 6)	Investigation Report Logbook Final Proposal

4	**DEC50122 Embedded Robotic**	EMBEDDED ROBOTIC presents the combination of mobile robots and embedded systems, from introductory to intermediate level. It is structured in three parts, which are embedded systems, mobile robot, and mobile robot applications. These parts are essential to students in mastering the crucial steps of building a complete working robotic system. They will help them to develop robots that not only can move, but intelligent as well. CREDIT(S): 2 PREREQUISITE(S): DEC20012 Programming Fundamentals	CLO1: Investigate the concept and fundamentals of mobile robotic, embedded controller, sensors and actuators based on land mobile robot design (C4, PLO 4) CLO2: Design the concept of robot positioning, identification and communication in mobile robot control according to a standard robot organization regulation (C6, PLO 3) CLO3: Manipulate the application of sensor and actuator, robot identification and communication during practical work based on land mobile robot design (P4, PLO 5) CLO4: Demonstrate good ability in managing a well-defined engineering-based project in a cost effective manner (A3, PLO 11)	Quiz Test Practical Work Practical Test Mini Project Mini Project (Generic Skill)

5	**MPU23052/MPU23042** **Sains Teknologi dan Kejuruteraan Islam* OR Nilai Masyarakat Malaysia**** SAINS TEKNOLOGI DAN KEJURUTERAAN DALAM ISLAM memberi pengetahuan tentang konsep Islam sebagai al-Din dan seterusnya membincangkan konsep sains, teknologi dan kejuruteraan dalam Islam serta impaknya, pencapaiannya dalam tamadun Islam, prinsip serta peranan syariah dan etika Islam, Peranan keaedah fiqh serta aplikasinya. CREDIT(S): 2 PREREQUISITE(S): None **ATAU** NILAI MASYARAKAT MALAYSIA membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran-cabaran dalam membentuk masyarakat Malaysia. CREDIT(S): 2 PREREQUISITE(S): None	CLO 1: Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian. (A2, CSs 4) CLO 2: Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam. (A3, CLS 5) CLO 3: Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam. (A4, CLS4) CLO1: Membincangkan konsep integrasi di Malaysia. (A2, CLS 4) CLO: Menerangkan etika dan nilai berkaitan pembentukan integrasi di Malaysia (A3, CLS 5) CLO3: Menghubungkait minda ingin tahu dengan cabaran dan kejayaan integrasi di Malaysia. (A4, CLS 4)	Tunjukcara Pembentangan E folio Tugasan berdasarkan masalah. Perbincangan Pembentangan E-folio Tugas berasaskan masalah
5	**DEC30023** **Computer Networking Fundamentals** COMPUTER NETWORK FUNDAMENTALS introduce students to the concepts and principles of data transmission and computer networks. This course enables students to correctly use standard terminology in describing the main Local Area Network (LAN) topologies, hardware and software components used in networking. This course provides students with the knowledge and skills to build a network infrastructure using copper cabling, and wireless devices wisely. Students also learn to troubleshoot and secure the network. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: investigate a computer network structure to determine the network protocol, network services, network problem and network security when implementing specific networking requirements (C4, PLO 4) CLO2: construct a simple LAN or WLAN in accordance to IEEE or TIA/EIA-568-A/B wiring standard and network troubleshooting using network simulation or tools (P4, PLO 5) CLO3: demonstrate awareness of the norm practice of professional bodies such as IEEE or TIA/EIA-568-A/B during practical work session (A3, PLO 8)	Quiz Test Practical Work Practical Work (Generic Skills) Practical Test End of Chapter Final Examination

5	**DEE50102** **Project 2** PROJECT 2 is the continuation of DEE40082 PROJECT 1 course. The course focuses on methods of circuit construction, testing, troubleshooting, debugging, repair and also completion of the project which was planned during the previous semester. This course also requires students to manage an economical engineering based project, prepare a project report in a given format and deliver a project presentation at the end of the semester. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course. CREDIT(S): 2 PREREQUISITE(S): DEE40082 Project 1	CLO1: Investigate the various alternative preliminary design and software programming for the previous chosen project (C4, PLO 4) CLO2: Suitable and attractive casing or complete system programme (for software project) with user interface (C6, PLO 3) CLO3: Perform systematically the relevant test and measurement to determine circuit fault and functionality and construct project casing (hardware project) or test run, debug and execute system programme (software project) using modern tools (P4, PLO 5) CLO4: Display element of environment and sustainability awareness in project implementation (A3, PLO 7) CLO5: Display effective communication skill in report writing and during presentation (A3, PLO 10) CLO6: Display good ability in project management and finance using a Gantt Chart (milestone chart) and an effective costing respectively (A3, PLO 11)	Logbook Model/System Final Report (Generic Skills) Presentation (Generic Skills)
5	**DET40073** **Power Electronics** POWER ELECTRONICS course is aimed to equip students with the knowledge and skills related to power electronic devices and its application in power conversion. This course also will focus on the operational principle of rectifiers, choppers, inverters and AC voltage controller circuits. Emphasis is given more on producing the output voltage waveforms of the converters. CREDIT(S): 3 PREREQUISITE(S): None	CLO1: analyze and investigate the well-defined operational behaviors, principle and basic concepts of power electronics by using schematics circuits (C4, PLO 4) CLO2: construct converters circuits and make observation on displayed waveforms using appropriate methods and equipments (P4, PLO 5) CLO3: demonstrate the ability to practice leadership skills to complete assigned power electronics tasks (A3, PLO 9)	Quiz Practical Work Practical Work (Generic Skills) Test End of Chapter Final Examination

5	DEJ50063 Process Measurement	PROCESS MEASUREMENT provides knowledge regarding the concept and basic principles of level, flow, pressure and temperature measurement. The course emphasizes on identifying and understanding the methods of measuring variables process and general equipment in process system. Overall, this course covers basic theories, structure diagrams, operating principles as well as the application of a particular instrument especially in processing industry CREDIT(S): 3 PREREQUISITE(S): None	CLO1: apply the concept and principles of process measurement in processing industry correctly (C3, PLO 1) CLO2: measure the process measurement during practical works based on the theory and principle operation of the system (P4, PLO 5) CLO3 : demonstrate effectively as a part of team while doing practical work based on related procedures (A3, PLO 9)	Quiz Test Practical Work Practical Work (Generic Skills) End of Chapter Final Examination
5	DEE50122 Circuit Analysis	CIRCUIT ANALYSIS provides knowledge and exposure on how to analyze electrical circuits that have alternating current (AC) voltage or current sources using various circuit analysis techniques and theorems. Application of mathematic theorem of Laplace Transform is also introduced as another method of AC circuit analysis and the use of mathematic theorem of Fourier Series to analyze electrical waveforms. CREDIT(S): 2 PREREQUISITE(S): DET20033 Electrical Circuit	CLO1: evaluate problems related to AC circuit analysis, Laplace transform and application and Fourier Series signal analysis using the appropriate table, formula and theorems (C5, PLO 2) CLO2: display ability to work in team to purpose the best solution to the assigned group tasks (A3, PLO 9)	Quiz Test End of Chapter (Generic Skills) End of Chapter Final Examination

Elective courses offered are subjected to departmental amendments.

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