

STUDENT HANDBOOK



DEPARTMENT OF ELECTRICAL ENGINEERING

POLITEKNIK IBRAHIM SULTAN

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TABLE OF CONTENTS

VISION & MISSION	4
TOP ORGANISATION	5
PIS ORGANIZATION CHART	6
JKE ORGANIZATION CHART	7
ELECTRICAL ENGINEERING DEPARTMENT	8
OUR FACILITIES	9
CAMPUS FACILITIES	14
STUDENT ENTRY REQUIREMENT	16
OUTCOME BASED EDUCATION (OBE)	17
PEO & PLO	19
DIPLOMA IN ELECTRONIC ENGINEERING (COMMUNICATION)	21
DIPLOMA IN ELECTRONIC ENGINEERING (CONTROL)	55
DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING	88

VISION

To be the leading-edge TVET institution
Menjadi peneraju institusi TVET yang unggul

MISSION

- ▶ To provide wide access to quality and recognized TVET programmes.
Menyediakan akses yang meluas kepada program TVET berkualiti dan diiktiraf.
- ▶ To empower communities through research, innovation and life-long learning.
Memperkasa komuniti melalui penyelidikan, inovasi dan pembelajaran sepanjang hayat.
- ▶ To develop holistic, entrepreneurial and balanced graduates.
Melahirkan graduan holistik, berciri keusahawanan dan seimbang.
- ▶ To capitalise on smart partnership with stakeholders.
Memanfaatkan sepenuhnya perkongsian pintar dengan pihak berkepentingan.
- ▶ To be the forefront in engineering, design technology and hospitality disciplines emphasizing on the niche area of creative design.
Mengungguli bidang kejuruteraan, teknologi rekabentuk dan hospitaliti bercirikan bidang tujahan rekabentuk kreatif.

TOP ORGANISATION



Hj. Ulaimi bin Yahya
Director



YM Tengku Nadzion bin
Tengku Ibrahim
Deputy Director (Academic)



Hj. Hamzah bin Zakaria
Deputy Director
(Governan & Strategic)



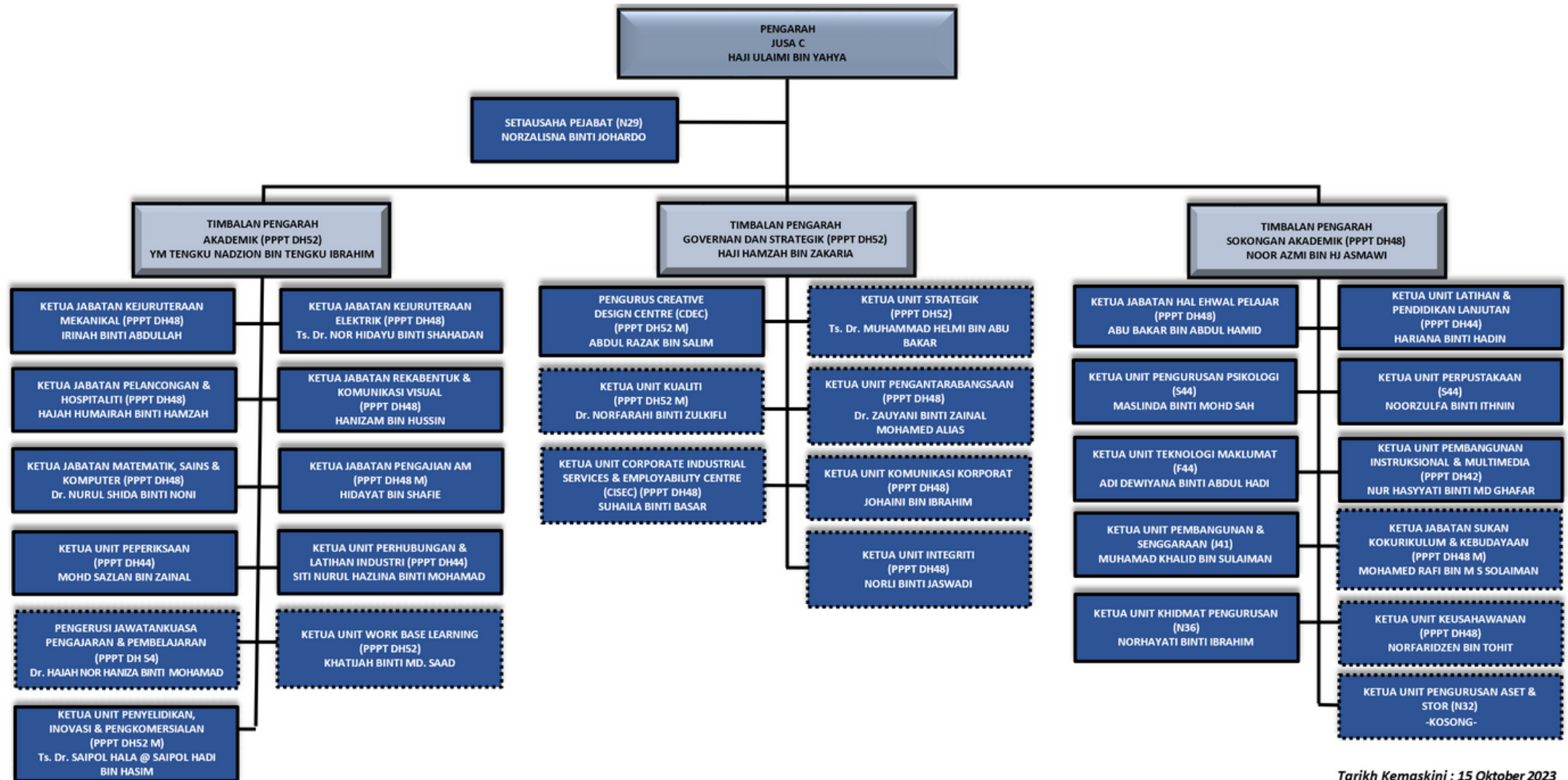
Noor Azmi bin Hj Asmawi
Deputy Director
(Academic Support)



Ts. Dr. Nor Hidayu binti Shahadan
Head of Electrical
Engineering Department

ORGANISATION CHART

POLITEKNIK IBRAHIM SULTAN



Tarikh Kemaskini : 15 Oktober 2023

ORGANISATION CHART

DEPARTMENT OF ELECTRICAL ENGINEERING



Ts. Dr. NOR HIDAYU BINTI SHAHADAN
HEAD OF ELECTRICAL ENGINEERING
DEPARTMENT



**ROSSIELYANA BINTI
ABDUL RAHIM**

HEAD OF PROGRAMME (DJK)



NAZRA BINTI ARIS

HEAD OF PROGRAMME (DEP)



**Dr. ARFAH BINTI AHMAD
HASBOLLAH**

HEAD OF PROGRAMME (DEE)

ELECTRICAL ENGINEERING DEPARTMENT

The Electrical Engineering Department at Politeknik Ibrahim Sultan is a department that specializes in providing students with the necessary knowledge and skills to design, operate, and maintain electrical and electronic systems. The department offers a diploma program in Electrical Engineering that aims to prepare students for careers in various industries such as power generation, electronics, telecommunications, and automation.

The program is designed to provide a balance between theoretical knowledge and practical skills. Students are exposed to various courses such as Electrical Circuit Analysis, Digital Electronics, Control Systems, Power Systems, Electrical

Machines, Instrumentation and Control. The program also includes hands-on laboratory sessions, where students can apply the theories learned in the classroom to real-world situations.

The department also has a team of experienced and qualified lecturers who are dedicated to providing students with a quality education. The lecturers are actively involved in research and development activities, and they incorporate their findings into their teaching. With a well-rounded curriculum, modern facilities, and experienced lecturers, students can gain the necessary knowledge and skills to succeed in this exciting field.



OUR FACILITIES

The department is equipped with modern facilities and equipment, including a power electronics laboratory, a control systems laboratory, computer laboratory and an electrical machines laboratory. These facilities provide students with the opportunity to conduct experiments and carry out projects that involve designing, building, and testing electrical systems.



OUR FACILITIES

LABORATORIES

- POWER ELECTRONIC & ELECTRICAL TECHNOLOGY (EEK & ETE)
 - ELECTRICAL PRINCIPLES (EPE)
 - ELECTRONIC (EEE)
 - COMPUTER HARDWARE (EPK)
 - MEASUREMENT (EMU)
 - ELECTRONICS REPAIR (EBE)
 - COMPUTER PROGRAMMING (EKP)
 - COMPUTER AIDED DESIGN 1 (ECAD 1)
 - COMPUTER AIDED DESIGN 2 (ECAD 2)
 - COMMUNICATION DATA (EPD)
 - TELECOMMUNICATION (ETL)
 - PROJECT (EPR)
 - WIRING/ INSTALLATION (EPP)
 - AUTOMATION & CONTROL SYSTEM (EAK)
 - EQUIPMENT & CONTROL SYSTEM (EAK)
 - ELECTRICAL MACHINE (EME)
 - POWER SYSTEM (ESK)
-

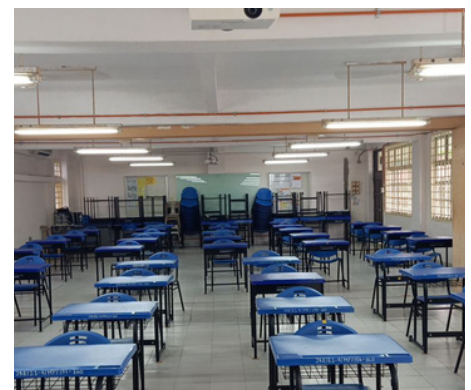
OUR FACILITIES



Lecture Hall



Seminar Room



Lecture Room



Electronic Lab



Measurement Lab



Electronics Repair Lab

OUR FACILITIES



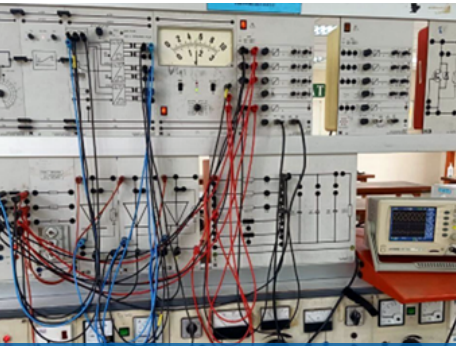
Communication Data Lab



ECAD Lab



Computer Programming Lab



Power Electronic & Electrical Technology Lab



Computer Hardware Lab



Wiring/Installation Lab

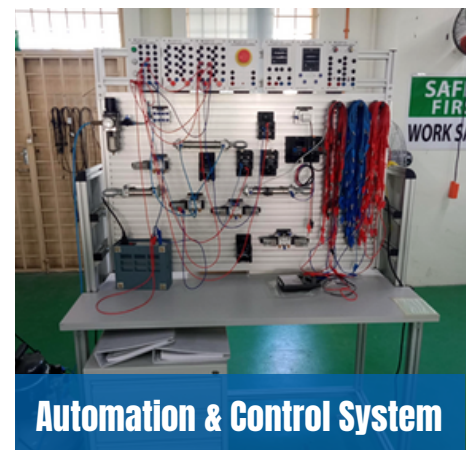
OUR FACILITIES



Power System Lab



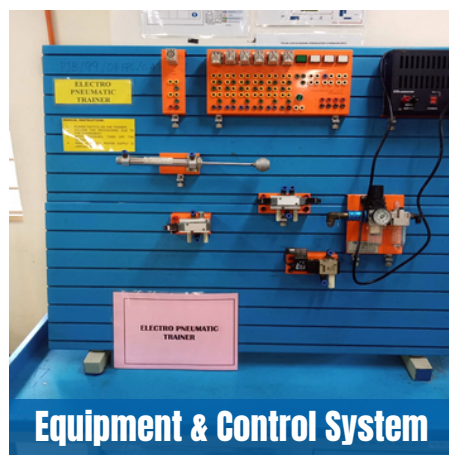
Electrical Machine Lab



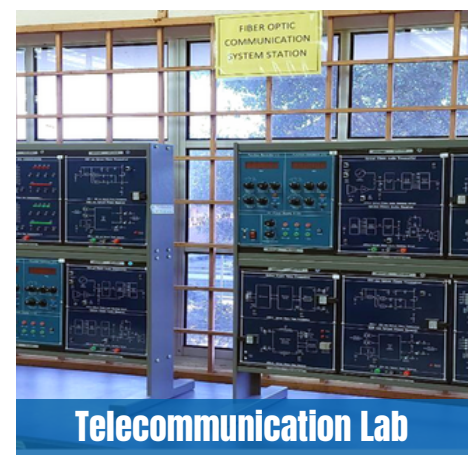
Automation & Control System



Project Lab



Equipment & Control System



Telecommunication Lab

CAMPUS FACILITIES



CAMPUS FACILITIES



Dewan Tunku Laksamana Abdul Jalil



Dewan Kuliah Utama



LIBRARY



COURT



SPORT CENTRE

STUDENT ENTRY REQUIREMENT



Sijil Pelajaran Malaysia (SPM)

- Malaysian citizen
- Acquire SPM or equivalent
- PASSED Bahasa Melayu
- PASSED Sejarah (SPM 2013 onwards)
- PASSED Bahasa Inggeris
- Obtain 3 CREDITS in:
 - a. Matematik
 - b. ONE (1) Sains / Teknikal / Vokasional / Elektif STEM subjects.
 - c. ONE (1) other subjects that have not been credited.

APEL

- Malaysian citizen
- Has a Level 4 APEL Certificate from MQA.
- Has working experience in related field.

Other than SPM

- Malaysian citizen
- Passed MQA-recognized Certificate level/ Malaysian Skills Certificate Level 3 in following field:
 - a. Level 3 Polytechnic Certificate, KKM.
 - b. Level 3 Community College Certificate, KKM.
 - c. Level 3 PERDA Advanced Technical Institute, KKM.
 - d. Level 3 MARA Skills Institute Certificate, KKM.

PRA DIPLOMA

- Malaysian citizen
- PASSED Pre-Diploma in Science

Candidates do not have any physical, hearing, visual disabilities (blindness and color blindness) or learning disabilities that would make it possible to perform practical job.

OUTCOME BASED EDUCATION (OBE)

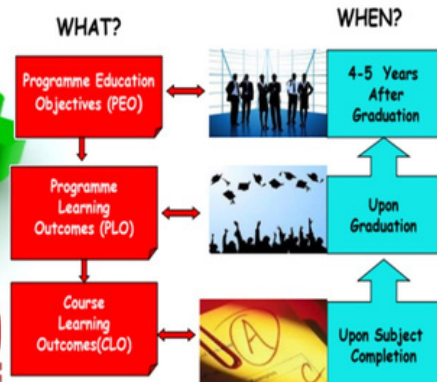
An Overview Of OUTCOME BASED EDUCATION (OBE)

Outcome-Based Education (OBE) is an approach that focuses on outcomes such as achievements of students that are measurable, proven and can be improved.

The students' achievements of the outcomes are measured during the course of the study and after the students have graduated and during work in industry.

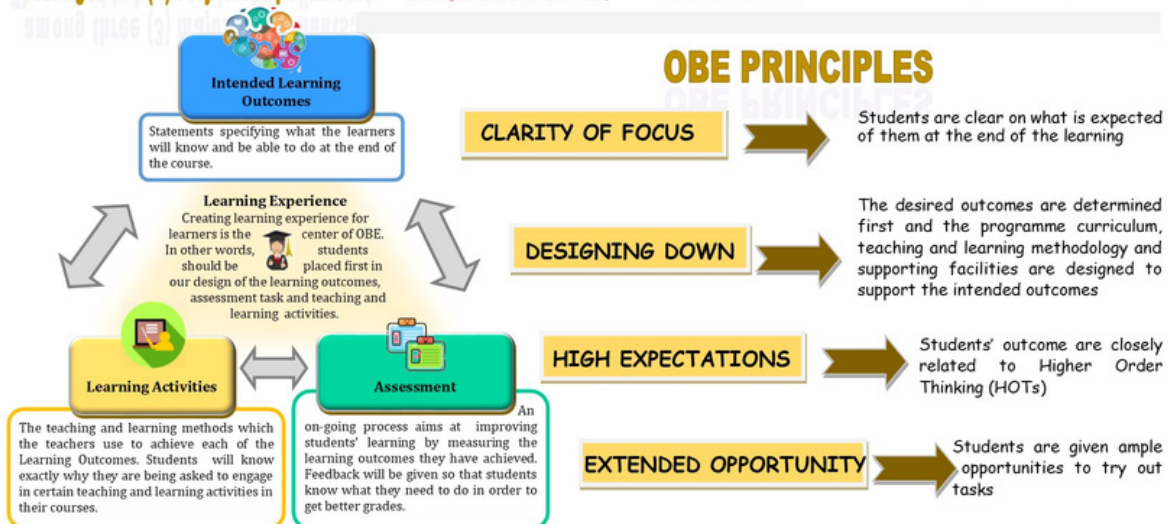


Outcome-Based Education (OBE) focuses on student learning by:



There need to be a constructive alignment among three (3) major components:

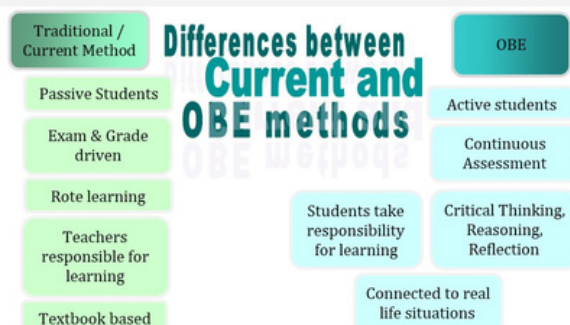
- Using learning outcome statements to make explicit what the student is expected to be able to know, understand or do;
- Providing learning activities which will help the student to reach these outcomes;
- Assessing the extent to which the student meets these outcomes through the use of explicit assessment criteria.



Benefits to Students



Benefits to Staff



CONTINUOUS QUALITY IMPROVEMENT (CQI)



OBE OUTCOME BASED EDUCATION

"Pembelajaran/pendidikan berasaskan hasil"

Apa itu OBE ?

Pendekatan berpusatkan pelajar (student centered)

Fokus kepada sesuatu hasil pembelajaran

Berasaskan kepada hasil Pengajaran dan Pembelajaran

Menilai mengikut hasil pembelajaran

Kesannya : Pelajar berjaya di akhir pembelajaran berdasarkan tugas yang diberikan dan lebih relevan di alam pekerjaan.

Kenapa perlunya OBE?

Graduan tidak bersedia untuk menghadapi alam pekerjaan

Isu:

Kurangnya kemahiran berkomunikasi
Kurangnya kemahiran bekerjasama dalam kumpulan
Kurang kreatif
Kurangnya pemikiran kritis

Bagaimana?

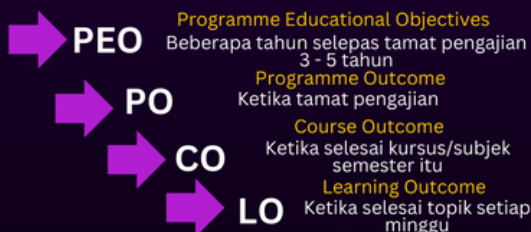
CONSTRUCTIVE ALIGNMENT

KURIKULUM

PENILAIAN
(ASSESSMENT)

KAEDAH PENGAJARAN/
ARAHAN

Perbezaan aras outcomes



Kaedah Pengajaran



Penilaian (Assessment)

Explain	assignment, essay question exam, oral, letter-to-a-friend
Integrate	project, assignment
Analyse	case study, assignment
Apply	project, case study, experiment
Solve problem	case study, project, experiment
Design, create	project, experiment
Reflect	reflective diary, portfolio, self-assessment

Pembelajaran kini VS OBE

Pelajar yang pasif	PELAJAR YANG AKTIF
Berorientasikan peperiksaan	PENILAIAN BERTERUSAN (PB) /CONTINUOUS ASSESSMENT
Pensyarah bertanggungjawab terhadap PdP	PELAJAR BERTANGGUNGJAWAB TERHADAP PdP
Buku & Berpusatkan Pensyarah	BERPUSATKAN PELAJAR
Pembelajaran berasaskan hafalan	PEMIKIRAN KRITIS, PEMIKIRAN KREATIF, KERJASAMA, KOMUNIKASI

PEO & PLO

DEPARTMENT OF ELECTRICAL ENGINEERING POLITEKNIK IBRAHIM SULTAN

DIPLOMA IN

- ELECTRICAL AND ELECTRONIC ENGINEERING - DEE**
- ELECTRONIC ENGINEERING (COMMUNICATION) - DEP**
- ELECTRONIC ENGINEERING (CONTROL) - DJK**

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1
practicing
technician in
electrical
engineering
related field

PEO 2
contributing to
society with
professional
ethic and
responsibilities

PEO 3 engaging in
enterprising
activities that apply
engineering
knowledge and
technical skills

PEO 4 engaging in
activities to
enhance
knowledge for
successful career
advancement

PROGRAMME LEARNING OUTCOMES (PLO)

PLO 1 - Knowledge

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

PLO 2 - Problem Analysis

Identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)

PLO 3 - Design/Development of Solutions

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)

PLO 4 - Investigation

Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements

PLO 5 - Modern Tool Usage

Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations

PLO 6 - The Engineer and Society

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)

PLO 7 - Environment and Sustainability

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)

PLO 8 - Ethics

Understand and commit to professional ethics and responsibilities and norms of technician practice: (DK7)

PLO 9 - Individual and Teamwork

Function effectively as an individual, and as a member in diverse technical teams;

PLO 10 - Communications

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

PLO 11 - Project Management and Finance

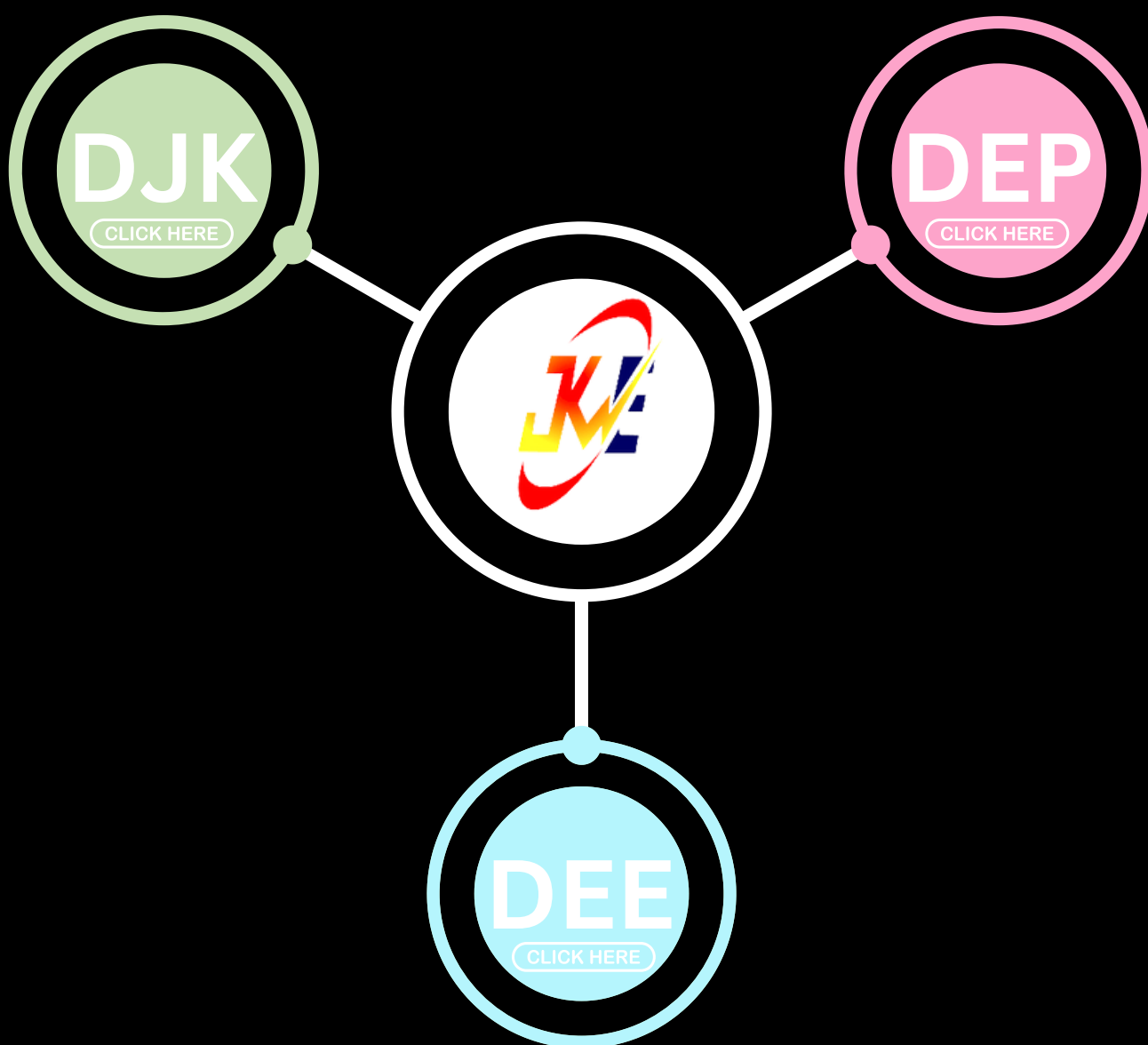
Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments

PLO 12 - Life Long Learning

Recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

- DK 1: A descriptive, formula-based understanding of the **natural sciences** applicable in a sub-discipline
- DK 2: Procedural **mathematics**, numerical analysis, statistics applicable in a subdiscipline
- DK 3: A coherent procedural formulation of **engineering fundamentals** required in an accepted sub-discipline
- DK 4: Engineering **specialist knowledge** that provides the body of knowledge for an accepted sub-discipline
- DK 5: Knowledge that supports **engineering design** based on the techniques and procedures of a practice area
- DK 6: Codified **practical engineering knowledge** in recognised practice area
- DK 7: **Knowledge** of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts

PROGRAMMES IN ELECTRICAL ENGINEERING DEPARTMENT





DEP

DIPLOMA IN ELECTRONIC ENGINEERING (COMMUNICATION)



LIST OF DEP LECTURER



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09	YUZI BINTI SAIDUN yuzi@pis.edu.my		
10	MOHAMED RIZUAN BIN MOHAMED NOAH m_rizuan@pis.edu.my		
11	NOR'ASHIKIN BINTI MOHD NASIR n_shikin@pis.edu.my		

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 workplaces 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 microwaves devices.

JOB PROSPECT

This programme provides the knowledge and skills in Electronics Engineering (Control) that can be applied to 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. Electrical/Electronic Technician
- b. Electrical Engineering Service Advisor
- c. Technical Assistant
- d. Electrical/ Electronic Engineering Supervisor
- e. Assistant Engineer

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.

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

PROGRAMME DETAILS

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 resourceful and adaptable technician to support the nation 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 DETAILS

PROGRAMME LEARNING OUTCOME

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

NO	PLO	CONTENT
1	PLO1	Knowledge: 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	Problem analysis: 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/development of solutions: 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	Investigation: Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements;
5	PLO5	Modern Tool Usage: Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6);
6	PLO6	The Engineer and Society: 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	Environment and Sustainability: 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);

PROGRAMME DETAILS

PROGRAMME LEARNING OUTCOME

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

NO	PLO	CONTENT
8	PLO8	Ethics: Understand and commit to professional ethics and responsibilities and norms of technician practice;
9	PLO9	Individual and Team Work: Function effectively as an individual, and as a member in diverse technical teams;
10	PLO10	Communications: 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	Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and apply them to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments;
12	PLO12	Life Long Learning: Recognise the needs for, and have the ability to engage in independent updating in the context of specialised technical knowledge;

Notes:

DK 1: A descriptive, formula-based understanding of the natural sciences applicable in a sub-discipline

DK 2: Procedural mathematics, numerical analysis, statistics applicable in a subdiscipline

DK 3: A coherent procedural formulation of engineering fundamentals required in an accepted sub-discipline

DK 4: Engineering specialist knowledge that provides the body of knowledge for an accepted sub-discipline

DK 5: Knowledge that supports engineering design based on the techniques and procedures of a practice area

DK 6: Codified practical engineering knowledge in recognised practice area

DK 7: 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)

PROGRAMME LEARNING OUTCOMES (PLOs)	PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)			
	PEO 1 Practicing technician in electrical engineering related field	PEO 2 Contributing to society with professional ethic and responsibilities	PEO 3 Engaging in enterprising activities that apply engineering knowledge and technical skills	PEO 4 Engaging in activities to enhance knowledge for successful career advancement.
PLO1 (Knowledge)	√			
PLO2 (Problem analysis)	√			
PLO3 (Design/development of solutions)	√			
PLO4 (Investigation)	√			
PLO5 (Modern Tool Usage)	√			
PLO6 (The Engineer and Society)		√		
PLO7 (Environment and Sustainability)		√		
PLO8 (Ethics)		√		
PLO9 (Individual and Team Work)			√	
PLO10 (Communications)			√	
PLO11 (Project Management and Finance)			√	
PLO12 (Life Long Learning)				√

COURSES VERSUS PROGRAMME OUTCOME 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								
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		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	MPU21032	Penghayatan Etika dan Peradaban	1	0	2	0	2								√				√	
	MPU24XX1	Kelab/Persatuan	0	2	0	0	1									√			√	
	MPU24XX1	Unit Beruniform 2																		
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 OUTCOME MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE			
			L	P	T	O	CREDIT VALUES	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 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															

COURSES VERSUS PROGRAMME OUTCOME MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE		
			L	P	T	O	CREDIT VALUES	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
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														

COURSES VERSUS PROGRAMME OUTCOME MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE			
			L	P	T	O	CREDIT VALUES	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		√					√								
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			√		√	√		√							
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				√								√			

COURSES VERSUS PROGRAMME OUTCOME 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
CLS1	CLS2	CLS2	CLS2	CLS3a	CLS3c	CLS3b	CLS5	CLS5	CLS3d	CLS3b	CLS4	CLS4									

ELECTIVE COURSES																					
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		√			√		√							
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*																					
1	DUD10012	Design Thinking	1	0	0	1	2		√								√				

COURSES VERSUS PROGRAMME OUTCOME MATRIX

	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. Elective courses offered are cross -disciplinary and can be chosen from courses listed in the program structure or any courses listed in the inventory of other disciplines; but must adhere to prerequisite / co-requisite requirement in the Programme Information

3. ^aFree 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.

4. ^bMPU22042 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.

5. 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)

6. 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

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DUE10012 Communicative English 1	<p>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 preparation for academic and work purposes.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 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) 2. Demonstrate awareness of values and opinions embedded in texts on currents issues. (A3,CLS 3b) 3. Present a topic of interest that carries identifiable values coherently using effective verbal and non-verbal communication skills. (A2,CLS4).
MPU24XX1 Sukan ATAU Unit Beruniform 1	<p>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.</p> <p>ATAU</p> <p>UNIT BERUNIFORM 1 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif.</p> <p>KREDIT : 1 PRASYARAT : TIADA</p>	<ol style="list-style-type: none"> 1. Mempamerkan kemahiran khusus bagi kursus berkaitan (P2,CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3,CLS 3d)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DUW10022 Occupational Safety and Health for Engineering	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia. (C2,PLO1) 2. Initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment. 3. Forms communication skills in a team to respond for an accident action at workplace. (A3,PLO10)
DET10013 Electrical Technology	<p>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 inductor, capacitor, magnetic and electromagnetic circuits.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept and principles of the related electrical circuit theorems and law to solve DC electrical circuit using various method and approach (C3, PLO 1) 2. Construct DC circuit and measure related electrical parameters using appropriate electrical equipments (P4 , PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame (A3 , PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DBM10013 Engineering Mathematics 1	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Use mathematical statement to describe relationship between various physical phenomena (C3, CLS1) 2. Show mathematical solutions using the appropriate techniques in mathematics (C3, CLS3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3,CLS 3b)
DBS100012 Engineering Science	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Use basic physics concept to solve engineering physics problems (C3,CLS1) 2. Apply knowledge of fundamental physics in activities to mastery physics concept. (C3,CLS1). 3. Perform appropriate activities related to physics concept. (P3,CLS 3a)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DET10012 Electrical Wiring	<p>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 sessions. This course also provides students with the knowledge and skill in doing different types of wiring installation, wiring protection, wiring testing and sustainable energy practices in electrical wiring.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to NIOSH, MS IEC 60364 standard. (C3,PLO1) 2. Construct single phase domestic wiring according to MS IEC 60364 standard.(P4,PLO5) 3. Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms and sustainable energy practices in electrical wiring during performing single phase domestic wiring task.
DEE10013 Measurement Devices	<p>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 analog meters, DC meters, analogue and digital multimeters, oscilloscope,signal generators and simple application of DC bridge.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept of measurement in electrical and electronic equipment using appropriate theorem. (C3,PLO1) 2. Perform meter calibrating and measuring techniques using the correct measuring equipment. (P4,PLO5). 3. Demonstrate good communication skill in oral presentation within a stipulated time frame. (A3,PLO10)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
MPU21032 Penghayatan Etika dan Peradaban	<p>PENGHAYATAN ETIKA DAN PERADABAN ini menjelaskan tentang konsep etika daripada perspektif peradaban yang berbeza. Ia bertujuan bagi mengenal pasti sistem, tahap perkembangan, kemajuan dan kebudayaan merentas bangsa dalam mengukuhkan kesepaduan sosial. Selain itu perbincangan dan perbahasan berkaitan isu-isu kontemporari dalam aspek ekonomi, politik, sosial, budaya, dan lain-lain sekitar daripada perspektif etika dan peradaban dapat melahirkan pelajar yang bermoral dan professional. Penerapan amalan pendidikan berimpak tinggi (HIEPs) yang bersesuaian digunakan dalam penyampaian kursus ini.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Membentangkan konsep etika dan peradaban dalam kepelbagaian tamadun. (A2, CLS 5) 2. Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia (A2, CLS 5) 3. Mencadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban. (A3, CLS 4)
DET 20033 Electrical Circuits	<p>ELECTRICAL CIRCUITS is designed to provide students with the knowledge related to AC of electrical circuits. It emphasizes 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DET10013 Electrical Technology</p>	<ol style="list-style-type: none"> 1. Apply the concept and principles in solving problems of electrical circuits using the appropriate AC electrical laws and theorem. (C3, PLO 1) 2. Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4, PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
MPU24XX1/ MPU24XX1 Kelab/Persatuan OR Unit Beruniform 2	<p>KELAB memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif.</p> <p>ATAU</p> <p>UNIT BERUNIFORM 2 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif.</p> <p>KREDIT :1 PRASYARAT : MPU24XX1 SUKAN ATAU UNIT BERUNIFORM 1</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Mempamerkan kemahiran khusus bagi kursus berkaitan. (P2, CLS 4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif. (A3, CLS 3d)
DBM20023 Engineering Mathematics 2	<p>Engineering ng 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DBM10013 Measurement Devices</p>	<ol style="list-style-type: none"> 1. Use algebra and calculus knowledge to describe relationship between various physical phenomena. (C3, CLS1) 2. Solve the mathematical problems by using appropriate and relevant fundamental calculus techniques. (C3, CLS 3c) 3. Use mathematical language to express mathematical ideas and arguments precisely, concisely, and logically in calculus. (A3, CLS 3b)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE20023 Semiconductor Devices	<p>SEMICONDUCTOR DEVICES introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistor and field effect transistors. The content encompasses device structure to biasing basic applications.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem. (C3, PLO 1) 2. Construct the various applications of semiconductor devices circuit by using schematic diagrams. (P4, PLO 5) 3. Demonstrate good communication skill in oral presentation within a stipulated time frame. (A3, PLO 10)
DEE20033 Digital Electronics	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit. (C3, PLO 1) 2. Construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop. (P4, PLO 5) 3. Demonstrate ability to work in team to complete assigned task during practical work sessions. (A3, PLO 9)
DEC20012 Programming Fundamental	<p>PROGRAMMING FUNDAMENTAL 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. 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) 2. Build programs written in C language for assigned mini project during practical work sessions. (P4, PLO 5) 3. Demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project. (A3, PLO 12)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DET 20033 Electrical Circuits	<p>ELECTRICAL CIRCUITS is designed to provide students with the knowledge related to AC of electrical circuits. It emphasizes 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DET10013 Electrical Technology</p>	<ol style="list-style-type: none"> 1. Apply the concept and principles in solving problems of electrical circuits using the appropriate AC electrical laws and theorem. (C3, PLO 1) 2. Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4, PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DUE30022 Communicative English 2	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEE10012 Communicative English 1</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience. (A3, CLS 3b) 2. Describe processes, procedures and instructions clearly by highlighting information of concern. (A3, CLS 4). 3. Demonstrate effectively communication and social skills in handling enquiries and complaints amicably and professionally. (A3, CLS 3b).
DBM30043 Electrical Engineering Mathematics	<p>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 Sample Fixed Raphson Point Iteration methods and Newton Raphson method. In addition, 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DBM20023 Engineering Mathematics 2</p>	<ol style="list-style-type: none"> 1. Demonstrate an understanding of common body of knowledge in mathematics. (C3, CLS 1) 2. Demonstrate problem solving skills in engineering problems. (C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE30043 Electronics Circuits	<p>ELECTRONICS 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : None</p>	<ol style="list-style-type: none"> 1. Apply the principles of electronic circuits devices by using block diagram or circuit diagram. (C3, PLO 1) 2. Construct the various applications of electronic circuits based on the theory and principle operation of the circuits. (P4, PLO 5) 3. Demonstrate good written communication skill through essay writing in group within a stipulated time frame. (A3, PLO 10)
DEE30052 Electronics Equipment Repair	<p>ELECTRONICS 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEE20023 SEMICONDUCTOR DEVICES</p>	<ol style="list-style-type: none"> 1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations. (C3, PLO 1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO 5)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE30071 Electronic Computer Aided Design (ECAD)	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations. (C3, PLO 1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO 5)
DEP30013 Communication System Fundamentals	<p>COMMUNICATION SYSTEM FUNDAMENTALS introduce 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept of electronic communication system by using appropriate diagram and standard formula. (C3, PLO 1) 2. Assemble the related communication equipment systematically in performing the measurement of appropriate signals parameter. (P4, PLO 5) 3. Demonstrate the ability to work in a team to complete the assigned tasks during practical work sessions. (A3, PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DEP30083 Telecommunication Network	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Apply the basic concept of telecommunication network by using appropriate block diagram and designated formula. (C3, PLO 1) 2. Assemble the related telecommunication equipment in performing the measurement of appropriate signal parameter. (P4, PLO 5) 3. Demonstrate good communication skill in oral presentation on assigned assignments. (A3, PLO 10)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DUE50032 Communicative English 3	<p>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 also learn to gather data and present them through the use of graphs and charts. Students will also learn basic of 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DUE30022 Communicative English 2.</p>	<ol style="list-style-type: none"> 1. Presents gathered data in graphs and charts effectively using appropriate language forms and functions. (A2, CLS 3b) 2. Prepare high impact resume and cover letter, highlighting competencies and strengths that meet employer's expectations. (A4, CLS 4). 3. Demonstrate effective communication and social skills in handling job interviews confidently. (A3, CLS 3b)
MPU22012 Entrepreneurship	<p>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 business plan framework through business model canvas.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Propose the value proposition of entrepreneurial idea using Business Model canvas. (A3, CLS 3b) 2. Develop a viable business plan by organizing business objectives according to priorities. (A4, CLS 4) 3. Organize the online presence business in social media marketing platform. (A3, CLS 4)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEC40053 Embedded System Applications	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DEC20012 Programming Fundamentals</p>	<ol style="list-style-type: none"> 1. Investigate internal features of PIC16F/PIC18F to interface properly with external devices. (C4, PLO 4) 2. Design embedded system application based on PIC16F/PIC18F microcontroller effectively. (C6, PLO 3) 3. Construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively. (P4, PLO 5) 4. Demonstrate knowledge of engineering project management principles through a written report on an assigned mini project. (A3, PLO 11)
DEP40053 Fiber Optic Communication System	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. 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, PLO4) 2. Design a fiber optic link using mathematical concept and design tool by considering the properties and elements of fiber optic link. (C6, PLO 3). 3. Assemble the related fiber optic communication equipment in performing the measurement of appropriate signals parameter. (P4, PLO 5) 4. Demonstrate contribution of fiber optic in communication system towards environment and sustainability through End of Chapter Question. (A3, PLO4)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE40113 Signal and System	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DBM20023 Engineering Mathematics 2</p>	<ol style="list-style-type: none"> 1. Evaluate continuous-time and discrete-time signal and system problems. (C5, PLO 2) 2. Manipulate software to analyse the signals and systems correctly based on the given procedure. (P4, PLO 5). 3. Display good oral communication during presentation of end of chapter assignment. (A3, PLO 10)
DEC50102 Embedded Robotic	<p>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. This will help them to develop robots that not only can move, but intelligent as well.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEC20012 Programming Fundamentals</p>	<ol style="list-style-type: none"> 1. Investigate the concept and fundamentals of mobile robotic, embedded controller, sensors and actuators based on land mobile robot design. (C4, PLO4) 2. Design the concept of robot positioning, identification and communication in mobile robot control according to a standard robot organization regulation. (C6, PLO 3). 3. Manipulate the application of sensor and actuator, robot identification and communication during practical work based on land mobile robot design. (P4, PLO 5) 4. Demonstrate good ability in managing a well-defined engineering-based project in a cost effective manner. (A3, PLO 11)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DEE40082 Project 1	<p>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. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Investigate well defined problem in order to make improvements on a chosen project. (C4, PLO4) 2. 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). 3. Perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically in a logbook. (P4, PLO 5) 4. Display good project management and finance through a Gantt Chart (milestone) and final proposal. (A3, PLO 11) 5. 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) 6. Display written communication skill through a final proposal. (A3, PLO 10) 7. describe the impact of the proposed project to the society in the final proposal. (A3, PLO 6)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
MPU23052 Sains Teknologi dan Kejuruteraan Islam	<p>SAINS TEKNOLOGI DAN KEJURUTERAAN 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 kaedah fiqh serta aplikasinya.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian. (A2, CLS 4) 2. Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam. (A3, CLS 5) 3. Menghubungkan minda ingin tahu dengan prinsip Syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam. (A4, CLS 4)
MPU23042 Nilai Masyarakat Malaysia	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Membincangkan konsep integrasi di Malaysia. (A2, CLS 4) 2. Menerangkan etika dan nilai berkaitan pembentukan integrasi di Malaysia. (A3, CLS 5) 3. Menghubungkan minda ingin tahu dengan cabaran dan kejayaan integrasi di Malaysia. (A4, CLS 4)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DEP50033 Data Communication and Networking	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DEP30013 Communication System Fundamentals.</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. 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) 2. 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). 3. demonstrate awareness of data communication and networking standard during practical work sessions. (A3, PLO 8)
DEP50043 Microwave Devices	<p>MICROWAVE DEVICES introduce THE EXISTENCE, characteristics 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 techniques of measurement used in microwave system.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. 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) 2. assemble the related microwave communication equipment in performing the measurement of appropriate output variable. (P4, PLO 5). 3. demonstrate appropriate good social interaction and responsibility while handling microwave equipment or transmission system. (A3, PLO 6)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEP50063 Wireless Communication	<p>WIRELESS COMMUNICATION introduces student to the basic of wireless communication includes several specialized topics. Students are exposed 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. investigate the principle of wireless in implementing the concept and system of wireless communication using appropriate technique and designated formula. (C4, PLO 4) 2. assemble the related wireless communication equipment systematically in performing the assigned practical work. (P4, PLO 5). 3. express the awareness of wireless technology in environment and sustainability on assigned essay questions. (A3, PLO 7)
DEP50072 Satellite and Radar Communication System	<p>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 send to end satellite and radar communication system in various generations and latest technologies.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. investigate the performance of satellite and radar in communication system by using designated concept and formula. (C4, PLO 4) 2. demonstrate continuous learning ability while engaging new technical knowledge on assigned essay questions. (A4, PLO 12).

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

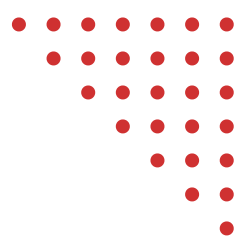
SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DEE30061 Computer Aided Electrical Drawing	<p>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 lay out diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software.</p> <p>CREDIT(S) : 1 PRE-REQUISITE(S) : NONE</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. apply computer aided design concepts, applications and capabilities in electrical engineering environment. (C3, PLO 1) 2. construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American British technical symbol standard. (P4, PLO 5). 3. 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)
DEE50102 Project 2	<p>PROJECT 2 is the continuation of DEE40082 PROJECT1 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEE40082 Project 1</p>	<ol style="list-style-type: none"> 1. Investigate the various alternative preliminary design and software programming for the previous chosen project. (C4, PLO 4) 2. 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). 3. 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) 4. Display element of environment and sustainability awareness in project implementation. (A3, PLO 7) 5. Display effective communication skill in report writing and during presentation. (A3, PLO 10) 6. Display good ability in project management and finance using a Gantt Chart (milestone chart) and an effective costing respectively. (A3, PLO 11)

Elective courses offered are subjected to departmental amendments.

DIPLOMA IN ELECTRONIC ENGINEERING (CONTROL)

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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 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 workplaces 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 (Control) 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 (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 incorporated 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 programme will enable them to participate in the job market as:

- a. Process Control Technical Assistant
- b. Industrial Automation Technical Assistance
- c. Technical Site Support
- d. Electrical/Electronic Technician
- e. Assistant Engineer
- f. Self-employed

PROGRAMME DETAILS

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 resourceful and adaptable technician to support the nation 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 DETAILS

PROGRAMME LEARNING OUTCOME

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

NO	PLO	CONTENT
1	PLO1	Knowledge: 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	Problem analysis: 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/development of solutions: 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	Investigation: Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements;
5	PLO5	Modern Tool Usage: Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6);
6	PLO6	The Engineer and Society: 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	Environment and Sustainability: 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);

PROGRAMME DETAILS

PROGRAMME LEARNING OUTCOME

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

NO	PLO	CONTENT
8	PLO8	Ethics: Understand and commit to professional ethics and responsibilities and norms of technician practice;
9	PLO9	Individual and Team Work: Function effectively as an individual, and as a member in diverse technical teams;
10	PLO10	Communications: 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	Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and apply them to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments;
12	PLO12	Life Long Learning: Recognise the needs for, and have the ability to engage in independent updating in the context of specialised technical knowledge;

Notes:

DK 1: A descriptive, formula-based understanding of the natural sciences applicable in a sub-discipline

DK 2: Procedural mathematics, numerical analysis, statistics applicable in a subdiscipline

DK 3: A coherent procedural formulation of engineering fundamentals required in an accepted sub-discipline

DK 4: Engineering specialist knowledge that provides the body of knowledge for an accepted sub-discipline

DK 5: Knowledge that supports engineering design based on the techniques and procedures of a practice area

DK 6: Codified practical engineering knowledge in recognised practice area

DK 7: 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)

PROGRAMME LEARNING OUTCOMES (PLOs)	PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)			
	PEO 1 Practicing technician in electrical engineering related field	PEO 2 Contributing to society with professional ethic and responsibilities	PEO 3 Engaging in enterprising activities that apply engineering knowledge and technical skills	PEO 4 Engaging in activities to enhance knowledge for successful career advancement.
PLO1 (Knowledge)	√			
PLO2 (Problem analysis)	√			
PLO3 (Design/development of solutions)	√			
PLO4 (Investigation)	√			
PLO5 (Modern Tool Usage)	√			
PLO6 (The Engineer and Society)		√		
PLO7 (Environment and Sustainability)		√		
PLO8 (Ethics)		√		
PLO9 (Individual and Team Work)			√	
PLO10 (Communications)			√	
PLO11 (Project Management and Finance)			√	
PLO12 (Life Long Learning)				√

COURSES VERSUS PROGRAMME OUTCOME MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE		
			L	P	T	O	CREDIT VALUES	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 2																						
Compulsory	MPU21032	Penghayatan Etika dan Peradaban	1	0	2	0	2									√				√		
	MPU24XX1	Kelab/Persatuan	0	2	0	0	1											√		√		
	MPU24XX1	Unit Beruniform 2																				
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 OUTCOME MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE		
			L	P	T	O	CREDIT VALUES	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
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				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
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															

COURSES VERSUS PROGRAMME OUTCOME MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE			
			L	P	T	O	CREDIT VALUES	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
SEMESTER 5																						
Compulsory	MPU23052 MPU23042	Sains Teknologi dan Kejuruteraan Islam* Nilai Masyarakat Malaysia**	1	0	2	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				√	√	√	√		√			√	√		DEE40082
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		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										

SEMESTER 6																						
Industrial Training	DUT600610	Engineering Industrial Training	0	0	0	0	10						√	√			√	√	√	√	√	
TOTAL			0				10															
TOTAL CREDIT VALUE							95															

COURSES VERSUS PROGRAMME OUTCOME MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE			
			L	P	T	O	CREDIT VALUES	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
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		
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		√					√								
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				√			√								

COURSES VERSUS PROGRAMME OUTCOME 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									
ELECTIVE COURSES																					
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
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*																					
1	DUD10012	Design Thinking	1	0	0	1	2		√								√				

COURSES VERSUS PROGRAMME OUTCOME MATRIX

	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. Elective courses offered are cross -disciplinary and can be chosen from courses listed in the program structure or any courses listed in the inventory of other disciplines; but must adhere to prerequisite / co-requisite requirement in the Programme Information

3. ^aFree 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.

4. ^bMPU22042 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.

5. 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)

6. 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

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DUE10012 Communicative English 1	<p>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 preparation for academic and work purposes.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 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) 2. Demonstrate awareness of values and opinions embedded in texts on currents issues. (A3,CLS 3b) 3. Present a topic of interest that carries identifiable values coherently using effective verbal and non-verbal communication skills. (A2,CLS4).
MPU24XX1 Sukan ATAU Unit Beruniform 1	<p>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.</p> <p>ATAU</p> <p>UNIT BERUNIFORM 1 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif.</p> <p>KREDIT : 1 PRASYARAT : TIADA</p>	<ol style="list-style-type: none"> 1. Mempamerkan kemahiran khusus bagi kursus berkaitan (P2,CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3,CLS 3d)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DUW10022 Occupational Safety and Health for Engineering	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia. (C2,PLO1) 2. Initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment. 3. Forms communication skills in a team to respond for an accident action at workplace. (A3,PLO10)
DET10013 Electrical Technology	<p>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 inductor, capacitor, magnetic and electromagnetic circuits.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept and principles of the related electrical circuit theorems and law to solve DC electrical circuit using various method and approach (C3, PLO 1) 2. Construct DC circuit and measure related electrical parameters using appropriate electrical equipments (P4 , PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame (A3 , PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DBM10013 Engineering Mathematics 1	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Use mathematical statement to describe relationship between various physical phenomena (C3, CLS1) 2. Show mathematical solutions using the appropriate techniques in mathematics (C3, CLS3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3,CLS 3b)
DBS100012 Engineering Science	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Use basic physics concept to solve engineering physics problems (C3,CLS1) 2. Apply knowledge of fundamental physics in activities to mastery physics concept. (C3,CLS1). 3. Perform appropriate activities related to physics concept. (P3,CLS 3a)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DET10012 Electrical Wiring	<p>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 sessions. This course also provides students with the knowledge and skill in doing different types of wiring installation, wiring protection, wiring testing and sustainable energy practices in electrical wiring.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to NIOSH, MS IEC 60364 standard. (C3,PLO1) 2. Construct single phase domestic wiring according to MS IEC 60364 standard.(P4,PLO5) 3. Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms and sustainable energy practices in electrical wiring during performing single phase domestic wiring task.
DEE10013 Measurement Devices	<p>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 analog meters, DC meters, analogue and digital multimeters, oscilloscope, signal generators and simple application of DC bridge.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept of measurement in electrical and electronic equipment using appropriate theorem. (C3,PLO1) 2. Perform meter calibrating and measuring techniques using the correct measuring equipment. (P4,PLO5). 3. Demonstrate good communication skill in oral presentation within a stipulated time frame. (A3,PLO10)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
MPU21032 Penghayatan Etika dan Peradaban	<p>PENGHAYATAN ETIKA DAN PERADABAN ini menjelaskan tentang konsep etika daripada perspektif peradaban yang berbeza. Ia bertujuan bagi mengenal pasti sistem, tahap perkembangan, kemajuan dan kebudayaan merentas bangsa dalam mengukuhkan kesepaduan sosial. Selain itu perbincangan dan perbahasan berkaitan isu-isu kontemporari dalam aspek ekonomi, politik, sosial, budaya, dan lain-lain sekitar daripada perspektif etika dan peradaban dapat melahirkan pelajar yang bermoral dan professional. Penerapan amalan pendidikan berimpak tinggi (HIEPs) yang bersesuaian digunakan dalam penyampaian kursus ini.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Membentangkan konsep etika dan peradaban dalam kepelbagaian tamadun. (A2, CLS 5) 2. Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia (A2, CLS 5) 3. Mencadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban. (A3, CLS 4)
DET 20033 Electrical Circuits	<p>ELECTRICAL CIRCUITS is designed to provide students with the knowledge related to AC of electrical circuits. It emphasizes 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DET10013 Electrical Technology</p>	<ol style="list-style-type: none"> 1. Apply the concept and principles in solving problems of electrical circuits using the appropriate AC electrical laws and theorem. (C3, PLO 1) 2. Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4, PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
MPU24XX1/ MPU24XX1 Kelab/Persatuan OR Unit Beruniform 2	<p>KELAB memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif.</p> <p>ATAU</p> <p>UNIT BERUNIFORM 2 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif.</p> <p>KREDIT :1 PRASYARAT : MPU24XX1 SUKAN ATAU UNIT BERUNIFORM 1</p>	<p>1. Mempamerkan kemahiran khusus bagi kursus berkaitan. (P2, CLS 4)</p> <p>2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif. (A3, CLS 3d)</p>
DBM20023 Engineering Mathematics 2	<p>Engineering ng 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DBM10013 Measurement Devices</p>	<p>1. Use algebra and calculus knowledge to describe relationship between various physical phenomena. (C3, CLS1)</p> <p>2. Solve the mathematical problems by using appropriate and relevant fundamental calculus techniques. (C3, CLS 3c)</p> <p>3. Use mathematical language to express mathematical ideas and arguments precisely, concisely, and logically in calculus. (A3, CLS 3b)</p>

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE20023 Semiconductor Devices	<p>SEMICONDUCTOR DEVICES introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistor and field effect transistors. The content encompasses device structure to biasing basic applications.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem. (C3, PLO 1) 2. Construct the various applications of semiconductor devices circuit by using schematic diagrams. (P4, PLO 5) 3. Demonstrate good communication skill in oral presentation within a stipulated time frame. (A3, PLO 10)
DEE20033 Digital Electronics	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit. (C3, PLO 1) 2. Construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop. (P4, PLO 5) 3. Demonstrate ability to work in team to complete assigned task during practical work sessions. (A3, PLO 9)
DEC20012 Programming Fundamental	<p>PROGRAMMING FUNDAMENTAL 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. 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) 2. Build programs written in C language for assigned mini project during practical work sessions. (P4, PLO 5) 3. Demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project. (A3, PLO 12)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DET 20033 Electrical Circuits	<p>ELECTRICAL CIRCUITS is designed to provide students with the knowledge related to AC of electrical circuits. It emphasizes 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DET10013 Electrical Technology</p>	<ol style="list-style-type: none"> 1. Apply the concept and principles in solving problems of electrical circuits using the appropriate AC electrical laws and theorem. (C3, PLO 1) 2. Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4, PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
<p>DUE30022 Communicative English 2</p>	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEE10012 Communicative English 1</p>	<ol style="list-style-type: none"> 1. Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience. (A3, CLS 3b) 2. Describe processes, procedures and instructions clearly by highlighting information of concern. (A3, CLS 4). 3. Demonstrate effectively communication and social skills in handling enquiries and complaints amicably and professionally. (A3, CLS 3b).
<p>DBM30043 Electrical Engineering Mathematics</p>	<p>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 Sample Fixed Raphson Point Iteration methods and Newton Raphson method. In addition, 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DBM20023 Engineering Mathematics 2</p>	<ol style="list-style-type: none"> 1. Demonstrate an understanding of common body of knowledge in mathematics. (C3, CLS 1) 2. Demonstrate problem solving skills in engineering problems. (C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE30043 Electronics Circuits	<p>ELECTRONICS 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : None</p>	<ol style="list-style-type: none"> 1. Apply the principles of electronic circuits devices by using block diagram or circuit diagram. (C3, PLO 1) 2. Construct the various applications of electronic circuits based on the theory and principle operation of the circuits. (P4, PLO 5) 3. Demonstrate good written communication skill through essay writing in group within a stipulated time frame. (A3, PLO 10)
DEE30052 Electronics Equipment Repair	<p>ELECTRONICS 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEE20023 SEMICONDUCTOR DEVICES</p>	<ol style="list-style-type: none"> 1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations. (C3, PLO 1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO 5)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
<p>DEE30071 Electronic Computer Aided Design (ECAD)</p>	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations. (C3, PLO 1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO 5)
<p>DEJ30013 Basic Control System</p>	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept and principles of control system fundamental in various type of control system engineering applications (C3, PLO 1) 2. Display an ability to handle control system equipment using proper techniques and procedures (P3, PLO 5) 3. Demonstrate effectively as a part of team while doing practical work based on related procedures (A3, PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
<p>DEE30061 Computer Aided Electrical Drawing</p>	<p>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 lay out diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software.</p> <p>CREDIT(S) : 1 PRE-REQUISITE(S) : NONE</p>	<p>1. Apply computer aided design concepts, applications and capabilities in electrical engineering environment. (C3, PLO 1) 2. Construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American British technical symbol standard. (P4, PLO 5). 3. 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)</p>
<p>DEJ30023 Instrumentation</p>	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<p>1. Apply the knowledge and principle of transducer, pneumatic and hydraulic system in process instrumentation control to create sustainable system. (C3, PLO 1) 2. Construct and test the processing control system application works based on the theory and principle operation of the system. (P4, PLO 5) 3. Demonstrate good communication skill in group presentation based on engineering activities. (A3, PLO 10)</p>

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DUE50032 Communicative English 3	<p>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 also learn to gather data and present them through the use of graphs and charts. Students will also learn basic of 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DUE30022 Communicative English 2.</p>	<ol style="list-style-type: none"> 1. Presents gathered data in graphs and charts effectively using appropriate language forms and functions. (A2, CLS 3b) 2. Prepare high impact resume and cover letter, highlighting competencies and strengths that meet employer's expectations. (A4, CLS 4). 3. Demonstrate effective communication and social skills in handling job interviews confidently. (A3, CLS 3b)
MPU22012 Entrepreneurship	<p>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 business plan framework through business model canvas.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Propose the value proposition of entrepreneurial idea using Business Model canvas. (A3, CLS 3b) 2. Develop a viable business plan by organizing business objectives according to priorities. (A4, CLS 4) 3. Organize the online presence business in social media marketing platform. (A3, CLS 4)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DEC40053 Embedded System Applications	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DEC20012 Programming Fundamentals</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Investigate internal features of PIC16F/PIC18F to interface properly with external devices. (C4, PLO 4) 2. Design embedded system application based on PIC16F/PIC18F microcontroller effectively. (C6, PLO 3) 3. Construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively. (P4, PLO 5) 4. Demonstrate knowledge of engineering project management principles through a written report on an assigned mini project. (A3, PLO 11)
DEJ40043 Control Systems	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DEJ30013 Basic Control System</p>	<ol style="list-style-type: none"> 1. Analyze well-defined of control system problems (C4 , PLO 2) 2. Organize work efficiently with proper technique and procedure while handling the related process equipment in control system (P4 , PLO 5) 3. Demonstrate good social responsibility in solving well defined engineering problems through practical work (A3 , PLO 6)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DEJ40033 PLC & Automation	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Evaluate environmentally-friendly automation control system using electromechanical devices and PLC. (C5,PLO2) 2. Display the ability to construct, troubleshoot and do maintenance of hardwired and PLC systems using appropriate equipment.(P4,PLO5) 3. Demonstrate an understanding of PLC environmentally-friendly automation system norm by following PLC IEC standard during practical work session. (A3,PLO7)
DEC50102 Embedded Robotic	<p>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. This will help them to develop robots that not only can move, but intelligent as well.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEC20012 Programming Fundamentals</p>	<ol style="list-style-type: none"> 1. Investigate the concept and fundamentals of mobile robotic, embedded controller, sensors and actuators based on land mobile robot design. (C4, PLO4) 2. Design the concept of robot positioning, identification and communication in mobile robot control according to a standard robot organization regulation. (C6, PLO 3). 3. Manipulate the application of sensor and actuator, robot identification and communication during practical work based on land mobile robot design. (P4, PLO 5) 4. Demonstrate good ability in managing a well-defined engineering-based project in a cost effective manner. (A3, PLO 11)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DEE40082 Project 1	<p>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. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Investigate well defined problem in order to make improvements on a chosen project. (C4, PLO4) 2. 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). 3. Perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically in a logbook. (P4, PLO 5) 4. Display good project management and finance through a Gantt Chart (milestone) and final proposal. (A3, PLO 11) 5. 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) 6. Display written communication skill through a final proposal. (A3, PLO 10) 7. describe the impact of the proposed project to the society in the final proposal. (A3, PLO 6)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
MPU23052 Sains Teknologi dan Kejuruteraan Islam	<p>SAINS TEKNOLOGI DAN KEJURUTERAAN 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 kaedah fiqh serta aplikasinya.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian. (A2, CLS 4) 2. Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam. (A3, CLS 5) 3. Menghubungkan minda ingin tahu dengan prinsip Syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam. (A4, CLS 4)
MPU23042 Nilai Masyarakat Malaysia	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Membincangkan konsep integrasi di Malaysia. (A2, CLS 4) 2. Menerangkan etika dan nilai berkaitan pembentukan integrasi di Malaysia. (A3, CLS 5) 3. Menghubungkan minda ingin tahu dengan cabaran dan kejayaan integrasi di Malaysia. (A4, CLS 4)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DET40073 Power Electronics	<p>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 waveform of converter.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Analyze and investigate the well-defined operational behaviours, principle and basic concepts of power electronics by using schematic circuits. (C4, PLO4) 2. Construct converters circuits and make observation on displayed waveforms using appropriate methods and equipments (P4, PLO5) 3. Demonstrate the ability to practice leadership skills to complete assigned power electronics tasks. (A3, PLO9)
DEJ50063 Process Measurement	<p>PROCESS MEASUREMENT provides knowledge regarding the concept and basic principles of level, flow, pressure and temperature measurement. The course emphasize 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept and principles of process measurement in processing industry correctly (C3 , PLO 1) 2. Measure the process measurement during practical works based on the theory and principle operation of the system (P4 , PLO 5) 3. Demonstrate effectively as a part of team while doing practical work based on related procedures (A3 , PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE50122 Circuit Analysis	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DET20033</p>	<ol style="list-style-type: none"> 1. 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) 2. Display ability to work in team to propose the best solution to the assigned group tasks. (A3, PLO 9)
DEC30023 Computer Networking Fundamentals	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. 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) 2. 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) 3. 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)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE50102 Project 2	<p>PROJECT 2 is the continuation of DEE40082 PROJECT1 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEE40082 Project 1</p>	<ol style="list-style-type: none"> 1. Investigate the various alternative preliminary design and software programming for the previous chosen project. (C4, PLO 4) 2. 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). 3. 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) 4. Display element of environment and sustainability awareness in project implementation. (A3, PLO 7) 5. Display effective communication skill in report writing and during presentation. (A3, PLO 10) 6. Display good ability in project management and finance using a Gantt Chart (milestone chart) and an effective costing respectively. (A3, PLO 11)

Elective courses offered are subjected to departmental amendments.

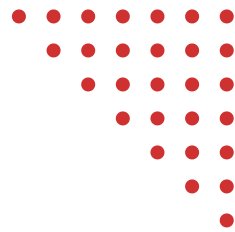


DEE

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING



LIST OF DEE LECTURER



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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 workplaces 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 system, 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 programmed will enable them to participate in the job market as:

- Electrical/Electronic Technician
- Electrical Engineering Service Advisor
- Technical Assistant
- Electrical/Electronic Engineering Supervisor
- Assistant Engineer

PROGRAMME DETAILS

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 resourceful and adaptable technician to support the nation 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 DETAILS

PROGRAMME LEARNING OUTCOME

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

NO	PLO	CONTENT
1	PLO1	Knowledge: 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	Problem analysis: 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/development of solutions: 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	Investigation: Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements;
5	PLO5	Modern Tool Usage: Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6);
6	PLO6	The Engineer and Society: 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	Environment and Sustainability: 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);

PROGRAMME DETAILS

PROGRAMME LEARNING OUTCOME

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

NO	PLO	CONTENT
8	PLO8	Ethics: Understand and commit to professional ethics and responsibilities and norms of technician practice;
9	PLO9	Individual and Team Work: Function effectively as an individual, and as a member in diverse technical teams;
10	PLO10	Communications: 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	Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and apply them to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments;
12	PLO12	Life Long Learning: Recognise the needs for, and have the ability to engage in independent updating in the context of specialised technical knowledge;

Notes:

DK 1: A descriptive, formula-based understanding of the natural sciences applicable in a sub-discipline

DK 2: Procedural mathematics, numerical analysis, statistics applicable in a subdiscipline

DK 3: A coherent procedural formulation of engineering fundamentals required in an accepted sub-discipline

DK 4: Engineering specialist knowledge that provides the body of knowledge for an accepted sub-discipline

DK 5: Knowledge that supports engineering design based on the techniques and procedures of a practice area

DK 6: Codified practical engineering knowledge in recognised practice area

DK 7: 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)

PROGRAMME LEARNING OUTCOMES (PLOs)	PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)			
	PEO 1 Practicing technician in electrical engineering related field	PEO 2 Contributing to society with professional ethic and responsibilities	PEO 3 Engaging in enterprising activities that apply engineering knowledge and technical skills	PEO 4 Engaging in activities to enhance knowledge for successful career advancement.
PLO1 (Knowledge)	√			
PLO2 (Problem analysis)	√			
PLO3 (Design/development of solutions)	√			
PLO4 (Investigation)	√			
PLO5 (Modern Tool Usage)	√			
PLO6 (The Engineer and Society)		√		
PLO7 (Environment and Sustainability)		√		
PLO8 (Ethics)		√		
PLO9 (Individual and Team Work)			√	
PLO10 (Communications)			√	
PLO11 (Project Management and Finance)			√	
PLO12 (Life Long Learning)				√

COURSES VERSUS PROGRAMME OUTCOME 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								
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		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	MPU21032	Penghayatan Etika dan Peradaban	1	0	2	0	2								√			√		
	MPU24XX1	Kelab/Persatuan	0	2	0	0	1									√		√		
	MPU24XX1	Unit Beruniform 2																		
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 OUTCOME 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	
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				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													

COURSES VERSUS PROGRAMME OUTCOME MATRIX

CLASSIFICATION	COURSE CODE	COURSE NAME	CONTACT HOURS				PROGRAMME LEARNING OUTCOME (PLO)												PREREQUISITE / CO-REQUISITE	
			L	P	T	O	CREDIT VALUES	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
SEMESTER 5																				
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 6																				
Industrial Training	DUT600610	Engineering Industrial Training	0	0	0	0	10					√		√		√	√	√		√
TOTAL			0				10													
TOTAL CREDIT VALUE							95													

COURSES VERSUS PROGRAMME OUTCOME 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								
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	1	2	0	0	2	√				√				√				
10	DEO40023	Optoelectronic	3	0	0	0	3		√					√						
11	DEP40053	Fibre Optic Communication System	2	2	0	0	3			√	√	√			√					
12	DEQ40023	Energy Management System and Energy Auditing	2	2	0	0	3		√			√	√			√				
13	DEQ40032	Energy Efficiency Engineering 1	2	0	0	0	2				√			√						
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			√		√	√		√					
21	DEE50122	Circuit Analysis	2	0	1	0	2		√							√				DET20033
22	DEG50032	Energy Efficiency And Management	2	0	0	0	2				√			√						
23	DEG50043	Green Energy System Integration	2	2	0	0	3		√			√	√						√	DEG40023
24	DEJ50063	Process Measurement	2	2	0	0	3	√				√				√				
25	DEO50033	Optosemiconductor	3	0	0	0	3				√				√					DEO40023
26	DEP50033	Data Communication and Networking	2	2	0	0	3		√			√	√		√					DEP30013

COURSES VERSUS PROGRAMME OUTCOME 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									
ELECTIVE COURSES																					
27	DEP50043	Microwave Devices	2	2	0	0	3					√	√	√	√						
28	DEP50063	Wireless Communication	2	2	0	0	3					√	√	√		√					
29	DEP50072	Satellite and Radar Communication Systems	2	0	0	0	2					√								√	
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					√	√			√					
36	DEU50053	Biomedical Instrumentation	2	2	0	0	3					√	√		√						
FREE ELECTIVES*																					
1	DUD10012	Design Thinking	1	0	0	1	2		√									√			

COURSES VERSUS PROGRAMME OUTCOME MATRIX

	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	
iv. (a) Electives	4	4%
(b) Free Electives ^a	2 ^a	0%
v. Industrial Training	10	11%
Grand Total Credit	95	100%

Engineering and Engineering Technology Courses	Credit	%
i. Practice - Oriented Components	34	54%
ii. Engineering and Engineering Technology Total Credit	64	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. Elective courses offered are cross -disciplinary and can be chosen from courses listed in the program structure or any courses listed in the inventory of other disciplines; but must adhere to prerequisite / co-requisite requirement in the Programme Information

3. ^aFree 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.

4. ^bMPU22042 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.

5. 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)

6. 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

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DUE10012 Communicative English 1	<p>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 preparation for academic and work purposes.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 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) 2. Demonstrate awareness of values and opinions embedded in texts on currents issues. (A3,CLS 3b) 3. Present a topic of interest that carries identifiable values coherently using effective verbal and non-verbal communication skills. (A2,CLS4).
MPU24XX1 Sukan ATAU Unit Beruniform 1	<p>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.</p> <p>ATAU</p> <p>UNIT BERUNIFORM 1 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistic bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif.</p> <p>KREDIT : 1 PRASYARAT : TIADA</p>	<ol style="list-style-type: none"> 1. Mempamerkan kemahiran khusus bagi kursus berkaitan (P2,CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3,CLS 3d)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DUW10022 Occupational Safety and Health for Engineering	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia. (C2,PLO1) 2. Initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment. 3. Forms communication skills in a team to respond for an accident action at workplace. (A3,PLO10)
DET10013 Electrical Technology	<p>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 inductor, capacitor, magnetic and electromagnetic circuits.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept and principles of the related electrical circuit theorems and law to solve DC electrical circuit using various method and approach (C3, PLO 1) 2. Construct DC circuit and measure related electrical parameters using appropriate electrical equipments (P4 , PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame (A3 , PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DBM10013 Engineering Mathematics 1	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Use mathematical statement to describe relationship between various physical phenomena (C3, CLS1) 2. Show mathematical solutions using the appropriate techniques in mathematics (C3, CLS3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3,CLS 3b)
DBS100012 Engineering Science	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Use basic physics concept to solve engineering physics problems (C3,CLS1) 2. Apply knowledge of fundamental physics in activities to mastery physics concept. (C3,CLS1). 3. Perform appropriate activities related to physics concept. (P3,CLS 3a)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 1

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DET10012 Electrical Wiring	<p>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 sessions. This course also provides students with the knowledge and skill in doing different types of wiring installation, wiring protection, wiring testing and sustainable energy practices in electrical wiring.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to NIOSH, MS IEC 60364 standard. (C3,PLO1) 2. Construct single phase domestic wiring according to MS IEC 60364 standard.(P4,PLO5) 3. Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms and sustainable energy practices in electrical wiring during performing single phase domestic wiring task.
DEE10013 Measurement Devices	<p>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 analog meters, DC meters, analogue and digital multimeters, oscilloscope,signal generators and simple application of DC bridge.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept of measurement in electrical and electronic equipment using appropriate theorem. (C3,PLO1) 2. Perform meter calibrating and measuring techniques using the correct measuring equipment. (P4,PLO5). 3. Demonstrate good communication skill in oral presentation within a stipulated time frame. (A3,PLO10)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
MPU21032 Penghayatan Etika dan Peradaban	<p>PENGHAYATAN ETIKA DAN PERADABAN ini menjelaskan tentang konsep etika daripada perspektif peradaban yang berbeza. Ia bertujuan bagi mengenal pasti sistem, tahap perkembangan, kemajuan dan kebudayaan merentas bangsa dalam mengukuhkan kesepaduan sosial. Selain itu perbincangan dan perbahasan berkaitan isu-isu kontemporari dalam aspek ekonomi, politik, sosial, budaya, dan lain-lain sekitar daripada perspektif etika dan peradaban dapat melahirkan pelajar yang bermoral dan professional. Penerapan amalan pendidikan berimpak tinggi (HIEPs) yang bersesuaian digunakan dalam penyampaian kursus ini.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Membentangkan konsep etika dan peradaban dalam kepelbagaian tamadun. (A2, CLS 5) 2. Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia (A2, CLS 5) 3. Mencadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban. (A3, CLS 4)
DET 20033 Electrical Circuits	<p>ELECTRICAL CIRCUITS is designed to provide students with the knowledge related to AC of electrical circuits. It emphasizes 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DET10013 Electrical Technology</p>	<ol style="list-style-type: none"> 1. apply the concept and principles in solving problems of electrical circuits using the appropriate AC electrical laws and theorem. (C3, PLO 1) 2. construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4, PLO 5) <p>demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO 9)</p>

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
MPU24XX1/ MPU24XX1 Kelab/Persatuan OR Unit Beruniform 2	<p>KELAB memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif.</p> <p>ATAU</p> <p>UNIT BERUNIFORM 2 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif.</p> <p>KREDIT :1 PRASYARAT : MPU24XX1 SUKAN ATAU UNIT BERUNIFORM 1</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. mempamerkan kemahiran khusus bagi kursus berkaitan. (P2, CLS 4) 2. menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif. (A3, CLS 3d)
DBM20023 Engineering Mathematics 2	<p>Engineering ng 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DBM10013 Measurement Devices</p>	<ol style="list-style-type: none"> 1. use algebra and calculus knowledge to describe relationship between various physical phenomena. (C3, CLS1) 2. solve the mathematical problems by using appropriate and relevant fundamental calculus techniques. (C3, CLS 3c) 3. use mathematical language to express mathematical ideas and arguments precisely, concisely, and logically in calculus. (A3, CLS 3b)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE20023 Semiconductor Devices	<p>SEMICONDUCTOR DEVICES introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistor and field effect transistors. The content encompasses device structure to biasing basic applications.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem. (C3, PLO 1) 2. Construct the various applications of semiconductor devices circuit by using schematic diagrams. (P4, PLO 5) 3. Demonstrate good communication skill in oral presentation within a stipulated time frame. (A3, PLO 10)
DEE20033 Digital Electronics	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit. (C3, PLO 1) 2. Construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop. (P4, PLO 5) 3. Demonstrate ability to work in team to complete assigned task during practical work sessions. (A3, PLO 9)
DEC20012 Programming Fundamental	<p>PROGRAMMING FUNDAMENTAL 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. 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) 2. build programs written in C language for assigned mini project during practical work sessions. (P4, PLO 5) 3. demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project. (A3, PLO 12)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 2

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
<p>DET 20033 Electrical Circuits</p>	<p>ELECTRICAL CIRCUITS is designed to provide students with the knowledge related to AC of electrical circuits. It emphasizes 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DET10013 Electrical Technology</p>	<p>1. Apply the concept and principles in solving problems of electrical circuits using the appropriate AC electrical laws and theorem. (C3, PLO 1)</p> <p>2. Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4, PLO 5)</p> <p>3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO 9)</p>

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
<p>DUE30022 Communicative English 2</p>	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEE10012 Communicative English 1</p>	<p>1. Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience. (A3, CLS 3b)</p> <p>2. Describe processes, procedures and instructions clearly by highlighting information of concern. (A3, CLS 4).</p> <p>3. Demonstrate effectively communication and social skills in handling enquiries and complaints amicably and professionally. (A3, CLS 3b).</p>
<p>DBM30043 Electrical Engineering Mathematics</p>	<p>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 Sample Fixed Raphson Point Iteration methods and Newton Raphson method. In addition, 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DBM20023 Engineering Mathematics 2</p>	<p>1. Demonstrate an understanding of common body of knowledge in mathematics. (C3, CLS 1)</p> <p>2. Demonstrate problem solving skills in engineering problems. (C3, CLS 3c)</p> <p>3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)</p>

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE30043 Electronics Circuits	<p>ELECTRONICS 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : None</p>	<ol style="list-style-type: none"> 1. Apply the principles of electronic circuits devices by using block diagram or circuit diagram. (C3, PLO 1) 2. Construct the various applications of electronic circuits based on the theory and principle operation of the circuits. (P4, PLO 5) 3. Demonstrate good written communication skill through essay writing in group within a stipulated time frame. (A3, PLO 10)
DEE30052 Electronics Equipment Repair	<p>ELECTRONICS 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEE20023 SEMICONDUCTOR DEVICES</p>	<ol style="list-style-type: none"> 1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations. (C3, PLO 1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO 5)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
<p>DEE30071 Electronic Computer Aided Design (ECAD)</p>	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations. (C3, PLO 1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO 5)
<p>DEP30013 Communication System Fundamentals</p>	<p>COMMUNICATION SYSTEM FUNDAMENTALS introduce 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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept of electronic communication system by using appropriate diagram and standard formula. (C3, PLO 1) 2. Assemble the related communication equipment systematically in performing the measurement of appropriate signals parameter. (P4, PLO 5) 3. Demonstrate the ability to work in a team to complete the assigned tasks during practical work sessions. (A3, PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 3

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
<p>DEE30061 Computer Aided Electrical Drawing</p>	<p>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 lay out diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software.</p> <p>CREDIT(S) : 1 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply computer aided design concepts, applications and capabilities in electrical engineering environment. (C3, PLO 1) 2. Construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American British technical symbol standard. (P4, PLO 5). 3. 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)
<p>DET30053 Power System</p>	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DET20033 Electrical Circuits.</p>	<ol style="list-style-type: none"> 1. 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. 2. Perform the practical works on electrical power generation, transmission and distribution system using an appropriate energy-efficient equipment. (P4,PLO5) 3. Demonstrate the awareness toward the sustainable energy generation and environmental friendly methods of transmission and distribution system (A3,PLO7)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DUE50032 Communicative English 3	<p>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 also learn to gather data and present them through the use of graphs and charts. Students will also learn basic of 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DUE30022 Communicative English 2.</p>	<ol style="list-style-type: none"> 1. Presents gathered data in graphs and charts effectively using appropriate language forms and functions. (A2, CLS 3b) 2. Prepare high impact resume and cover letter, highlighting competencies and strengths that meet employer's expectations. (A4, CLS 4). 3. Demonstrate effective communication and social skills in handling job interviews confidently. (A3, CLS 3b)
MPU22012 Entrepreneurship	<p>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 business plan framework through business model canvas.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Propose the value proposition of entrepreneurial idea using Business Model canvas. (A3, CLS 3b) 2. Develop a viable business plan by organizing business objectives according to priorities. (A4, CLS 4) 3. Organize the online presence business in social media marketing platform. (A3, CLS 4)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEC30023 Computer Networking Fundamentals	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Investigate a computer network structure to determine the network protocol network services, network problem and network security when implementing specific networking requirements (C4, PLO4) 2. 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) 3. 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)
DEC40053 Embedded System Applications	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : DEC20012 Programming Fundamentals</p>	<ol style="list-style-type: none"> 1. Investigate internal features of PIC16F/PIC18F to interface properly with external devices. (C4, PLO 4) 2. Design embedded system application based on PIC16F/PIC18F microcontroller effectively. (C6, PLO 3) 3. Construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively. (P4, PLO 5) 4. Demonstrate knowledge of engineering project management principles through a written report on an assigned mini project. (A3, PLO 11)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DEJ40033 PLC & Automation	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. Evaluate environmentally-friendly automation control system using electromechanical devices and PLC. (C5,PLO2) 2. Display the ability to construct, troubleshoot and do maintenance of hardwired and PLC systems using appropriate equipment.(P4,PLO5) 3. Demonstrate an understanding of PLC environmentally-friendly automation system norm by following PLC IEC standard during practical work session. (A3,PLO7)
DEC50102 Embedded Robotic	<p>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. This will help them to develop robots that not only can move, but intelligent as well.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEC20012 Programming Fundamentals</p>	<ol style="list-style-type: none"> 1. Investigate the concept and fundamentals of mobile robotic, embedded controller, sensors and actuators based on land mobile robot design. (C4, PLO4) 2. Design the concept of robot positioning, identification and communication in mobile robot control according to a standard robot organization regulation. (C6, PLO 3). 3. Manipulate the application of sensor and actuator, robot identification and communication during practical work based on land mobile robot design. (P4, PLO 5) 4. Demonstrate good ability in managing a well-defined engineering-based project in a cost effective manner. (A3, PLO 11)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 4

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DEE40082 Project 1	<p>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. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Investigate well defined problem in order to make improvements on a chosen project. (C4, PLO4) 2. 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). 3. Perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically in a logbook. (P4, PLO 5) 4. Display good project management and finance through a Gantt Chart (milestone) and final proposal. (A3, PLO 11) 5. 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) 6. Display written communication skill through a final proposal. (A3, PLO 10) 7. describe the impact of the proposed project to the society in the final proposal. (A3, PLO 6)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
MPU23052 Sains Teknologi dan Kejuruteraan Islam	<p>SAINS TEKNOLOGI DAN KEJURUTERAAN 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 kaedah fiqh serta aplikasinya.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian. (A2, CLS 4) 2. Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam. (A3, CLS 5) 3. Menghubungkan minda ingin tahu dengan prinsip Syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam. (A4, CLS 4)
MPU23042 Nilai Masyarakat Malaysia	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Membincangkan konsep integrasi di Malaysia. (A2, CLS 4) 2. Menerangkan etika dan nilai berkaitan pembentukan integrasi di Malaysia. (A3, CLS 5) 3. Menghubungkan minda ingin tahu dengan cabaran dan kejayaan integrasi di Malaysia. (A4, CLS 4)
DET30043 Electrical Machine	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply the concept, principle operation and motor control of electrical machine to solve the related problems using standard formula. (C3, PLO 1) 2. Measure and record electrical and mechanical parameters related to ac and dc electrical machine using appropriate electrical equipment's. (P 4, PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks. (A3, PLO 9)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course, students should be able to:
DET40073 Power Electronics	<p>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 waveform of converter.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Analyze and investigate the well-defined operational behaviours, principle and basic concepts of power electronics by using schematic circuits. (C4, PLO4) 2. Construct converters circuits and make observation on displayed waveforms using appropriate methods and equipments (P4, PLO5) 3. Demonstrate the ability to practice leadership skills to complete assigned power electronics tasks. (A3, PLO9)
DEG30013 Fundamental of Renewable Energy	<p>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.</p> <p>CREDIT(S) : 3 PRE-REQUISITE(S) : NONE</p>	<ol style="list-style-type: none"> 1. Apply principles of renewable energy technology in addressing clean, safe and sustainable energy supply according to energy and environment policy. (C3, PLO1) 2. Measure input and output parameters of renewable energy system using appropriate tools and equipment. (P4, PLO5) 3. Demonstrate understanding of environment & sustainability practices in renewable energy field through a given task session. (A3, PLO7)

COURSE SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEMESTER 5

CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO)
DEE50122 Circuit Analysis	<p>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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DET20033</p>	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none"> 1. 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) 2. Display ability to work in team to propose the best solution to the assigned group tasks. (A3, PLO 9)
DEE50102 Project 2	<p>PROJECT 2 is the continuation of DEE40082 PROJECT1 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.</p> <p>CREDIT(S) : 2 PRE-REQUISITE(S) : DEE40082 Project 1</p>	<ol style="list-style-type: none"> 1. Investigate the various alternative preliminary design and software programming for the previous chosen project. (C4, PLO 4) 2. 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). 3. 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) 4. Display element of environment and sustainability awareness in project implementation. (A3, PLO 7) 5. Display effective communication skill in report writing and during presentation. (A3, PLO 10) 6. Display good ability in project management and finance using a Gantt Chart (milestone chart) and an effective costing respectively. (A3, PLO 11)

