POLITEKNIK
MALAYSIA
SULTAN MIZAN ZAINAL ABIDIN

STUDENT's STUDY GUIDE

Diploma of Electronic Engineering (Communication) - DEP

Diploma of Electrical and Electronic Engineering - DEE

Diploma of Electronic Engineering (Computer) - DTK

Department of Electrical Engineering

Endorsement

This Student's Study Guide for this programme has been prepared and approved to be used by June 2019.

Sr Haji Mohd Fikri bin Ismail
Director
Polytechnic of Sultan Mizan Zainal Abidin
Department of Polytechnic Education
Ministry of Higher Education

KM08, Jalan Paka, 23000 Dungun Terengganu Darul Iman
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http://www.psmza.edu.my

Assalamualaikum Warahmatullahi Wabarakatuh

Firstly, let us express our sincere congratulations to all the students that have been selected to join the Diploma in Electronic Engineering (Communications), Diploma in Electronic Engineering (Computer) and Diploma in Electrical and Electronic Enginnering at the Department of Electrical Engineering, Politeknik Sultan Mizan Zainal Abidin (PSMZA).

This little booklet, called Student Study Guide, is the main guide book to the students during the period of study here. It helps the students to understand the structure of the programme and allow the early preparation for the students to make proper planning in continuing their study in PSMZA session.

With the implementation of the Outcome Base Education (OBE) in PSMZA, I hope that the students can get involved and fully commited with any form of assessment that has been planned and they should take advantages and opportunities while in the classroom here as to complete their studies successfully.

I hope and believe that if students able to adapt to the campus life environment, focus on learning and active in all the activities planned, with the God willing, Polytechnic's dream to reach her vision and mission.   .

Good Luck!

Thank you,

Norliza binti Kassim
Head of Department
Department of Electrical Engineering
Politeknik Sultan Mizan Zainal Abidin

Assalamualaikum Warahmatullahi Wabarakatuh

Firstly, I wish to congratulate all the junior students of Department in Electrical Engineering, Politeknik Sultan Mizan Zainal Abidin.

Student Study Guide contains all the important instruments in Diploma of Electronic Engineering (Communication), Diploma of Electronic Engineering (Computer) and Diploma of Electrical and Electronic Engineering such as Programme Learning Outcome (PLO), synopsis of each course and complete programme structure for students to plan and complete their studies successfully. This is important as PSMZA is in their way to implement the Outcome Base Education (OBE) and of course the students should know all the outcomes learning in their studies.

Finally, during 3 years of their studies, I hope the students are able to manage their time and grab the opportunities in order to obtain good results to help PSMZA to produce competitive human capital in generating economy led by innovation.

Congratulations and Good Luck!

Thank you,

Azlin binti Yajid
Program Leader of Electronic Engineering (Computer)
Department of Electrical Engineering
Politeknik Sultan Mizan Zainal Abidin

INTRODUCTION

Vision of PSMZA
TVET institutions become premier-led industry by 2025

Mission of PSMZA
To provide access to quality and recognised TVET programme
To implement effective and relevant curriculum through collaborative industry.
To produce balanced and competitive graduates in entrepreneurship through dynamic and sustainable education.
To obtain external recognition through the cooperation and active participation in TVET community.

Vision of JKE
To be the nation's leading provider of semi professionals in electrical engineering through transformational education and training for the global workforce.

Mission of JKE
Providing quality education at diploma and advanced diploma levels in electrical engineering that meets international standards and fostering collaborations with industries and other institutions.
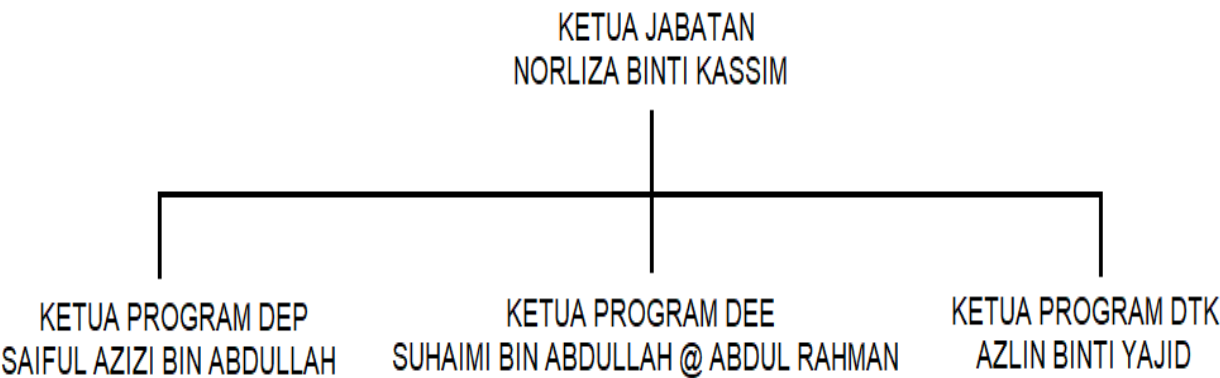
DEPARTMENT OF ELECTRICAL ENGINEERING (JKE)

Department of Electrical Engineering is one of the academic departments at the Sultan Mizan Zainal Abidin (PSMZA) Polytechnic, Dungun, Terengganu that has been established in 2001.

JKE aims to produce well-trained student, efficient, skilled and competent in electrical and electronic engineering field. The department is currently lead by Pn. Norliza binti Kassim as the Head of Department and assisted by En. Zulkifli Bin Che Din, while Pn. Azlin binti Yajid (DTK), En. Saiful Azizi bin abdullah (DEP) and En. Suhaimi Bin Abdullah @ Abdul Rahman (DEE) as Programme Leaders. JKE has 60 academic staff and 3 technicians, who manage and maintain the laboratory equipment and assist in administrative work

JKE offers three (3) diploma programmes which are Diploma in Electronic Engineering (Communications) (DEP), Diploma in Electronic Engineering (Computer) (DTK) and Diploma Electrical and Electronic (DEE) that provide practical training and knowledge for students to prepare themselves with skills in electrical and electronic engineering field as well as to develop their skills of human capital.

Carta Organisasi Jabatan Kejuruteraan Elektrik

KETUA JABATAN
NORLIZA BINTI KASSIM

KETUA PROGRAM DEP
SAIFUL AZIZI BIN ABDULLAH

KETUA PROGRAM DEE
SUHAIMI BIN ABDULLAH @ ABDUL RAHMAN

KETUA PROGRAM DTK
AZLIN BINTI YAJID

DIPLOMA IN ELECTRONIC ENGINEERING (COMMUNICATION) (DEP)

INTRODUCTION

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

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

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

SYNOPSIS

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

JOB PROSPECT

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

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

PROGRAMME AIM

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The engineering programme should produce balanced TVET graduates who are:

PEO1: practicing technician in electrical engineering related field
PEO2: contributing to society with professional ethic and responsibilities
PEO3: engaging in enterprising activities that apply engineering knowledge and technical skills
PEO4: engaging in activities to enhance knowledge for successful career advancement

PROGRAMME LEARNING OUTCOMES (PLO)

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

PLO1	apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices
PLO2	identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)
PLO3	design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DK5)
PLO4	conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements
PLO5	apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)
PLO6	demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (DK7)
PLO7	understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)
PLO8	understand and commit to professional ethics and responsibilities and norms of technician practice
PLO9	function effectively as an individual, and as a member in diverse technical teams
PLO10	communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions
PLO11	demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments
PLO12	recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

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

POLITEKNIK SULTAN MIZAN ZAINAL ABIDIN
ELECTRICAL ENGINEERING DEPARTMENT
PROGRAMME STRUCTURE
DIPLOMA IN ELECTRONIC ENGINEERING (COMMUNICATION)

VERSION : 090514_1.0_Effective: June 2019

SEMESTER 1

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUE10012	COMMUNICATIVE ENGLISH 1		COMPULSARY	1	0	2	2.0	
2	MPU24XX1	SUKAN		COMPULSARY	0	2	0	1.0	
@		UNIT BERUNIFORM 1		COMPULSARY	0	2	0	1.0	
3	DUW10022	OCCUPATIONAL SAFETY & HEALTH FOR ENGINEERING		COMMON	2	0	0	2.0	
4	DBM10013	ENGINEERING MATHEMATICS 1		COMMON	2	0	2	3.0	*
5	DBS10012	ENGINEERING SCIENCE		COMMON	2	1	0	2.0	
6	DET10013	ELECTRICAL TECHNOLOGY		DISCIPLINE	2	2	0	3.0	*
7	DET10022	ELECTRICAL WIRING		DISCIPLINE	1	3	0	2.0	
8	DEE10013	MEASUREMENT DEVICES		DISCIPLINE	2	2	0	3.0	*
		TOTAL OF CONTACT HOUR/CREDIT/CUMMULATIVE		CONTACT HOURS	12	10	4	26.0 → 18.0	18.0

SEMESTER 2

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	MPU21012	PENGAJIAN MALAYSIA		COMPULSARY	1	0	2	2.0	
2	MPU24XX1	KELAB /PERSATUAN		COMPULSARY	0	2	0	1.0	
@		UNIT BERUNIFORM 2	MPU24XX1	COMPULSARY	0	2	0	1.0	
3	DBM20023	ENGINEERING MATHEMATICS 2	DBM10013	COMMON	2	0	2	3.0	*
4	DET20033	ELECTRICAL CIRCUITS	DET10013	DISCIPLINE	2	2	0	3.0	*
5	DEE20023	SEMICONDUCTOR DEVICES		DISCIPLINE	2	2	0	3.0	*
6	DEE20033	DIGITAL ELECTRONICS		DISCIPLINE	2	2	0	3.0	*
7	DEC20012	PROGRAMMING FUNDAMENTALS		DISCIPLINE	1	2	0	2.0	
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE		CONTACT HOURS	10	10	4	24.0 → 17.0	35.0

SEMESTER 3

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUE30022	COMMUNICATIVE ENGLISH 2	DUE10012	COMPULSARY	1	0	2	2.0	
2	DBM30043	ELECTRICAL ENGINEERING MATHEMATICS	DBM20023	COMMON	2	0	2	3.0	
3	DEP30013	COMMUNICATION SYSTEM FUNDAMENTALS		DISCIPLINE	2	2	0	3.0	*
4	DEE30043	ELECTRONIC CIRCUITS	DEE20023	DISCIPLINE	2	2	0	3.0	*
5	DEE30052	ELECTRONIC EQUIPMENT REPAIR		DISCIPLINE	1	3	0	2.0	
6	DEE30071	ELECTRONIC COMPUTER AIDED DESIGN	DEE20023	DISCIPLINE	0	2	0	1.0	
7	DEP30083	TELECOMMUNICATION NETWORK		SPECIALISATION	2	2	0	3.0	*
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE		CONTACT HOURS	10	11	4	25.0 → 17.0	52.0

SEMESTER 4

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUE50032	COMMUNICATIVE ENGLISH 3	DUE30022	COMPULSARY	1	0	2	2.0	
2	MPU22012	ENTREPRENUERSHIP		COMPULSARY	1	2	0	2.0	
3	DEC40053	EMBEDDED SYSTEM APPLICATION	DEC20012	DISCIPLINE	2	2	0	3.0	*
4	DEP40053	FIBER OPTIC COMMUNICATION SYSTEM		SPECIALISATION	2	2	0	3.0	*
5	DEE40113	SIGNAL AND SYSTEM	DBM20023	SPECIALISATION	2	2	0	3.0	*
6	DEE40082	PROJECT 1		SPECIALISATION	1	2	0	2.0	
7		ELECTIVE 1		***ELECTIVE	0	0	0	2.0	
		TOTAL OF CONTACT HOUR/CREDIT/CUMMULATIVE		CONTACT HOURS	9	10	2	21.0 → 17.0	69.0

SEMESTER 5

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	MPU23052	SAINS TEKNOLOGI DAN KEJURUTERAAN ISLAM		COMPULSARY	1	0	2	2.0	#
@	MPU23042	NILAI MASYARAKAT MALAYSIA		COMPULSARY					##
2	DEE30061	COMPUTER AIDED ELECTRICAL DRAWING		DISCIPLINE	0	2	0	1.0	
3	DEP50033	DATA COMMUNICATION AND NETWORKING	DEP30013	SPECIALISATION	2	2	0	3.0	*
4	DEP50043	MICROWAVE DEVICES		SPECIALISATION	2	2	0	3.0	*
5	DEP50063	WIRELESS COMMUNICATION		SPECIALISATION	2	2	0	3.0	*
6	DEE50102	PROJECT 2	DEE40082	SPECIALISATION	0	3	0	2.0	
7		ELECTIVE 2		***ELECTIVE	0	0	0	2.0	
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE		CONTACT HOURS	7	11	2	20.0 → 16.0	85.0

SEMESTER 6

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUT40110	INDUSTRIAL TRAINING		COMPULSORY	0	0	0	10.0	
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE		CONTACT HOURS	0	0	0	0.0 → 10.0	95.0

*** Any Level 4 and 5 electrical and electronic courses not in the programme structure but listed in the Courses Inventory can be offered by the respective polytechnic. For a list of Courses Inventory, please refer to portal.cidos.edu.my. Students are required to take a minimum of four credits.

Disediakan Oleh:
Unit Kurikulum
Jabatan Kejuruteraan Elektrik
Politeknik Sultan Mizan Zainal Abidin

NOTES :

RE : Remark
* : Kursus Yang Mempunyai Peperiksaan Akhir
# : For Muslim Students
: For Non Muslim Students

Students are required to take a minimum of four credits of elective courses in semester 5 (2 Elective Courses)

L : Lecture
P : Practical
T : Tutorial
C : Credit

For Co-curriculum:
1. Path 1 : Sport/Recreation (Uniform Unit are required to complete 5 modules for commissioning).
   (Uniform) is a prerequisite to DRE20X1 (Unit Beruniform 1).
2. Path 2 : Uniform (DRE20X1 and DRE3XX2 are graded.
   Ungraded, audited courses with full assessment. Upon completion of DRES/XX2, students are entitled for commissioning.

DIPLOMA IN ELECTRONIC ENGINEERING (COMPUTER) (DTK)

INTRODUCTION

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

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

The Diploma in Electronic Engineering (Computer) 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 (Computer) covers broad discipline of electronics engineering, with specialization in computer technology which includes electrical and electronic fundamentals, computer fundamentals and programming, semiconductor devices and computer aided design while emphasizing the area of specialization. The specialization courses include microprocessor fundamental, computer architecture and organization, database system, operating system, internet based controller, computer diagnosis and maintenance, CMOS IC design and fabrication and project.

JOB PROSPECT

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

a. Electrical / Electronic Engineering Technician
b. Assistant Engineer
c. Technical Assistant
d. Maintenance technician
e. Production technician
f. Process control technician
g. Instrumentation technician
h. Assistant Technical Designer
i. Assistant Network Engineer / Administrator
j. Machine assembly technician
k. Asssistant Embedded Programmer / Developer
l. Integrated Circuit Layout Designer Technician

PROGRAMME AIM

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The engineering programme should produce balanced TVET graduates who are:

PEO1: practicing technician in electrical engineering related field
PEO2: contributing to society with professional ethic and responsibilities
PEO3: engaging in enterprising activities that apply engineering knowledge and technical skills
PEO4: engaging in activities to enhance knowledge for successful career advancement

PROGRAMME LEARNING OUTCOMES (PLO)

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

PLO1	apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices
PLO2	identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)
PLO3	design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DK5)
PLO4	conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements
PLO5	apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)
PLO6	demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (DK7)
PLO7	understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)
PLO8	understand and commit to professional ethics and responsibilities and norms of technician practice
PLO9	function effectively as an individual, and as a member in diverse technical teams
PLO10	communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions
PLO11	demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments
PLO12	recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

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

POLITEKNIK SULTAN MIZAN ZAINAL ABIDIN
ELECTRICAL ENGINEERING DEPARTMENT
PROGRAMME STRUCTURE
DIPLOMA IN ELECTRONIC ENGINEERING (COMPUTER)

VERSION : D90514_1.0_Effective: June 2019

SEMESTER 1

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUE10012	COMMUNICATIVE ENGLISH 1		COMPULSARY	1	0	2	2.0	
2	MPU24XX1	SUKAN		COMPULSARY	0	2	0	1.0	
@	DUW10022	UNIT BERUNIFORM 1			0	0	0	2.0	
3	DBM10013	OCCUPATIONAL, SAFETY & HEALTH FOR ENGINEERING		COMMON	2	0	0	2.0	*
4	DBS10012	ENGINEERING MATHEMATICS 1		COMMON	2	0	2	3.0	
5	DET10013	ENGINEERING SCIENCE		COMMON	2	1	0	2.0	
6	DET10013	ELECTRICAL TECHNOLOGY		DISCIPLINE	2	2	0	3.0	*
7	DET10022	ELECTRICAL WIRING		DISCIPLINE	1	3	0	2.0	
8	DEE10013	MEASUREMENT DEVICES		DISCIPLINE	2	2	0	3.0	*

TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE   CONTACT HOURS **12 | 10 | 4 | 26.0**   **18.0 | 18.0**

SEMESTER 2

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	MPU21012	PENGAJIAN MALAYSIA		COMPULSARY	1	0	2	2.0	
		KELAB /PERSATUAN							
@	MPU24XX1	UNIT BERUNIFORM 2	MPU24XX1	COMPULSARY	0	2	0	1.0	
3	DBM30023	ENGINEERING MATHEMATICS 2	DBM10013	COMMON	2	0	2	3.0	*
4	DET20033	ELECTRICAL CIRCUITS	DET10013	DISCIPLINE	2	2	0	3.0	*
5	DEE20023	SEMICONDUCTOR DEVICES		DISCIPLINE	2	2	0	3.0	*
6	DEE20033	DIGITAL ELECTRONICS		DISCIPLINE	2	2	0	3.0	
7	DEC20012	PROGRAMMING FUNDAMENTALS		DISCIPLINE	1	2	0	2.0	

TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE   CONTACT HOURS **10 | 10 | 4 | 24.0**   **17.0 | 35.0**

SEMESTER 3

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUE30022	COMMUNICATIVE ENGLISH 2	DUE10012	COMPULSARY	1	0	2	2.0	
2	DBM30043	ELECTRICAL ENGINEERING MATHEMATICS	DBM20023	COMMON	2	0	2	3.0	*
3	DEE30043	ELECTRONIC CIRCUITS	DEE20023	DISCIPLINE	2	2	0	3.0	*
4	DEC30032	COMPUTER ARCHITECTURE AND ORGANIZATION	DEE20033	SPECIALISATION	2	0	2	2.0	*
5	DEE30071	ELECTRONIC COMPUTER AIDED DESIGN		DISCIPLINE	0	2	0	1.0	
6	DEC30043	MICROPROCESSOR FUNDAMENTAL	DEC20012	SPECIALISATION	2	2	0	3.0	*
7	DEC30023	COMPUTER NETWORKING FUNDAMENTALS		DISCIPLINE	2	2	0	3.0	*

TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE   CONTACT HOURS **11 | 8 | 4 | 23.0**   **17.0 | 52.0**

SEMESTER 4

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUE50032	COMMUNICATIVE ENGLISH 3	DUE30022	COMPULSARY	1	0	2	2.0	
2	MPU22012	ENTERPRENEURSHIP		COMPULSARY	1	2	0	2.0	
3	DEE30061	COMPUTER AIDED ELECTRICAL DRAWING		DISCIPLINE	0	2	0	1.0	
4	DEC40053	EMBEDDED SYSTEM APPLICATIONS	DEC20012	DISCIPLINE	2	2	0	3.0	*
5	DEC50132	INTERNET BASED CONTROLLER		SPECIALISATION	1	2	0	2.0	
6	DEC40073	DATABASE SYSTEM		SPECIALISATION	2	2	0	3.0	*
7	DEE40082	PROJECT 1		SPECIALISATION	1	2	0	2.0	
8		ELECTIVE 1		---ELECTIVE	0	0	0	2.0	

TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE   CONTACT HOURS **8 | 12 | 2 | 22.0**   **17.0 | 69.0**

SEMESTER 5

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	MPU23052	SAINS, TEKNOLOGI DAN KEJURUTERAAN ISLAM		COMPULSARY	1	0	2	2.0	#
@	MPU23042	NILAI MASYARAKAT MALAYSIA							##
2	DEC50103	OPERATING SYSTEMS		SPECIALISATION	2	2	0	3.0	*
3	DEE50102	PROJECT 2	DEE40082	SPECIALISATION	0	3	0	2.0	
4	DEC50113	COMPUTER SYSTEM DIAGNOSE AND MAINTAINANCE		SPECIALISATION	2	2	0	3.0	*
5	DEC50143	CMOS INTEGRATED CIRCUIT DESIGN AND FABRICATION	DEE20023 & DEE20033	SPECIALISATION	2	2	0	3.0	*
6		ELECTIVE 2		---ELECTIVE	0	0	0	2.0	

TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE   CONTACT HOURS **7 | 9 | 2 | 18.0**   **15.0 | 84.0**

SEMESTER 6

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUT40110	INDUSTRIAL TRAINING		INDUSTRIAL TRAINING	0	0	0	10.0	

TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE   CONTACT HOURS **0 | 0 | 0 | 0.0**   **10.0 | 94.0**

**** Any Level 4 and 5 electrical and electronic courses not in the programme structure but listed in the Courses Inventory can be offered by the respective polytechnic. For a list of Courses Inventory, please refer to portal.cidos.edu.my. Students are required to take a minimum of four credits.

Disediakan Oleh:
Unit Kurikulum
Jabatan Kejuruteraan Elektrik
Politeknik Sultan Mizan Zainal Abidin

NOTES :

RE	: Remark	L : Lecture	For Co-curriculum,	Uniform Unit (Students who choose Uniform Unit are required to complete 5 modules for commissioning):
*	: Kursus Yang Mempunyai Peperiksaan Akhir	P : Practical	1. Path 1 : Sport and Club	1. DRB10000 (Asas Unit Beruniform) is a prerequisite to DRB20001 (Unit Beruniform 1)
#	: For Muslim Students	T : Tutorial	2. Path 2 : Uniform Unit	2. DRB20001 and DRB30X2 are graded.
##	: For Non Muslim Students	C : Credit		3. DRB50000 and DRB60X0 are optional, non-graded, audited courses with full assessment. Upon completion of DRB60X00, students are entitled for commissioning

Students are required to take a minimum of four credits of elective courses.(2 credits in semester 4 & 2 credits in semester 5)

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING (DEE)

INTRODUCTION

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

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

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

SYNOPSIS

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

JOB PROSPECT

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

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

PROGRAMME AIM

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The engineering programme should produce balanced TVET graduates who are:

PEO1: practicing technician in electrical engineering related field
PEO2: contributing to society with professional ethic and responsibilities
PEO3: engaging in enterprising activities that apply engineering knowledge and technical skills
PEO4: engaging in activities to enhance knowledge for successful career advancement

PROGRAMME LEARNING OUTCOMES (PLO)

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

PLO1	apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices
PLO2	identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)
PLO3	design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DK5)
PLO4	conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements
PLO5	apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)
PLO6	demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (DK7)
PLO7	understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)
PLO8	understand and commit to professional ethics and responsibilities and norms of technician practice
PLO9	function effectively as an individual, and as a member in diverse technical teams
PLO10	communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions
PLO11	demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments
PLO12	recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

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

POLITEKNIK SULTAN MIZAN ZAINAL ABIDIN
ELECTRICAL ENGINEERING DEPARTMENT
PROGRAMME STRUCTURE
DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING

VERSION : 230419_1_Effective: June 2019 (SEM 1)

SEMESTER 1

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUE10012	COMMUNICATIVE ENGLISH 1		COMPULSARY	1	0	2	2.0	
2	MPU24X01	SUKAN		COMPULSARY	0	2	0	1.0	
⊕		UNIT BERUNIFORM 1							
3	DUW10022	OCCUPATIONAL SAFETY AND HEALTH FOR ENGINEERING		COMMON	2	0	0	2.0	
4	DBM10013	ENGINEERING MATHEMATICS 1		COMMON	2	0	0	3.0	*
5	DBS10012	ENGINEERING SCIENCE		COMMON	2	1	0	2.0	
6	DET10013	ELECTRICAL TECHNOLOGY		DISCIPLINE	2	2	0	3.0	*
7	DET10022	ELECTRICAL WIRING		DISCIPLINE	1	3	0	2.0	
8	DEE10013	MEASUREMENT DEVICES		DISCIPLINE	2	2	0	3.0	*
		CONTACT HOURS			12	10	4		
						26.0		18.0	
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE						18.0	

SEMESTER 2

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	MPU21012	PENGAJIAN MALAYSIA		COMPULSARY	1	0	2	2.0	
2	MPU24X01	KELAB/PERSATUAN		COMPULSARY	0	2	0	1.0	
⊕	MPU24X01	UNIT BERUNIFORM 2							
3	DBM20023	ENGINEERING MATHEMATICS 2	DBM10013	COMMON	2	0	2	3.0	*
4	DET20033	ELECTRONIC CIRCUITS	DET10013	DISCIPLINE	2	2	0	3.0	*
5	DEE20023	SEMICONDUCTOR DEVICES		DISCIPLINE	2	2	0	3.0	*
6	DEE20033	DIGITAL ELECTRONICS		DISCIPLINE	2	2	0	3.0	*
7	DEC20012	PROGRAMMING FUNDAMENTALS		DISCIPLINE	1	2	0	2.0	
		CONTACT HOURS			10	10	4		
						24.0		17.0	
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE						35.0	

SEMESTER 3

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUE30022	COMMUNICATIVE ENGLISH 2	DUE10012	COMPULSARY	1	0	2	2.0	
2	DBM30043	ELECTRICAL ENGINEERING MATHEMATICS	DBM20023	COMMON	2	0	2	3.0	
3	DEE30043	ELECTRONIC CIRCUITS		DISCIPLINE	2	2	0	3.0	*
4	DEE30052	ELECTRONIC EQUIPMENT REPAIR	DEE20023	DISCIPLINE	1	3	0	2.0	
5	DEE30061	COMPUTER AIDED ELECTRICAL DRAWING		DISCIPLINE	0	2	0	1.0	
6	DEE30071	ELECTRONIC COMPUTER AIDED DESIGN		DISCIPLINE	0	2	0	1.0	
7	DEP30013	COMMUNICATION SYSTEM FUNDAMENTALS		DISCIPLINE	2	2	0	3.0	*
8	DET30053	POWER SYSTEM	DET20033	DISCIPLINE	2	2	0	3.0	*
		CONTACT HOURS			10	13	4		
						27.0		18.0	
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE						53.0	

SEMESTER 4

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUE50032	COMMUNICATIVE ENGLISH 3	DUE30022	COMPULSARY	1	0	2	2.0	
2	MPU22012	ENTREPRENEURSHIP		COMPULSARY	1	2	0	2.0	
3	DEC30023	COMPUTER NETWORKING FUNDAMENTALS		DISCIPLINE	2	2	0	3.0	*
4	DEC40053	EMBEDDED SYSTEM APPLICATION	DEC20012	DISCIPLINE	2	2	0	3.0	*
5	DEJ40033	PROGRAMMABLE LOGIC CONTROLLER (PLC) AND AUTOMATION		DISCIPLINE	2	2	0	3.0	
6	DEE40062	PROJECT 1		DISCIPLINE	1	2	0	2.0	
7		ELECTIVE 1		**ELECTIVE	0	0	0	2.0	
		CONTACT HOURS			9	10	2		
						21.0		17.0	
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE						70.0	

SEMESTER 5

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	MPU23052	SAINS TEKNOLOGI DAN KEJURUTERAAN ISLAM		COMPULSARY	1	0	2	2.0	#
⊕	MPU23042	NILAI MASYARAKAT MALAYSIA							##
2	DEE50102	PROJECT 2	DEE40062	DISCIPLINE	0	3	0	2.0	*
3	DET30043	ELECTRICAL MACHINE		DISCIPLINE	2	2	0	3.0	*
4	DET40073	POWER ELECTRONICS		DISCIPLINE	2	2	0	3.0	*
5	DEG30013	FUNDAMENTAL OF RENEWABLE ENERGY		DISCIPLINE	2	2	0	3.0	*
6		ELECTIVE 2		**ELECTIVE	0	0	0	2.0	
		CONTACT HOURS			7	9	2		
						18.0		15.0	
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE						85.0	

SEMESTER 6

NO	CODE	COURSE	PREREQUISITE	CORE	L	P	T	CREDIT	RE
1	DUT60610	INDUSTRIAL TRAINING		INDUSTRIAL TRAINING				10.0	
		CONTACT HOURS			0	0	0		
						0.0		10.0	
		TOTAL OF CONTACT HOURS/CREDIT/CUMMULATIVE						95.0	

Students are required to take a minimum of four credits of elective courses (2 credits in semester 4 & 2 credits in semester 5)

NOTES:
RE : Reman
* : Kursus Yang Mempunyai Peperiksaan Akhir
# : For Muslim Students
: For Non Muslim Students

L : Lecture
P : Practical
T : Tutorial
C : Credit

For Co-curriculum,
1. Path 1: Sport and Club
2. Path 2: Uniform Unit

Uniform Unit (Students who choose Uniform Unit are required to complete 5 modules for commisioning)
1. DRB1XX0 (Asas Unit Beruniform) is a prerequisite to DRB2XX1 (Unit Beruniform 1).
2. DRB2XX1 and DRB3XX2 are graded.
3. DRB5XX0 and DRB6XX0 are optional, non-graded, audited courses with full assessment. Upon completion of DRB6XX0, students are entitled for commisioning.

*** Any Level 4 and 5 electrical and electronic courses not in the programme structure but listed in the Courses Inventory can be offered by the respective polytechnic. For a list of Courses Inventory, please refer to portal.cidos.edu.my. Students are required to take a minimum of four credits.

Disediakan Oleh:
Unit Kurikulum
Jabatan Kejuruteraan Elektrik
Politeknik Sultan Mizan Zainal Abidin

Course	Synopsis	Course Learning Outcome
	Semester 1	
DBS10012 ENGINEERING SCIENCE	**ENGINEERING SCIENCE** course introduces the physical concepts required in engineering disciplines. Students will learn the knowledge of fundamental physics in order to identify and solve engineering physics problems. Students will be able to perform experiments and activities to mastery physics concepts.	1 Use basic physics concept to solve engineering physics problems.(C3, PLO1) 2 Apply knowledge of fundamental physics in activities to mastery physics concept. (C3, PLO5) 3 Perform appropriate activities related to physics concept.(P3, PLO10)
DUE10012 COMMUNICATIVE ENGLISH 1	**COMMUNICATIVE ENGLISH 1** focuses on developing students' speaking skills to enable them to communicate effectively and confidently in group discussions and in a variety of social interactions. It is designed to provide students with appropriate reading skills to comprehend a variety of texts. The students are equipped with effective presentation skills as a preparation for academic and work purposes.	1 Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3, PLO10) 2 Demonstrate awareness of values and opinions embedded in texts on current issues. (A3, PLO12) 3 Present a topic of interest that carries identifiable values coherently using effective verbal and nonverbal communication skills. (A2, PLO10)
DUW10022 OCCUPATIONAL SAFETY AND HEALTH	**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, Emergency Preparedness and Response (EPR), fire safety, Hazard Identification, Risk Control and Risk Assessment (HIRARC) and guide the students gradually into this multi-disciplinary science	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. (A3, PLO8) 3. Forms communication skills in a team to respond for an accident action at workplace. (A3, PLO10)
DBM 10013 ENGINEERING MATHEMATICS 1	**ENGINEERING MATHEMATICS 1** exposes students to the basic algebra including resolve partial fractions. This course also covers the concept of trigonometry and the method to solve trigonometry problems by using basic identities,	1 Use mathematical statement to describe relationship between various physical phenomena. (C3, PLO1)

	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.	2 Show mathematical solutions using the appropriate techniques in mathematics. (C3, PLO5) 3 Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, PLO10)
MPU21012 PENGAJIAN MALAYSIA	**PENGAJIAN MALAYSIA** membincangkan sejarah dan politik, perlembagaan Malaysia dan sistem pemerintahan negara, kemasyarakatan dan perpaduan, pembangunan negara dan isu-isu keperihatinan negara. Kursus ini adalah bertujuan untuk melahirkan graduan yang mempunyai identiti kebangsaan dan semangat patriotisme yang unggul	1. Menerangkan nilai sejarah bangsa dan negara di Malaysia. (A3, PLO8) 2. Menghubungkait sikap dan tanggungjawab yang signifikan dengan sIstem pemerintahan negara. (A4, PLO8) 3. Membentuk minda ingin tahu menerusi aktiviti kemasyarakatan atau patriotisme dalam kalangan pelajar. (A3, PLO12)
DEE10013 MEASUREMENT DEVICES	**MEASUREMENT** DEVICES introduces students to the basic concept of electrical instrument and measurement. It covers the basic principles of measurement, safety precautions and meter calibration. Students will also use measurement devices such as analogue meters, DC meters, analogue and digital multimeters, oscilloscopes, signal generators and power meters during practical session. This course also covers the basic concept and simple application of DC Bridge.	1. Apply the concept of measurement in electrical and electronic equipment using appropriate theorem. (C3, PLO 1) 2. Perform meter calibrating and measuring technique using the correct measuring equipment (P4, PLO 5) 3. Demonstrate good communication skill in oral presentation within a stipulated time frame (A3, PLO 10)
DET10022 ELECETRICAL WIRING	**ELECTRICAL WIRING** course exposes students to the various aspects of wiring installation according to the MS IEC 60364 standard. Students will be able to relate theoretical aspect in practical work on electrical wiring during workshop sessions. This course also provides students with the knowledge and skill in doing different types of wiring installation, wiring protection, wiring inspection, wiring testing and sustainable energy practices in electrical wiring.	1. Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to NIOSH, MS IEC 60364 standard. (C3, PLO 1) 2. Construct single phase domestic wiring according to MS IEC 60364 (P4, PLO 5) 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. (A3, PLO 8)
DET10013 ELECTRICAL TECHNOLOGY	**ELECTRICAL TECHNOLOGY** course will introduce students to the principles related to DC electrical circuits. It covers the fundamental laws, theorems and circuit	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)

	techniques of the electrical technology basic fundamental. This course also covers inductor, capacitor, magnetic and electromagnetic circuits.	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)
	Semester 2	
DET20023 SEMICONDUCTOR DEVICES	**SEMICONDUCTOR DEVICES** introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistors and field effect transistors. The content encompasses devices structure to biasing basic applications	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
DEE20033 DIGITAL ELECTRONICS	**DIGITAL ELECTRONICS** introduces the theories on the basic of digital systems. This course emphasizes on the digital system fundamentals and applications. This course mainly covers number systems, code systems, logic gates, Boolean operations, flip-flops, counters and registers	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	**PROGRAMMING FUNDAMENTALS** course provides the skills necessary for the effective of application of computation and computer programming in engineering applications. Students will develop their programming skills through a variety of assignments and labs and by reviewing case studies and example programs. The learning outcome is proficiency in writing small to medium programs in a procedural programming language..	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)
DET20033 ELECTRICAL CIRCUITS	**ELECTRICAL CIRCUITS** is designed to provide students with the knowledge related to AC of electrical circuits. It emphasized on the principles of an alternating current AC waveform and sinusoidal steady state circuit analysis. This course also covers the applications of	1. Apply the concept and principle 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

	three phase system and operation of various types of transformers.	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)
DBM20023 ENGINEERING MATHEMATICS 2	**ENGINEERING MATHEMATICS 2** exposes students to the basic laws of indices and logarithms. This course introduces the basic rules of differentiation concepts to solve problems that relates maximum, minimum and calculate the rates of changes. This course discusses integration concepts in order to strengthen student's knowledge for solving area and volume bounded region problems. In addition, students will learn application of both techniques of differentiation and integration.	1. Use algebra and calculus knowledge to describe relationship between various physical phenomena. (C3, PLO1) 2. Solve the mathematical problems by using appropriate and relevant fundamental calculus techniques. (C3, PLO5) 3. Use mathematical language to express mathematical ideas and arguments precisely, concisely and logically in calculus. (A3, PLO10)
MPU23052 SAINS, TEKNOLOGI & KEJURUTERAAN DALAM ISLAM	**SAINS, TEKNOLOGI DAN KEJURUTERAAN DALAM ISLAM** memberi pengetahuan tentang konsep Islam sebagai al-Din dan seterusnya membincangkan konsep sains, teknologi dan kejuruteraan dalam Islam serta impaknya, pencapaiannya dalam tamadun Islam, prinsip serta peranan syariah dan etika Islam, peranan kaedah fiqh serta aplikasinya	1. Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian. (A2, PLO12) 2. Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam. (A3, PLO8) 3. Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam. (A4, PLO12)
MPU23042 NILAI MASYARAKAT MALAYSIA	**NILAI MASYARAKAT MALAYSIA** membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran-cabaran dalam membentuk masyarakat Malaysia.	1. Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia. (A2, PLO12) 2. Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotism masyarakat Malaysia. (A3, PLO8) 3. Menghubungkait minda ingin tahu dengan cabaran - cabaran dalam membentuk masyarakat Malaysia. (A4, PLO12)
Semester 3		
DEE30043 ELECTRONIC CIRCUITS	**ELECTRONIC CIRCUITS** emphasizes the concept of electronic device applications. The course covers the fundamental of electronic circuit application which include power supply unit, oscillator,	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

	operational amplifier, timer, filters and AD/DA converters. The content cover circuit configurations, operation and application of the electronic circuits	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 ELECTRONIC EQUIPMENT REPAIR	**ELECTRONIC EQUIPMENT REPAIR** provides the knowledge and skills on troubleshooting and repairing the electronics equipment. This course focuses on the identification of faults in regulated dc power supply, audio equipment and television system. This course also provides knowledge and skills on troubleshooting and repairing broken cell phones	1. diagnose fault of electronic equipment related to electronic equipment repair using the correct diagnosis technique and tools (C4, PLO 2) 2. fix the post-consumer's electronic equipment fault using the correct diagnosis technique (P4, PLO 5) 3. demonstrate good social responsibility in solving well defined engineering problems during performing electronic system and appliances maintenance task (A3 , PLO 6)
DEE30061 COMPUTER AIDED ELECTRICAL DRAWING	**COMPUTER AIDED ELECTRICAL DRAWING** provides knowledge and exposure on the usage of AutoCAD software. The course focuses on the application of the software to produce drawings of graphics, electrical / electronic component symbols, circuit schematics and electrical wiring layout diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software	1. Apply computer aided design concept, 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)
DEE30071 ELECTRONIC COMPUTER AIDED DESIGN	**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 mixedsignal 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.	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)

Code / Course	Description	Course Learning Outcomes
DEP32013 **COMMUNICATION SYSTEM FUNDAMENTALS**	**COMMUNICATION SYSTEM FUNDAMENTALS** introduces the students to the concepts of communication system. This course covers the principles of communications, analog and digital modulation techniques, multiplexing and transmission medium. It also exposes the students to the basic of data communication system.	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)
DET30053 **POWER SYSTEMS**	**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.	1. Apply the concepts of eco-friendly electrical power generation resources, to improve an environmentally conscious of a quality power generation, transmission and distribution system and its efficiency (C3, PLO 1) 2. Perform the practical works on electrical power generation, transmission and distribution system using an appropriate energy-efficient equipment. (P4, PLO 5) 3. Demonstrate the awareness toward the sustainable energy generation and environmental friendly methodes of transmission and distribution system. (A3, PLO 7)
DEP30083 **TELECOMMUNICATION NETWORK**	**TELECOMMUNICATION NETWORK** provides students with the basic knowledge of telecommunication network of Next Generation Networks (NGN). This course focuses on NGN architectures, protocols and services, including technologies and regulation. Students are also expose to NGN convergence between the traditional telecommunications and the internet to facilitate voice and data communications	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 commucation skill in oral presentation on assigned assignments (A3, PLO 1)
DEC30023 **COMPUTER NETWORKING FUNDAMENTALS**	**COMPUTER NETWORK FUNDAMENTALS** introduce students to the concepts and principles of data transmission and computer networks. This course enables	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)

	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.	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)
DEC30032 COMPUTER ARCHITECTURE AND ORGANIZATION	**COMPUTER ARCHITECTURE AND ORGANIZATION** course introduces students to the concepts and principles of computer hardware operation and computer's component logic design. This course enables students to correctly evaluate the design of typical logic computer, connection between computer components and use block function to implement operation. This course provides students with the knowledge about basic computer logic circuit that is use in computer hardware system.	1. Evaluate the architecture and organization of a computer and various functional modules in a computer (C5, PLO 2) 2. Demonstrate the awareness on the responsibility of an engineer towards society, health, safety, legal issues through assignments on assigned topics (A3 , PLO 6)
DEC30043 MICROPROCESSOR FUNDAMENTALS	**MICROPROCESSOR FUNDAMENTALS** covers the basic processor architecture and application of ARM processor (microcontroller products). Students will learn the fundamental concepts and techniques to apply ARM Development Tools using inline assembler in C language. This course also provides the skills to control external peripherals using digital input and output peripherals.	1. Apply the concept of microprocessor architecture related to the internal register, the memory and the input/output of ARM processor to operate external peripherals (C3, PLO 1) 2. Build the assembly language program to enable features of various peripherals in the ARM processor (P4, PLO 5) 3. Demonstrate continuous and independent learning to enhance programming skill through an assiged essay (A3, PLO 6)
DUE30022 COMMUNICATIVE ENGLISH 2	**COMMUNICATIVE ENGLISH 2** emphasises the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints.	1. Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience. (A3, PLO10) 2. Describe processes, procedures and instructions clearly by highlighting information of concern. (A3, PLO12) 3. Demonstrate effective communication and social skills in handling enquiries and complaints amicably and professionally. (A3, PLO10)

			Semester 4

DEC40053 **EMBEDDED SYSTEM APPLICATIONS**	**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	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)
DEE40082 **PROJECT 1**	**PROJECT 1** provides knowledge regarding the implementation and development methods of a project based on hardware or software or a combination of hardware and software. This course provides exposure to the project management and finance, techniques to develop project and proposal preparation.	1. Investigate well defined problem in order to make improvements on a chosen project (C4, PLO 4) 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 (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 6. development of the project through the final proposal (A3, PLO 12) 7. Display written communication skill through a final proposal (A3, PLO 10) 8. Describe the impact of the proposed project to the society in the final proposal(A3, PLO 6)
DEJ40033 **PROGRAMMABLE LOGIC CONTROLLER (PLC) AND AUTOMATION**	**PROGRAMMABLE LOGIC CONTROLLER (PLC) AND AUTOMATION** provides knowledge regarding the concept and principle of automation system. This course emphasizes the relationship between conventional/ hardwired/ relay ladder logic (RLL) and PLC system, application of various industrial input and output devices of PLC, designing process,	1. Evaluate environmentally-friendly automation control system using electromechanical devices and PLC (C5, PLO 2) 2. display the ability to construct, troubleshoot and do maintenance of hardwired and PLC systems using appropriate equipment (P4, PLO 5) 3. Demonstrate an understanding of PLC environmentally-friendly automation system

	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	norm by following PLC IEC standard during practical work session (A3, PLO 7)
DEE40092 **AUDIO VIDEO SYSTEMS AND PRODUCTION**	**AUDIO VIDEO SYSTEMS AND PRODUCTION** exposes students to audio video equipment and systems operation which lead to the understanding of audio video material production. The function and basic operation of various audio video equipment such as amplifiers, mixers, microphones, loudspeakers, players, recorders, cameras and monitor displays are taught to the extend where the students would be able to install and operate various audio video systems. The students will also learn the process of video production which involves scriptwriting, audio recording, video shooting and audio video editing*	1. apply the basic principle of audio and video equipment in audio video production using audio video software. (C3, PLO1) 2. construct various audio video systems using audio video equipment. (P4, PLO5) 3. demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project. (A3, PLO12)
DEE50122 **CIRCUIT ANALYSIS**	**CIRCUIT ANALYSIS** provides knowledge and exposure on how to analyze electrical circuits that have alternating current (AC) voltage or current sources using various circuit analysis techniques and theorems. Application of mathematic theorem of Laplace Transform is also introduced as another method of AC circuit analysis and the use of mathematic theorem of Fourier Series to analyze electrical waveforms	1. evaluate problems related to AC circuit analysis, Laplace transform and application and Fourier Series signal analysis using the appropriate table, formula and theorems. (C3, PLO1) 2. display ability to work in team to propose the best solution to the assigned group tasks. (C3, PLO2)
DEP500033 **DATA COMMUNICATION AND NETWORKING**	**DATA COMMUNICATION AND NETWORKING** exposes the student to the principle of data communication and networking. This course covers basic concept of data communication and networking fundamental for a quality data transmission. Students are expose to Open Systems Interconnection (OSI) Model and Network Protocol. Students are also introduced to Local Area Network and public digital network.	1. evaluate the performance of data and computer networks while implementing the knowledge, concepts, technology and terms related to data communication and networking. (C5, PLO1) 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, PLO5) 3. demonstrate awareness of data communication and networking standard during practical work sessions. (A3, PLO8)

Code / Course	Description	Course Learning Outcomes
DEP50043 **MICROWAVE DEVICES**	**MICROWAVE DEVICES** introduces the existence, characteristic and the effect of electromagnetic wave to the surrounding. This course also focuses on the devices used in microwave communication system such as waveguide (transmission lines), basic accessories, sources, microwave antennas as well as the techniques of measurement used in microwave system.	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, PLO4) 2. assemble the related microwave communication equipment in performing the measurement of appropriate output variable. (P4, PLO5) 3. demonstrate appropriate good social interaction and responsibility while handling microwave equipment or transmission system. (A3, PLO6)
DEP40053 **FIBER OPTIC COMMUNICATION SYSTEM**	**FIBER OPTIC COMMUNICATION SYSTEM** introduces students to the basic concept of fiber optic in communication systems with environmental sustainability. This course covers fiber optic characteristics, components in fiber optic system, losses in fiber optic cable and the fundamental concept of optical measurement. This course also provides knowledge in splicing techniques with safety awareness, multiplexing techniques and design consideration in fiber optic communication link.	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, PLO3) 3. assemble the related fiber optic communication equipment in performing the measurement of appropriate signals parameter. (P4, PLO5) 4. demonstrate contribution of fiber optic in communication system towards environment and sustainability through End of Chapter Question. (A3,PLO7)
DEC40062 **VISUAL BASIC PROGRAMMING**	**VISUAL BASIC PROGRAMMING** introduces students to event-driven programming using Microsoft Visual Basic. This module covers designing an application in Windows environment, creating forms, compiling an application, interacting with databases, error checking and debugging, and testing of the application.	1. design an application programmes based on the standard procedure of Visual Basic Programming. (C3, PL01). 2. build Visual Basic language programs using standard Visual Basic programming format for practical works and assigned mini project. (P4, PL05). 3. demonstrate good ability in managing a well-defined software based project in a cost effective manner. (A3, PLO11)
DEC40073 **DATABASE SYSTEM**	**DATABASE SYSTEM** course offers a comprehensive coverage of basic concept and application of data manipulation. Student will learn the fundamental concepts and techniques for designing and developing database and	1. investigate the requirements of database models by applying normalization technique in logical database designs. (C3, PLO1) 2. manipulate correctly Structured Query Language (SQL) for database using a

	manipulating data using Structured Query Language (SQL).	database management system during practical works. (C3, PLO2) 3. demonstrate good ability in managing a well-defined Structured Query Language (SQL) project in a cost effective manner. (P4, PLO5)
DEC50132 **INTERNET BASED CONTROLLER**	**INTERNET BASED CONTROLLER** provides knowledge and exposure in advanced technology. The course focuses on the basic knowledge of hardware component, wireless communication technologies and wireless sensor network. Green network in Internet of Things will help student to exploits on environmental conservation and surveillance to minimize the cost and power consumption in development of project.	4. apply knowledge of basic concept, structure and component of Internet of Things in electrical and electronic engineering field. (C3, PLO 1) 5. manipulate various types of input/output application, data acquisition and communication during practical work using embedded system platform/board. (P4, PLO 5) 6. demonstrate social responsibility in making our environment more sustainable through mini project development theme-based. (A3 , PLO 7)
DBM30043 **ELECTRICAL ENGINEERING MATHEMATICS**	**ELECTRICAL ENGINEERING MATHEMATICS** exposes students to the statistical and probability concepts and their applications in interpreting data. The course also introduces numerical methods concept to solve simultaneous equations by using Gaussian Elimination method, LU Decomposition using Doolittle and Crout methods, polynomial problems using Simple Fixed Point Iteration methods and Newton Raphson method. In additional, the course also discusses Ordinary Differential Equation (ODE). In order to strengthen the students in solving engineering problems, Laplace Transform by using the Table of Laplace is also included. It is designed to build students' teamwork and problems solving skill.	1. Demonstrate an understanding of the common body of knowledge in mathematics. (C3, PLO1) 2. Demonstrate problems solving skills in engineering problems. (C3, PLO5) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, PLO10)

DUE50032 **COMMUNICATIVE ENGLISH 3**	**COMMUNICATIVE ENGLISH 3** aims to develop the necessary skills in students to analyse and interpret graphs and charts from data collected as well as to apply the job hunting mechanics effectively in their related fields. Students will learn to gather data and present them through the use of graphs and charts. Students will also learn basics of job hunting mechanics which include using various job search strategies, making enquiries, and preparing relevant resumes and cover letters. The students will develop communication skills to introduce themselves, highlight their strengths and abilities, present ideas, express opinions and respond appropriately during job interviews.	1. Present gathered data in graphs and charts effectively using appropriate language forms and functions. (A2, PLO10) 2. Prepare a high impact resume and a cover letter, highlighting competencies and strengths that meet employer's expectations. (A4, PLO12) 3. Demonstrate effective communication and social skills in handling job interviews confidently. (A4, PLO10)
	Semester 5	
DEE50102 **PROJECT 2**	**PROJECT 2** is the continuation of DEE40082 PROJECT 1 course. The course focuses on methods of circuit construction, testing, troubleshooting, debugging, repair and also completion of the project which was planned during the previous semester. This course also requires students to manage an economical engineering based project, prepare a project report in a given format and deliver a project presentation at the end of the semester. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course.	1. investigate the various alternative preliminary design and software programming for the previous chosen project. (C4, PLO4) 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, PLO3) 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, PLO5) 4. display element of environment and sustainability awareness in project implementation. (A3, PLO7) 5. display effective communication skill in report writing and during presentation. (A3, PLO10) 6. display good ability in project management and finance using a Gantt Chart (milestone chart) and an effective costing respectively. (A3, PLO11)

Course	Description	Learning Outcomes
DEE50143 **CMOS INTEGRATED CIRCUIT DESIGN AND FABRICATION**	**CMOS INTEGRATED CIRCUIT DESIGN AND FABRICATION** course exposes the students to the basic integrated circuit (IC) and CMOS IC fabrication processes which include oxidation, doping, photolithography, metallization and etching. This course also covers IC testing, reliability and failure analysis. The students will be equipped with the knowledge of inverter design and simple to complex CMOS logic gates. The students will experience developing the physical layout of integrated circuit based on specific transistor feature size and using CAD tools while adhering to specific design rules. Finally, this course also covers the topic on design methodology used in designing integrated circuits.	1. design the basic logic gates, digital circuits from Boolean function and integrated circuit layout based on the knowledge of integrated circuit design methodology. (C6, PLO3) 2. construct the layout design of CMOS circuits using layout design software based on specific CMOS layout design rules. (P4, PLO5) 3. demonstrate elements of environmental sustainability in implementing reduce and reuse techniques in design parameters and design consideration through practical work. (A3, PLO7)
DET300043 **ELECTRICAL MACHINES**	**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	1. Apply the concept, principle operation and motor control of electrical machine to solve the related problems using standard formula. (C3, PLO1) 2. Measure and record electrical and mechanical parameters related to ac and dc electrical machine using appropriate electrical equipments. (P4, PLO5) 3. Demonstrate ability to work in team to complete assigned tasks. (A3, PLO9)
DET40073 **POWER ELECTRONICS**	**POWER ELECTRONICS** course is aimed to equip students with the knowledge and skills related to power electronic devices and its application in power conversion. This course also will focus on the operational principle of rectifiers, choppers, inverters and AC voltage controller circuits. Emphasis is given more on producing the output voltage waveforms of the converters.	1. Analyze and investigate the well-defined operational behaviors, principle and basic concepts of power electronics by using schematics 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 leadaership skills to complete assigned power electronics tasks. (A3, PLO9)
DEC40082 **INTERACTIVE MUTIMEDIA APPLICATION**	**INTERACTIVE MULTIMEDIA APPLICATION** exposes students to the process of creating interactive multimedia presentation including the role and design of multimedia systems which incorporate digital audio, graphics and video, underlying concepts and representations	1. investigate suitable latest software and techniques to effectively produce interactive multimedia project. (C4, PLO4) 2. design a multimedia interactive presentation incorporating motion graphics or animation, with typography, sound, and special effects to produce interactive multimedia project using the four primary stages. (C6, PLO3)

	of sound, pictures and video, data compression and transmission, integration of media, multimedia authoring, and delivery of multimedia. Students will produce a final digital interactive multimedia.	3. produce multimedia elements like typography, graphic, sound, video and animation for efficient delivery methods in a ready to use files using multimedia authoring software. (P4, PLO5) 4. demonstrate good oral communication skill in presentation for assigned mini project within a stipulated time frame. (A3, PLO10)
DEC50122 **EMBEDDED ROBOTIC**	**EMBEDDED ROBOTIC** presents the combination of mobile robots and embedded systems, from introductory to intermediate level. It is structured in three parts, which are embedded systems, mobile robot, and mobile robot applications. These parts are essential to students in mastering the crucial steps of building a complete working robotic system. They will help them to develop robots that not only can move, but intelligent as well.	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, PLO3) 3. manipulate the application of sensor and actuator, robot identification and communication during practical work based on land mobile robot design. (P4, PLO5) 4. demonstrate good ability in managing a well-defined engineering-based project in a cost effective manner. (A3, PLO11)
DEP50072 **SATELLITE AND RADAR COMMUNICATION SYSTEM**	**SATELLITE AND RADAR COMMUNICATION SYSTEM** introduces to students the concept of satellite and radar, satellite orbits, space satellite subsystem, satellite communication system, radar fundamentals and different types of radar system. It also covers end to end satellite and radar communication system in various generations and latest technologies.	1. investigate the performance of satellite and radar in communication system by using designated concept and formula. (C4, PLO4) 2. demonstrate continuous learning ability while engaging new technical knowledge on assigned essay questions. (A3, PLO12)
DEE40113 **SIGNAL AND SYSTEM**	**SIGNAL AND SYSTEM** provides knowledge on the signals and systems, the Linear Time-Invariant (LTI) systems, the Laplace transform the Z-transform and Fourier analysis. The course focuses on the mathematical description of signals and systems, the input-output relationship for Linear Time-Invariant (LTI) systems, the Laplace transform and Z-transform and their application techniques for analyzing the systems and Fourier analysis of signals and systems.	1. evaluate continuous-time and discrete-time signal and system problems. (C5, PLO2) 2. manipulate software to analyse the signals and systems correctly based on the given procedure. (P4, PLO5) 3. display good oral communication during presentation of end of chapter assignment. (A3, PLO10)

DEP50063 WIRELESS COMMUNICATION	**WIRELESS COMMUNICATION** introduces student to the basic of wireless communication includes several specialized topics. Students are expose to wireless networking, evolution of mobile communication, cellular network channels, techniques used to enhance capacity and speed, interferences, radio wave propagation and multiple access techniques. This course also exposes the student to the awareness of wireless technology to the health and environmental.	1. investigate the principle of wireless in implementing the concept and system of wireless communication using appropriate technique and designated formula. (C4, PLO4) 2. assemble the related wireless communication equipments systematically in performing the assigned practical work. (P4, PLO5) 3. express the awareness of wireless technology in environment and sustainability on assigned essay questions. (A3, PLO7)
DEC50103 OPERATING SYSTEMS	**OPERATING SYSTEMS** course introduces the fundamentals of operating systems. Topics included are inter-process communication, process scheduling, deadlock, memory management, virtual memory and file system. Formal principles are illustrated with examples and case studies of one or more contemporary operating system. The course shall enable students to develop skills to install and configure a server using Microsoft Windows network operating system or Open Source network operating system.	1. investigate the background process performed by operating systems based on management of memory, resource and file to ensure the computer system operates at optimum performance. (C4, PLO4) 2. perform installation for workstation and domain server using MS Windows server or Open Source server operating system (P4, PLO5) 3. demonstrate awareness of profesionalism and computer ethics during practical work to comply with profesionals bodies such as ACM or IEEE. (A3, PLO8)
DEC50113 COMPUTER SYSTEM DIAGNOSIS AND MAINTENANCE	**COMPUTER SYSTEM DIAGNOSIS AND MAINTENANCE** course provides knowledge on the general concept of computer system diagnosis and maintenance. Students are exposed to computer system hardware, laptop system, computer peripherals and security. The course focuses on the methods of operation, installation, diagnostic, troubleshooting and maintenance in computer hardware.	1. evaluate the fault in personal computer, laptop, printer and computer peripherals using diagnostic procedures. (C5, PLO2) 2. construct systematically the installation, configuration, optimization, upgrade and preventive maintenance on personal computer, laptop, computer peripherals and security system. (P4, PLO5) 3. demonstrate awareness of social responsibility safety and health in practical work during computer troubleshooting and maintenance using proper troubleshooting procedures. (A3, PLO6)
MPU22012 ENTREPRENEURSHIP	**ENTREPRENEURSHIP** focuses on the fundamentals and concept of entrepreneurship in order to inculcate the value and interest in students to choose entrepreneurship as a career. This course can help students to initiate creative and innovative entrepreneurial ideas. It also emphasizes a preparation of a business	1. Propose the value proposition of entrepreneurial idea using Business Model Canvas. (A3, PLO10) 2. Develop a viable business plan by organizing business objectives according to priorities. (A4, PLO11)

Code	Course	Synopsis	Course Learning Outcomes
		plan framework through business model canvas.	3. Organise the online presence business in social media marketing platform(A3, PLO11)
DEG30013	FUNDAMENTAL OF RENEWABLE ENERGY	**FUNDAMENTAL OF RENEWABLE ENERGY** course is aimed to provide students with the knowledge and skills related to meet the demands of the new economy that will rely on the primary source. The focus is on the renewable energy sources such as solar, wind, bioenergy, geothermal, hydroelectric, tidal and fuel cell. The importance and public benefits of renewable energy used and the environmental impact of renewable energy technologies will also be discussed.	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. (C3, PLO7)

Semester 6

| DUT40110 | INDUSTRIAL TRAINING | **INDUSTRIAL TRAINING** exposes students to relate workplace competencies demanded by industries. This course provides exposure to students in terms of technology literacy, effective communication, practice social skills and teamwork, policies, procedures and regulations, professional ethics and reporting. It also equips students with real work experience, thus helping students to perform as novice workers. | 1. apply related knowledge and skills at the workplace. (C3)
2. communicate effectively with others. (A3)
3. practice teamwork. (A5)
4. professionally and ethically comply with policies, procedures and rules of the organization. (A5)
5. explain the tasks assigned (during the industrial training) according to the prescribed format. (P2, A4) |

RELATED REFERENCES

Student support services and facilities

1. Hostel
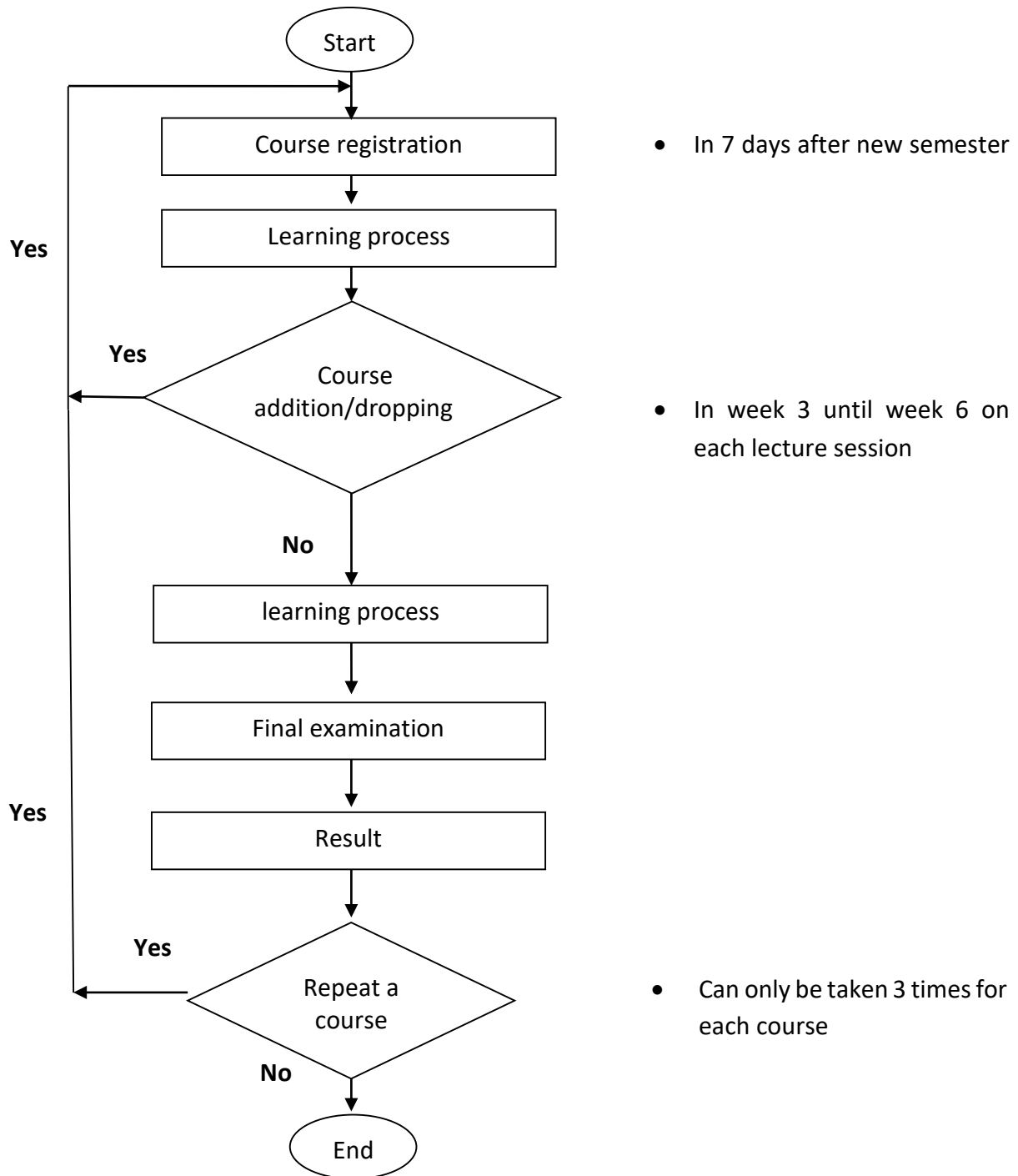2. Health service
3. Insurance
4. Financial aid
5. Sport Facilities
6. Library
7. Canteen / Cafeteria
8. Pusat Islam
9. Lecture Hall
10. Koperasi
11. Alumni
12. Counseling Unit, Career and Entrepreneurship Unit
13. Customer Feedback Form, suggestion box and website
14. ICT facilities (Cyber Cafe Center, Local Area Network (LAN) system, Wireless, etc)

Student's Act

Refer "Buku Panduan dan Peraturan AM Pelajar Politeknik, Jabatan Pengajian Politeknik" for further information.

Teaching and Learning Process

Student in *Diploma in Electronic Engineering (Communications), Diploma in Electronic Engineering (Computer) and Diploma in Electrical and Electronic Engineering* should accomplish 6 semesters for teaching and learning process and for each semester, the steps are as below :-

- In 7 days after new semester

- In week 3 until week 6 on each lecture session

- Can only be taken 3 times for each course

Examination
Refer *"Arahan-arahan Peperiksaan dan Kaedah Penilaian"* for further information.

Academic Advisory System
Academic Advisory System (AAS) is a systematic communication system for student to get guidance, advice and information from the reliable source. AAS help students determine the direction towards academic excellence and generic student attribute.

Refer "Garis Panduan Kecemerlangan Sistem Penasihatan Akademik Politeknik, Jabatan Pengajian Politeknik" for further information.

Industrial Training
Industrial Training is a MUST to all students under Diploma Program. Students have to pass industrial training before being recommended for the graduates of Diploma in Polytechnic KPTM.

*Please refer to Industrial Training and Liaison Unit for further information

REFFERENCES

1. Buku Panduan dan Peraturan AM Pelajar Politeknik, Jabatan Pengajian Politeknik

2. Arahan-arahan Peperiksaan dan Kaedah Penilaian

3. Garis Panduan Kecemerlangan Sistem Penasihatan Akademik Politeknik, Jabatan Pengajian Politeknik

4. Garis Panduan Pengurusan dan Kaedah Penilaian Latihan Industri Politeknik, Jabatan Pengajian Politeknik

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