POLITEKNIK
MALAYSIA
TUANKU SULTANAH BAHIYAH

Student
HANDBOOK

DEPARTMENT OF
ELECTRICAL ENGINEERING

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5th EDITION STUDENT HANDBOOKS COMMITTEE

(ELECTRICAL ENGINEERING DEPARTMENT)

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GREETING FROM DIRECTOR…

السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللهِ وَبَرَكَاتُهُ

To all my dearest students,

Welcome to Politeknik Tuanku Sultanah Bahiyah,Kulim (PTSB) ~ your first step to a brighter future!

Thank you for choosing PTSB as your higher learning institution. I assure you that you will not regret it. PTSB offers twelve diploma programs; both in engineering and non-engineering fields, all accredited by ETAC and MQA. The programs are highly sought after by industries, and since 2015, we have achieved a graduate employability rate of over 90%. So, if you are looking for a job after completing your diploma, rest assured, you will not be disappointed. If you wish to pursue further studies at a higher level, do not worry, as more than 10% of our students continue their degrees at local universities.

We want you to make the most of your time with us, experiencing and learning as much as possible. Therefore, this Students' Handbook is designed to help you kick-start your quest for knowledge at PTSB with ease and without any trouble. It will also help you to understand how the learning system works. Learning at the polytechnic involves face-to-face interactions as well as online learning. This means, you will not only attend lectures but also engage in hands-on work in the workshops or laboratories. Occasionally, your lecturers may assign certain tasks to be completed online. 'Blended Learning' has become a culture at PTSB, and we believe that learning in this way can be enjoyable. We have CIDOS and MSTeam as official platforms for online learning, but we can always utilize any other online platforms to enrich our resources. Additionally, the Outcome-Based Education (OBE) approach encourages student-centered learning and teamwork, helping develop your leadership and communication skills.

Please make full use of the facilities available on our campus. You are welcome to enjoy the sport center, library, Pusat Islam, canteen and cafeteria. In addition, we provide the Sistem Penasihatan Akademik, competent counselors at the Counselling Unit, and friendly Majlis Perwakilan Pelajar (MPP) to help you throughout your study journey.

I sincerely hope that you will enjoy this phase of your learning journey and **I WISH YOU… ALL THE BEST**!!

TN. HJ. MOHD RUZI BIN HAMZAH
Director,
Politeknik Tuanku Sultanah Bahiyah.

1. ABOUT POLYTECHNIC OF TUANKU SULTANAH

Politeknik Tuanku Sultanah Bahiyah (PTSB), formerly known as Politeknik Kulim (PKU) was the 16th established polytechnic under the Ministry of Education Malaysia. PKU commenced on 1st March 2002 at a temporary campus in Politeknik Seberang Prai, Pulau Pinang. On 3rd March 2003, it was relocated to its new premise of 100 acres at Kulim Hitech Park, Kulim, Kedah. This campus is equipped with up-to-date infrastructure which provides a conducive and ambient environment for higher education learning. It enrolled its first batch of 507 students on 9th June 2003.

This campus was officiated by the late Sultan of Kedah, Sultan Al-Mu'tasimu Billahi Muhibbuddin Tuanku Al-Haj Abdul Halim Mu'adzam Shah Ibni Almarhum Sultan Badlishah on 27th March 2007 and rebranded as Politeknik Tuanku Sultanah Bahiyah (PTSB).

PTSB is one of the Politeknik Malaysia under the administration of Jabatan Pendidikan Politeknik dan Kolej Komuniti (JPPKK). It plays its vital role in producing semiprofessional workers for the engineering and commercial industry in the private and public sectors. There are four main academic departments namely Civil Engineering Department, Electrical Engineering Department, Mechanical Engineering Department and Commerce Department. The teaching and learning processes in these main departments are supported by General Studies Department as well as Mathematics, Science & Computer Department.

The teaching and learning processes at PTSB are certified by SIRIM MS ISO 9001:2015. To maintain this certification, surveillance audit will be done every year and recertification for every three years. Apart from SIRIM certification, all engineering programs are accredited by ETAC and all non-engineering programs are accredited by MQA. By complying with the requirements of SIRIM, ETAC and MQA, we guarantee that students are equipped with all the knowledge and skills they need to serve in their respective fields and beyond. Furthermore, skills and knowledge like entrepreneurship as well as other softskills needed by employers are also nurtured among our students as these qualities are essentials in the current scenario of the working world.

2. MISSION & VISION

OUR ORGANISATION

POLITEKNIK MALAYSIA
TUANKU SULTANAH BAHIYAH

PTSB VISION

To be an outstanding TVET institution

PTSB MISSION

01 — To provide wide access to quality and recognized TVET programmes

02 — To develop holistic, entrepreneurial and balanced graduates

03 — To capitalise on smart partnerships with stakeholders

04 — To empower communities through life-long learning

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Unit Pengurusan Strategik, Prestasi & Risiko.
Politeknik Tuanku Sultanah Bahiyah
09090 Kulim Hi-Tech Park
Kedah Darulaman

3.

Ptsb Organization Chart

4. CAMPUS PLAN

1. ADMINISTRATION
2. LIBRARY AND RESOURCE CENTER
3. TRAINING AND CONTINUOUS LEARNING UNIT
4. DIGITAL MULTIMEDIA LEARNING CENTER
5. MAIN LECTURER HALL
6. DEWAN MUAD'ZAM SHAH (MULTI PURPOSE HALL)
7. DEPARTMENT OF MATHEMATICS AND COMPUTER
8. DEPARTMENT COMMERCE
9. DEPARTMENT OF ELECTRICAL ENGINEERING BLOCK
10. DEPARTMENT OF STUDENT AFFAIRS AND DEVELOPMENT.
11. DEPARTMENT OF CIVIL ENGINEERING BLOCK
12. DEPARTMENT OF MECHANICAL ENGINEERING BLOCK
13. CANTEEN
14. DEVELOPMENT AND MAINTENANCE UNIT
15. STORE UNIT
16. DRIVER UNIT
17. MOSQUE
18. CAFETERIA
19. STUDENT HOSTEL BLOCK
20. DEPARTMENT OF SPORT, CO-CURRICULAR AND CULTURE
21. DIRECTOR RESIDENTIAL
22. STAFF RESIDENTIAL
23. HOSTEL MANAGEMENT UNIT
24. WATER TANK
25. WATER TANK
26. MAIN / SUB STATION HOUSE

5.1 CIVIL ENGINEERING DEPARTMENT

Introduction

Civil Engineering Department (CED) is one of the main academic departments in Politeknik Tuanku Sultanah Bahiyah, Kulim, Kedah. CED has organized a wide range of activities in 2015 for students as well as for the staff to strengthen their skills and enhance their knowledge in various fields. It is our main aim to produce graduates that will be able to demonstrate desired behavioral traits such as integrity, teamwork, problem solving and passion in performing tasks related to their area of specialization. Students are also exposed to entrepreneurial skills that can be contributed to the economic growth in developing the nation towards 2020, especially in the construction industry. It is hoped that more competitive graduates will be produced to accommodate the present global market.

Programs Offered

- Diploma In Civil Engineering (DKA)
- Diploma In Geomatics (DGU)

Facilities

Below are the facilities available at Civil Engineering Department :

- Lecture Theatre
- Lecture Room
- Seminar Room
- CADD Laboratory
- Drawing Studio
- Carpentry Workshop
- Brick Workshop
- Concrete Laboratory
- Pipe Workshop
- Structure Laboratory
- Hydraulic Laboratory
- Geotechnics Laboratory
- Highway Laboratory
- Geomatics' Laboratory
- Photogrammetry Laboratory (Working Area)
- Remote Sensing Laboratory
- Environment Laboratory
-

5.2 ELECTRICAL ENGINEERING DEPARTMENT

Introduction

Electrical Engineering Department (EED) is one of the academic departments in Politeknik Tuanku Sultanah Bahiyah (PTSB). It offers engineering program in electrical and electronics field for diploma level.

EED offers quality efficient education and professional services through a broad-based knowledge within the field of electrical and electronic engineering. The aim is to produce graduates with potential, competent and competitive as well as highly skilled. In order to achieve a commendable work, EED is comprised of dedicated professional trainers, with sufficient infrastructure.

Programs Offered

- Diploma in Electrical Engineering (DET)
- Diploma in Electronic (Communication) Engineering (DEP)
- Diploma in Electronic (Computer) Engineering (DTK)
- Diploma in Electrical and Electronic Engineering (DEE)

Facilities

- 25 Classrooms
- 1 Lecture hall
- 2 Electrical and Technology Principle Lab (EPT)
- 3 Computer Programming Lab (ECP)
- 2 Electronic Maintenance Lab (EER)
- 2 Electronic Labs (EEL)
- 1 Telecommunication Lab (ETC)
- 1 Communication Data Lab (EDC)
- 1 Measurement Lab (EME)
- 2 Project Labs (BPL)
- 1 Instrumentation Lab (BIN)
- 1 Electrical Wiring Lab (BEI)
- 1 Power System Lab (BPS)
- 1 Power Electronic Lab (BPE)
- 1 CAD Lab (CAD)
- 1 Project Presentation Room (EPP)
- 1 Hi-Tech Lab (BHI)
- 1 Robotics Lab (BRO)
- 1 Electrical Machine Lab (BEM)

5.3 Mechanical Engineering Department

Introduction

Mechanical Engineering Department (MED) is one of the major departments at the Politeknik Tuanku Sultanah Bahiyah, Kulim Kedah. As one of the academic departments in PTSB, MED provides a plethora of opportunities to the students to learn by organizing many interesting activities and programmes. Students will possess entrepreneurial skills, practice good work ethics, be able to promote good morality and behavior, and continuously enhance their knowledge and skills that will allow them to make tangible contributions and meet new technical challenges. The graduates will communicate and interact responsibly and be able to contribute effectively as a team member. They will also be adaptable to new changes at the workplace.

Programs Offered

- Diploma In Mechanical Engineering (DKM)
- Diploma In Mechanical Engineering (Manufacturing) (DTP)
- Diploma In Mechatronics Engineering (DEM)

Facilities

- Machining Workshop
- Welding Workshop
- Fitting Workshop
- Project Workshop
- Foundry Workshop
- Plastics Workshop
- Strength and Material Laboratory
- Mechanics and Machine Laboratory

- Metrology Laboratory
- Robotics Laboratory
- Plant Laboratory
- CAD/CAM Laboratory
- Automation Laboratory
- Electrical Technology Laboratory
- Instrumentation and Control Laboratory

5.4 COMMERCE DEPARTMENT

Introduction

Commerce Department is one of the academic departments in Politeknik Tuanku Sultanah Bahiyah. It operated on 2003 and it previously known as Politeknik Kulim where it offered several courses such as Accounting, Marketing and Business Studies at Diploma and certificate level. The first batch consisted of 176 students and 17 lecturers during its first session on 2003. Currently the number of students are 1,099 with an average intake of 180 to 250 students for every semester.

Commerce Department is moving forward by offering efficient and professional services in its education based on accounting, marketing and business studies in order to produce potential graduates who are hardworking, charismatic and professional. To realize this, Commerce Department has professional, dedicated and experience lecturers and it also has complete infrastructure such as classrooms, lecture hall and computer lab which are fully equip and comfortable for the students to achieve a successful academic.

Programs Offered

- Diploma in Accountancy (DAT)
- Diploma in Marketing (DPR)
- Diploma in Business Studies (DPM)

Facilities

- A lecture Hall
- 16 Classrooms
- A Business Support Room
- A Presentation Seminar Room
- An Entrepreneurship Development Room
- An Accountancy Computer Lab
- A Micro Accountancy Room
- 2 Meeting Rooms
- 2 Entrepreneurship Kiosks
- A Simulation Office

5.5 MATHEMATICS, SCIENCE AND COMPUTER DEPARTMENT

Introduction

Mathematics, Science & Computer Department (MSCD) of PTSB is an ancillary department that consists of Mathematics Unit, Science Unit and Computer Unit. The department works to develop students' knowledge and skills in Mathematics, Science and Computer as the basic for them to learn engineering courses in the main academic. As an ancillary academic department, MSCD is also committed to develop students' competence and professionalism in their field. Since December 2015, MSCD has the intake of Pre-diploma in Science (IPS). Pre-Diploma Science is a program implemented to provide candidates who do not meet the minimum diploma-level qualifications to pursue their studies at Polytechnics as well as provide candidates with a second chance to seize jobs and improve their economic status and family.

Courses Offered

- DBM 10013 Engineering Mathematics 1
- DBM 20023 Engineering Mathematics 2
- DBM 30013 Engineering Mathematics 3
- DBM 30043 Electrical Engineering Mathematics
- DBS 10012 Engineering Science
- DBC20012 Computer Application

Facilities

- 1 Meeting Room
- 5 Tutorial Rooms
- 4 Computer Lab
- 2 Science Lab

5.6 GENERAL STUDIES DEPARTMENT

Introduction

General Studies Department (GSD) of PTSB consists of English Language Unit and Islamic Studies and Moral Education Unit that work on a professional partnership in their quest to take students to greater heights, morally and socially. As an ancillary academic department, GSD is committed in improving the English Language proficiency as well as the teaching of Islamic and Moral Education of undergraduates in the main academic departments.

Courses Offered

- DUE10012 – Communicative English 1
- DUE30022 – Communicative English 2
- DUE50032 – Communicative English 3
- MPU23012-Pengajian Islam
- MPU21032- Penhayatan Etika dan Peradaban
- MPU23052- Sains Teknologi Dan Kejuruteraan Dalam Islam
- MPU23042- Nilai Masyarakat Malaysia
- MPU22042- Bahasa Kebangsaan A

Facilities

- 3 Language Labs
- 1 Seminar Room
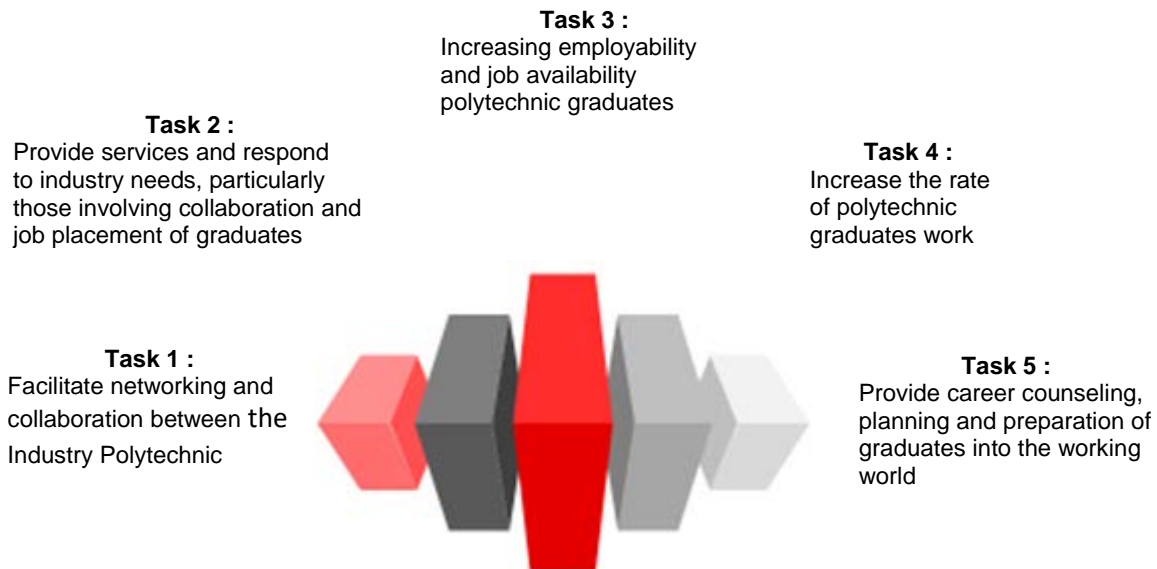- 1 Presentation Room
- 1 Meeting Room

5.7 COLLABORATION, INDUSTRIAL SERVICES AND EMPLOYMENT CENTRE (CISEC)

Introduction

Collaboration, Industrial Services And Employability Centre (CISEC) is one of unit was established at Politeknik Tuanku Sultanah Bahiyah (PTSB) with the function to four main areas and Alumni Tracer Study, Careers Advisory Service and Continuing Education, Planning and Preparedness into the working world, as well as industrial relations and placement through the industrial services especially in networking and collaboration

Scope And Function CISEC

Focuses on services to the industry, particularly in terms of networking and collaboration

Task 3 :
Increasing employability and job availability polytechnic graduates

Task 2 :
Provide services and respond to industry needs, particularly those involving collaboration and job placement of graduates

Task 4 :
Increase the rate of polytechnic graduates work

Task 1 :
Facilitate networking and collaboration between the Industry Polytechnic

Task 5 :
Provide career counseling, planning and preparation of graduates into the working world

Alumni PTSB
A group of students who have graduated from PTSB since 2010
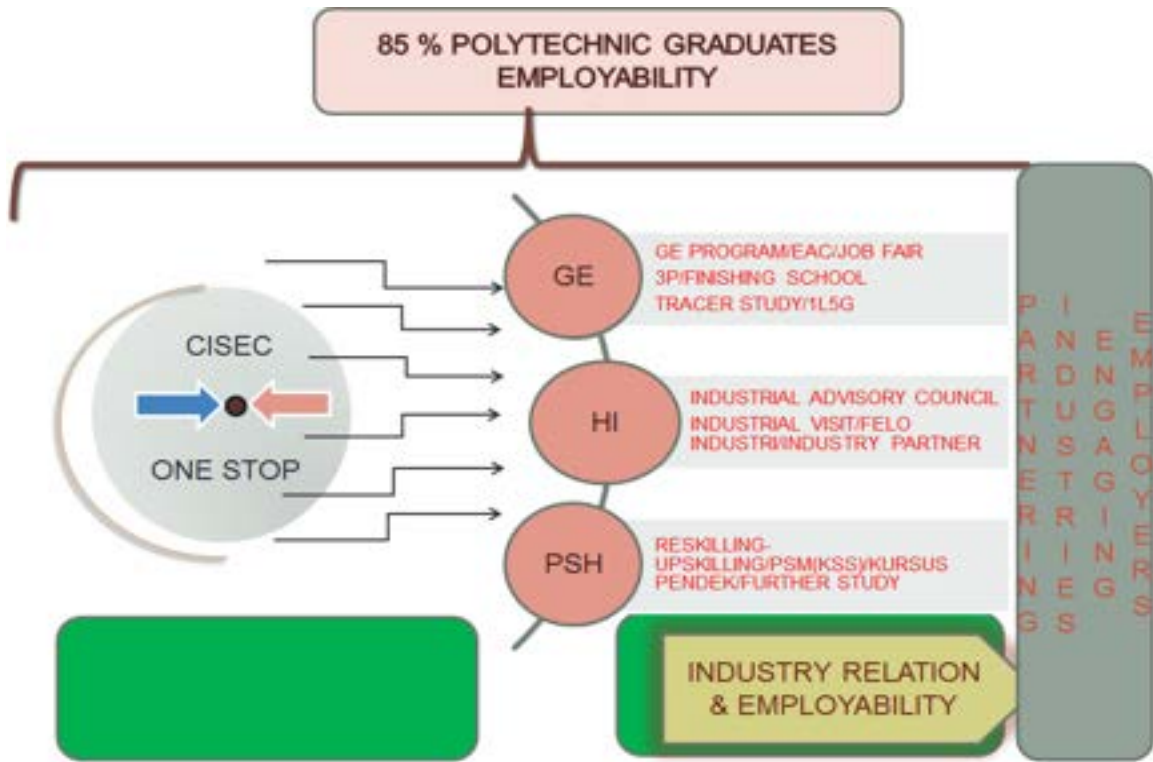
Alumni Fund Function

helps to shape **PTSB** today and tomorrow by providing critical funds used by the Polytechnic leadership to meet the most pressing needs of the Polytechnic and students

INDUSTRY COLLABORATION MODEL

INDUSTRY ENGAGEMENT

INDUSTRY DIALOGUE

- Networking
- Inputs
  HRD Trends, Curricula, Employment

INDUSTRY ADVISORY

- Inputs
  HRD Trends, Curricula, Employment
- Networking

INDUSTRY FOCUS GROUP

- Focus group seminar
- Focus group advisory
- Networking reach out /discussion
  New fields, HRD Trends, Curricula,
  Employment

INDUSTRY COLLABORATION

ACADEMICS

Student Industry Training
Staff Industry Attachment
Industry Lecturers/Fellow
Curricula Development
Work Based Learning
Career/technical advice & support

RESEARCH

Joint Research /Project
Consultancy

BUSINESS ENGAGEMENT

Time Sector Privatization
CPD & Workforce development
Specialist Facilities

COLLABORATIVE OUTCOME

NATIONAL AGENDA

Human Capital Projection
& Planning

INSTITUTION

Expertise & Capacity
Competitiveness & image
Funding Opportunities

GRADUATES

Employability
Salary Enhancement

EMPLOYABILITY MODEL

85 % POLYTECHNIC GRADUATES EMPLOYABILITY

GE — GE PROGRAM/EAC/JOB FAIR 3P/FINISHING SCHOOL TRACER STUDY/1L5G

HI — INDUSTRIAL ADVISORY COUNCIL INDUSTRIAL VISIT/FELO INDUSTRI/INDUSTRY PARTNER

PSH — RESKILLING-UPSKILLING/PSM(KSS)/KURSUS PENDEK/FURTHER STUDY

CISEC
ONE STOP

PARTNERINGS INDUSTRIES ENGAGING EMPLOYERS

INDUSTRY RELATION & EMPLOYABILITY

EMPLOYABILITY MODEL
3ES – ENROL. EMPOWER. EMPLOY

STUDENTS BEGIN WITH AN END IN MIND

- TECHNICAL SKILLS
- SOFT SKILLS
- CO-CURRICULUM
- ENTREPRENEURSHIP SKILLS
- INDUSTRIAL ATTACHMENT
- INDUSTRY CERTIFICATION

CISEC
ONE STOP

MOTIVATION AND COUNSELLING

TRAINING PLACEMENT — JOB PLACEMENT

My World of Work

EMPLOYABILITY ADVISORY
- Needs
- Trend

JOB HUNTING MECHANISM
- CV/Resume
- Interviewing
- Grooming
- Market trend / salary

POTENTIAL EMPLOYER
- Alumni
- Agencies
- Portal & Database

GUIDANCE
- Profiling
- Career
- Further studies

CISEC ORGANIZATION CHART

	PEGARAWAI KEBOLEHPASARAN GRADUAN	Penyelaras Kebolehpasaran Jabatan JKA/JKE/JKM/JP
	PEGAWAI 1L5G	Penyelaras 1L5G Jabatan JKA/JKE/JKM/JP
	PEGAWAI KOLABORASI	Penyelaras Kolaborasi Jabatan JKA/JKE/JKM/JP/JMSK/JPA
KETUA CISEC	PEGAWAI KERJAYA GRADUAN	Penyelaras Kerjaya Jabatan JKA/JKE/JKM/JP
	PEGAWAI PENGANTARABANGSAAN	Penyelaras Pengantarabangsaan Jabatan JKA/JKE/JKM/JP/JMSK/JPA
	PEGAWAI TRACER STUDY	Penyelaras Tracer Study Jabatan JKA/JKE/JKM/JP
	PEGAWAI ALUMNI	Penyelaras Alumni Jabatan JKA/JKE/JKM/JP

5.8 INDUSTRIAL TRAINING AND LIAISON UNIT

Introduction

The Liaison & Industrial Training Unit (UPLI) is responsible for managing students' industrial training affairs. Students will be assigned to a particular organization during their training period based on their respective fields of study.

The placement process is finalised before training commences. Students are constantly advised to maintain a high level of discipline. They should abide by the rules and regulations of both the polytechnic and organization. Organizations are advised to consult the polytechnic immediately if there are any disciplinary problems.

Function and Roles

Liaise between students and organization where the students undergo their training

Manage the Industrial Training process for the eligible students

Coordinate Industrial Training activity

Industrial Training Course (DUT40110)

Industrial Training exposes students to related workplace competencies demanded by industries. It also equips students with real work experience, thus helping students to perform as novice workers. Upon completion of this course, students should be able to:

- apply related knowledge and skills at the workplace.
- communicate effectively with others.
- practice teamwork.
- professionally and ethically comply with policies, procedures and rules of the organization.
- explain the tasks assigned (during the industrial training) according to the prescribed format.

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● **Assessment**

The course assessment is carried out by Coursework where it's a continuous assessment that measures knowledge, technical skills and soft skills. Student will be evaluate by using a rubric form as:

   i.   Organization Evaluation (total of 60%)

- Practical Task – 40%
- Reflective Journal – 20%

  ii.   Lecturer Evaluation (total of 40%)

- Observation – 10%
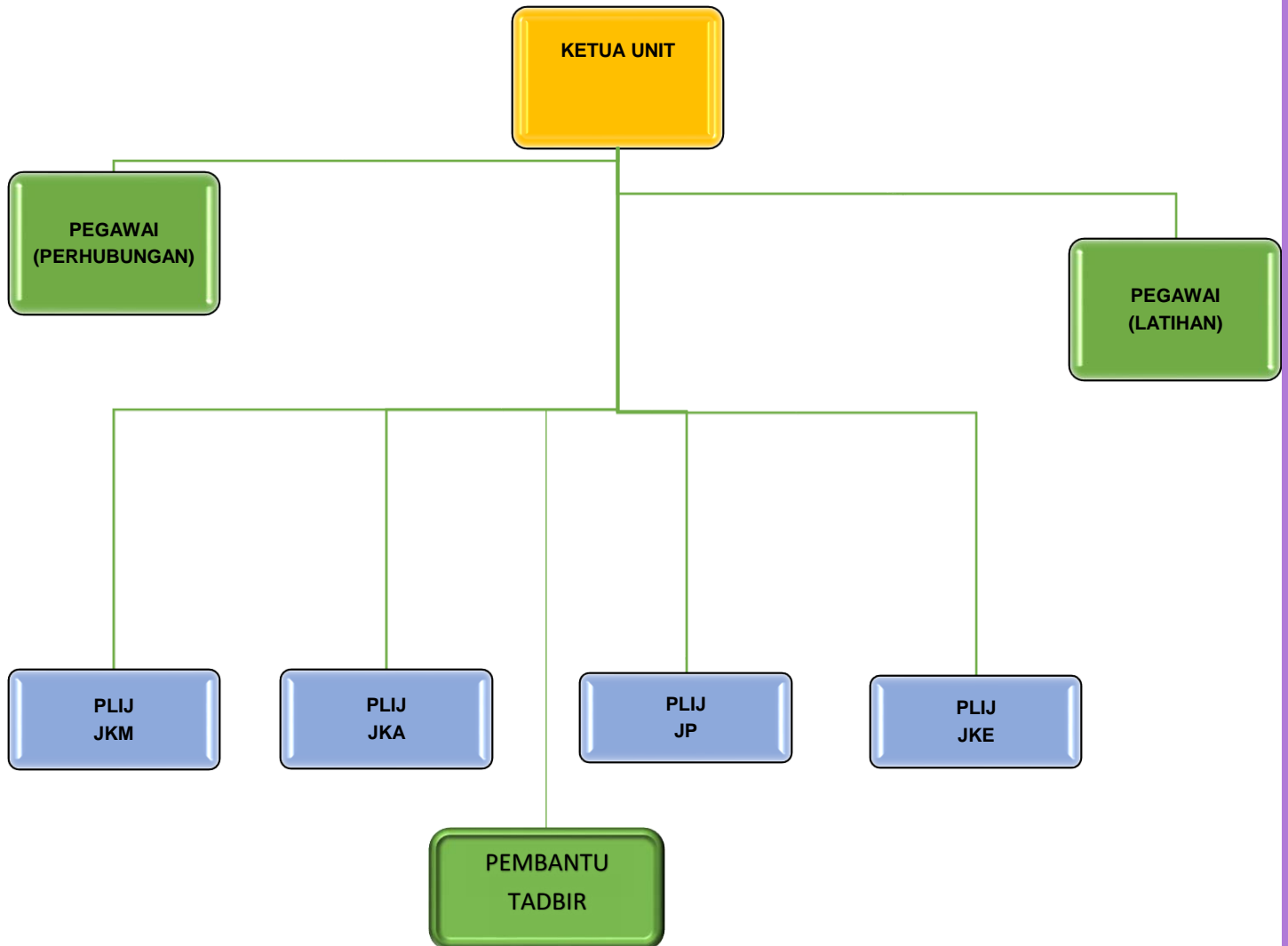- Final Report – 20%
- Presentation – 10%

Grading

Industrial Training grade are follow the guideline stated in the Arahan-Arahan Peperiksaan dan Kaedah Penilaian which is approved by the Lembaga Peperiksaan dan Penganugerahan Sijil/ Diploma Politeknik and Dasar Latihan Industri Institusi Pengajian Tinggi which is published by Minister of Higher Education.

Industrial Training DUT40110 are grade as follow:

MARK	RESULT	STATUS
80 – 100	Excellent	
65 – 79	Distinction	Pass
40 – 64	Pass	
0 – 49	Fail	Fail

INDUSTRIAL TRAINING AND LIAISON UNIT
ORGANIZATION CHART14

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                    ┌──────────────┐
                    │  KETUA UNIT  │
                    └──────┬───────┘
        ┌──────────────────┼──────────────────────┐
┌───────────────┐                          ┌───────────────┐
│   PEGAWAI     │                          │   PEGAWAI     │
│ (PERHUBUNGAN) │                          │  (LATIHAN)    │
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   │  JKM   │  │  JKA   │  │   JP   │  │  JKE   │
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              ┌────────────┐
              │  PEMBANTU  │
              │  TADBIR    │
              └────────────┘
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5.9

ASSESSMENT AND EXAMINATION UNIT

Introduction

Examination Unit is responsible to coordinate and to handle activities regarding final examination and certification. The unit is fully supported by all departments to fulfil the responsibilities given. Examination Officer is responsible to monitor the whole examination process of polytechnic while Examination Coordinator is to manage things regarding examination for their respective departments. Other than that, Examination Unit also cooperate in organizing workshops related to examination such as Assessments and Vetting Workshop which is organized every semester in order to produce high quality examination questions to be applied in the Final Examination of Politeknik KPT. There are rooms in the Examination Unit as the offices of the Examination Officer, Departments' Examination Coordinator, Computer Room, and Vault Room, Examination Materials/Equipment Room and Printing Room.

Function and Roles

Prepare Final Examination Schedule and Invigilation of Final Semester

Prepare graduates' Certificates/Diploma and certification matters

Supervise the Final Semester Examination.

Process and prepare documents regarding Final Examination such as Examination Slip, Student's Letters.

Sort and prepare the question for Final Semester Examination.

Repeat Module, Repeat Semester, Fail, Research Data of Examination Result, Board Report, Graduates List and etc.

Questions construction process and organize the workshops for questions construction and vetting.

Prepare examination result transcript

Course Credit

- Credits for each course are as set forth in the Curriculum and Program Structure Document as approved by the Course Curriculum Institution and the Polytechnic Training Program

- The number of credits to be taken by the student for each semester is between 12 to 20 or as specified in the document Curriculum and Program Structure
- The minimum credit amount to be collected by the student before being considered for the award of the certificate is as prescribed in Document Curriculum and Program Structure

MARKS	POINT OF INTEREST	GRED	STATUS
90 - 100	4.00	A+	Very Excellence
80 - 89	4.00	A	Excellence
75 - 79	3.67	A-	Credit
70 - 74	3.33	B+	Credit
65 - 69	3.00	B	Credit
60 - 64	2.67	B-	Pass
55 - 59	2.33	C+	Pass
50 - 54	2.00	C	Pass
47 - 49	1.67	C-	Pass
44 - 46	1.33	D+	Pass
40 - 43	1.00	D	Pass
30 - 39	0.67	E	Fail
20 - 29	0.33	E-	Fail
0 - 19	0.00	F	Fail

Determination of Passing Mark for Continuous Assessment, Final Assessment, and Final Examination

The requirement or pass marks for both assessments, i.e. Continuous Assessment (CA) and Final Examination / Final Assessment (FE) are used for all courses. The prescribed pass mark is at least:

Continuous Assessment (CA) / Final Assessment = 40%
Final Examination (FE) = 20%
Total Passing Mark = 40%

ASSESSMENT AND EXAMINATION UNIT
ORGANIZATION CHART

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                        ┌──────────────────┐
                        │   Head of Unit   │
                        │     (DH44)       │
                        └──────────────────┘
 ┌──────────────┐                              ┌──────────────┐
 │ Examination  │                              │ Examination  │
 │   Officer    │                              │   Officer    │
 │   (DH41)     │                              │   (DH41)     │
 └──────────────┘                              └──────────────┘
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| EXAMINATION COORDINATOR JKM | EXAMINATION COORDINATOR JKA | EXAMINATION COORDINATOR JP | EXAMINATION COORDINATOR JKE | EXAMINATION COORDINATOR JMSK | EXAMINATION COORDINATOR JPA |

PEMBANTU TADBIR

PEMBANTU OPERASI
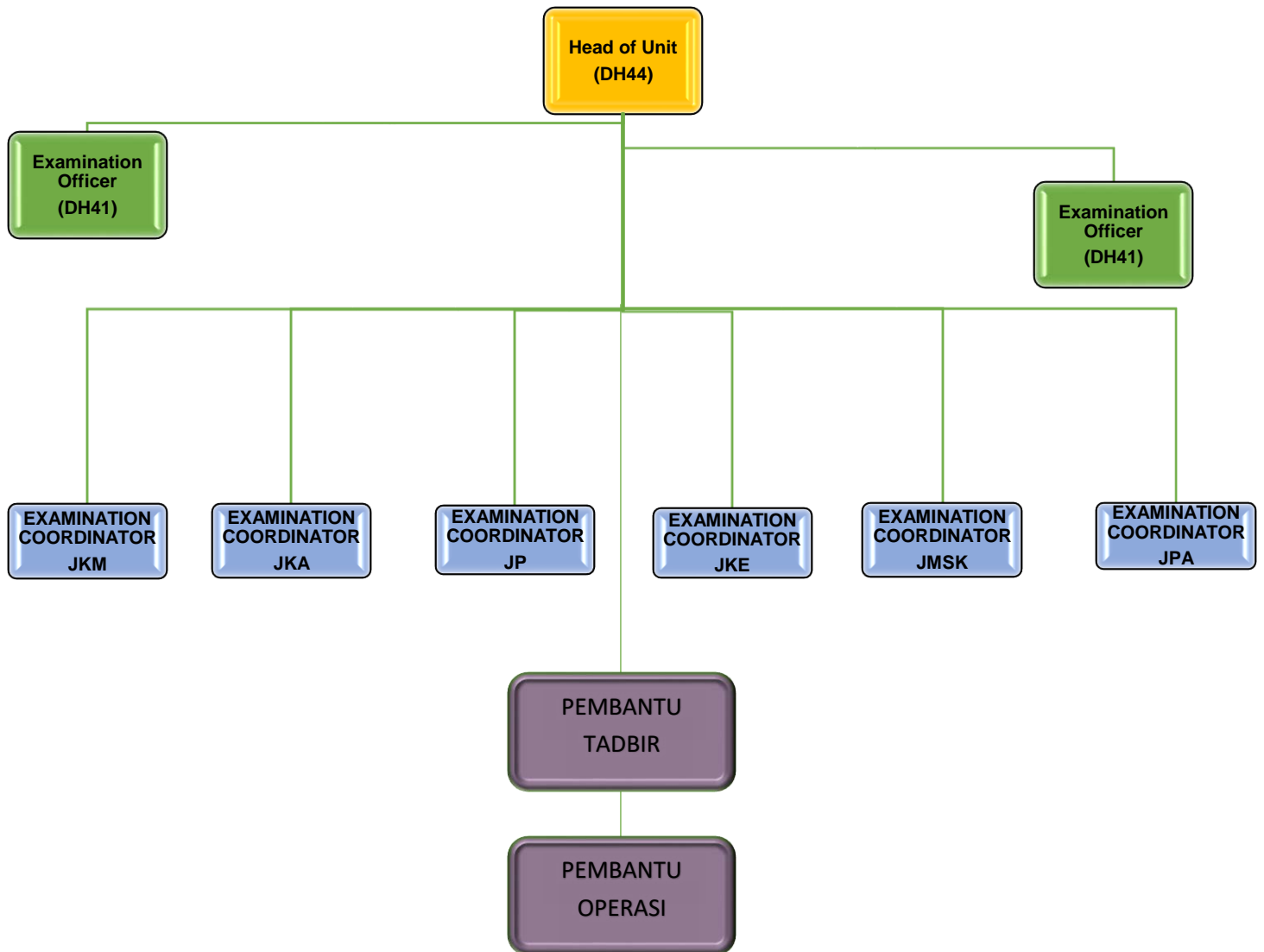
STUDENT HANDBOOK

PTSB

NON-ACADEMIC TEAM

6.1 STUDENT AFFAIR DEPARTMENT

This unit is structured into three divisions; Data & Intake, Discipline & Welfare and Student Representative Council / Majlis Perwakilan Pelajar (MPP). Each division is led by an officer assisted by other officers and 3 supporting staff in order to manage the particular job scope.

Division of Data & Intake

- Student intake
- New students' registration and seniors' self-report
- Student card application
- Switching polytechnics and courses
- Semester extension
- Students' study letter confirmation
- Students' quit letter confirmation
- Students' data and record

Division of Discipline & Welfare

i. **Financial support Management**

- Most of the diploma certificate and course students are funded by Perbadanan Tabung Pendidikan Tinggi Nasional (PTPTN) and Ministry of Education (MoE). The rests are sponsored by other sponsors such as State Foundation, Baitul Mal, State Zakat and Majlis Amanah Rakyat (MARA).
- Students can get guidance from Scholarship officers regarding procedures and information for financial support.

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ii. Students' Welfare Management

- To manage students' insurance
  (PTSB students are insured by Syarikat Takaful Malaysia through Group Family Plan)
- To manage students' treatment letter
- To manage students' charity
- To report students' death and accident to particular parties
- To issue a student care letter if necessary
- To manage hostel placement for students
- To provide information about off-campus residential for students

Sponsorship Information				
Public Services Department (JPA) RM 5,000	State Foundations RM 2,000 – RM 3,000	Ministry of Higher Education (KPTM) RM 3,000	KUOK Foundation RM 5,000	National Higher Education Fund Corpoation (PTPTN) RM 5,000

iii. Students' Discipline Management

- To provide disciplines planning and management
- To handle cases of misconduct and disciplinary and trial procedures
- The discipline of PTSB Students is subject to ACT 174.

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iv.   Student Orientation Week

- To chair and manage new students orientation week

v.   Majlis Perwakilan Pelajar (MPP)

- To advise Committee Student Representative

MPP is an abbreviation for the Majlis Perwakilan Pelajar which acts to represent students in all matters and expressed a student's view to a Polytechnic. MPP is also responsible for having an excellent student in skills, academics, sports and so on.

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Majlis Perwakilan Pelajar (MPP) was established to develop the personality and ideas of a leader among students. MPP will be formed through learning, management, leadership, implementation of activities, council ethics and motivation to enable them to have different added value to other students. MPP has a role to assist management in identifying the needs and welfare of students. Apart from that, MPP also acted on campus by various agendas and activities for students.

vi. Student Vehicle Registration Management

- To manage matters regarding the registration of students' vehicles in campus
- To take action on traffic offenses according to the education institutions acts and methods
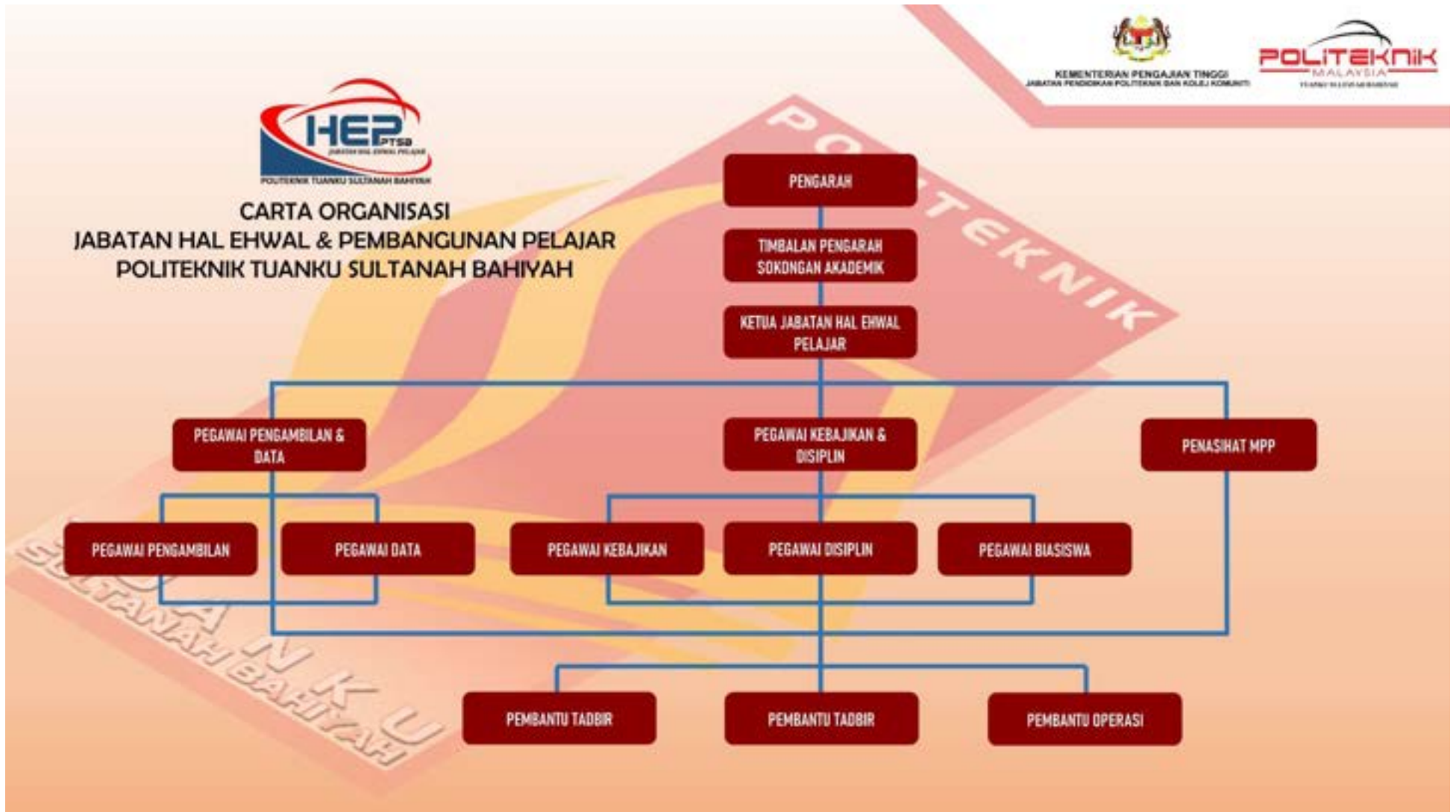
6.2 SPORTS CO-CURRICULLUM AND CULTURE DEPARTMENT

Sports Co-curriculum and Culture Department (SCCD) of Politeknik Tuanku Sultanah Bahiyah (PTSB) consist of Sports Unit, Co-Curriculum Unit and Culture Unit that is commitment to provide opportunities for student and staff to participate in all types of sports, health and fitness activities. SCCD is responsible for planning, organizing, implementing, coordinating, supervising and monitoring sports, co-curriculum and culture activities at polytechnic. The department also manages the equipment and ensures that facilities are at its best and provides quality service to customers.

Objectives

- To nurture young talents amongst PTSB students and at the same time to develop their potential to a higher level.
- To develop "The thinking athletes" among PTSB students as aligned by the aspiration of Ministry of Higher Education's sports development policy.
- To promote to the community that the institution does not only emphasize on academic excellence, but is also active in co-curriculum and sports development.
- To encourage sportsmanship, friendship and positive competitive spirits among higher education institutions.

Courses offered

- Extra Curricullar (Route1-Sports and Club)
- Extra Curricullar (Route2-Uniform)

Facilities

- Football Field
- Rugby Field
- Tennis Courts
- Squasy Court

- Futsal Courts
- Netball Courts
- Badminton Courts
- Volleyball Courts

- Basketball Courts
- Ping Pong
- Gymnasium
- Paintball

CARTA ORGANISASI
JABATAN SUKAN KOKURIKULUM DAN KEBUDAYAAN
2023

6.3

PSYCHOLOGY MANAGEMENT UNIT

The Psychology Management Unit provides facilities where the clients (students, staff and community) are encouraged to maximize their potential. The unit also aimed to nurture good mental health among clients of the Politeknik Tuanku Sultanah Bahiyah.

The Psychology Officer is available to the clients to discuss and share information on education, academic purposes, vocational and technical, personal matters, emotions, social and health problems.

The main objective of the Psychology Management Unit is to help clients to get better understanding on themselves so that they can resolve any problems faced. Group activities are also planned from time to time, to develop communication and interaction skills, leadership skills, management and administration skills. Using this approach, it is hoped that the concept of awareness and responsibilities are nurtured to the clients.

Services :

01 Counseling Services are handled through individual or grouped counselling session.

02 Guidance and Enrichment Service is given through talks, seminars, workshops and forums.

03 Prevention activities like health programs covering physical and mental, drugs and AIDS/HIV prevention, stress management and others are organized.

04 Listing final year students to IPTA and IPTS for chances of further studies.

6.4 LIBRARY AND RECOURCES CENTRE

The library provides quality and up to date information to everyone in terms of managing and providing access to information resources. Taking the role as a centre of knowledge, the library acts as a catalyst and assist in the teaching and learning and research in the process of producing creative and innovative semi-professional. The library unit is also an instrument in inculcating the reading culture among PTSB and the local communities through an ongoing reading campaign. All staff and students can access all resources from the library freely. It also can accommodate up to 600 students at one time. In addition, carrel and discussion rooms as well as referral service, photocopying and internet service are also provided for students. Apart from using the materials in the library as a reference source, library users can also use online reference resources such as e-books and e-journals using smartphones via link http://www.u-library.gov.my/portal/web/guest/onlinedatabases.

PTSB Library or Perpustakaan Al-Khawarizmi has been upgraded (floor tiles) using RMK 11 budget and now has a new and refreshing image. Hence, this will attract the students and staff to use the library facilities regularly. The library has conducted many programs to enhance reading among PTSB staff and students since 2020. For example Book Corner competition and the online programs which involve students and staffs such as FB live books review, book review contest and book corner contest. Other than that, library has also taken an initiative to add more academic books collection by organizing book donation program named '1 Staf 1 Buku'.

Library Objectives

01 to be the main resource for staff and students in teaching and learning

02 to update the book collections and other references that currently needed by staff and students

03 to acquire relevant and current information for reference

04 to manage a collection of information using a standard system for easy access.

05 to provide quality information service and cultivate interest in reading

6.5 STUDENT RESIDENTIAL COLLEGE

The uniquely modern PTSB hostel can easily accommodate a total of 1404 students. Semester one students have the opportunity to benefit the facilities provided in the campus in addition to a comfortable and conducive living environment. Students are placed in the in the hostel to instill good learning habit, moral values integration and friendship among students of different races, religions and culture. Four blocks of which are V1, V2, V3 and V4 are especially for female students, whereas the other two blocks which are V5 and V6 are for male students. Each room is will be occupied by two students and equipped with basic facilities such as bed, mattress, study table, chair and cupboard.

Capacity of PTSB Residence for Students

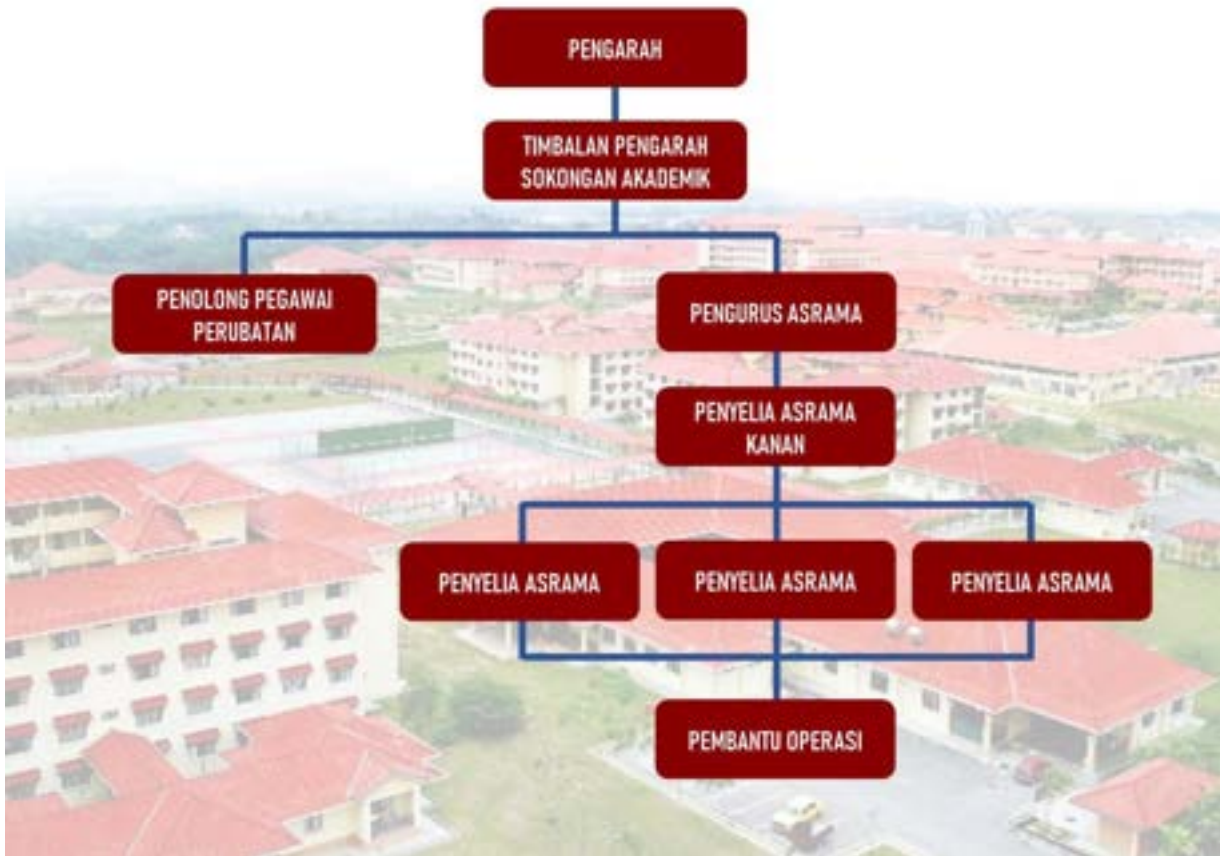|	Male	Female
Total Block	3	3
Total Rooms	351	351
Total Beds	702	702

Hostel Facilities

- Hostel Administration Office
- Hostel Warden Office
- Treatment Room
- Recreation and Rest Room
- Laundry Room
- Cafeteria
- Mini Market Under Coop
- Self Service Prepaid Laundry Service

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STUDENT RESIDENTIAL COLLEGE
ORGANIZATION CHART

KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

POLITEKNIK MALAYSIA
TUANKU SULTANAH BAHIYAH

CARTA ORGANISASI
UNIT PENTADBIRAN KAMSIS
POLITEKNIK TUANKU SULTANAH BAHIYAH

PENGARAH

TIMBALAN PENGARAH SOKONGAN AKADEMIK

PENOLONG PEGAWAI PERUBATAN

PENGURUS ASRAMA

PENYELIA ASRAMA KANAN

PENYELIA ASRAMA

PENYELIA ASRAMA

PENYELIA ASRAMA

PEMBANTU OPERASI

6.6 Entrepreneurship Unit

Entrepreneurship Unit (UKES) acts as the main driver in increasing the level of innovation, creativity and competitiveness of a country. Entrepreneurship field has been recognized as a catalyst for economic development in Malaysia. In order to realize the vision and mission of the Entrepreneurship Development Policy for Institutions of Higher Learning, Politeknik Tuanku Sultanah Bahiyah has established the Entrepreneurship unit.

Service Function :

01 Provide opportunities for students in the business world

02 Organize the program that aims to provide basic exposure to students so that more polytechnic graduates becomes entrepreneurs.

03 Attract students to become entrepreneurs and be the job creator for the society.

04 Achieve the KPI of institution every year

Entrepreneurship Activities :

01 Bazar MyAgrosis Ptsb

02 Program My Best Buy PTSB Bersama FAMA Kulim

03 Program Bisnes Pitching

04 Karnival Street Sale

05 Entreprenuer Explorace IR 4.0 Bersama Mentor Alumni Dan PTime Resources

05 Workshop: Mini Project DIY Soap Using Recycled Cooking Oil

6.7

STUDENTS EXCELLENCE UNIT

The Student Skills and Excellence Unit (SSEU) is a unit that plays a role in regulating and improving Student Skills and Excellence at Polytechnic Tuanku Sultanah Bahiyah (PTSB). It is divided into 5 important subunits;

1. Academic Counseling,
2. Student Excellence,
3. Polyskill,
4. Fira and,
5. External Competition

SEU Functions :

01 To Plan and implement excellence programs to produce holistic and high - performing students

02 Improving the effectiveness of the Academic Advising (PA)

03 Implement activities that can improve student achievement in order to achieve the GOT target (Graduate On Time)

04 Implement activities that can reduce student failure each semester.

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STUDENTS EXCELLENCE UNIT
ORGANIZATION CHART

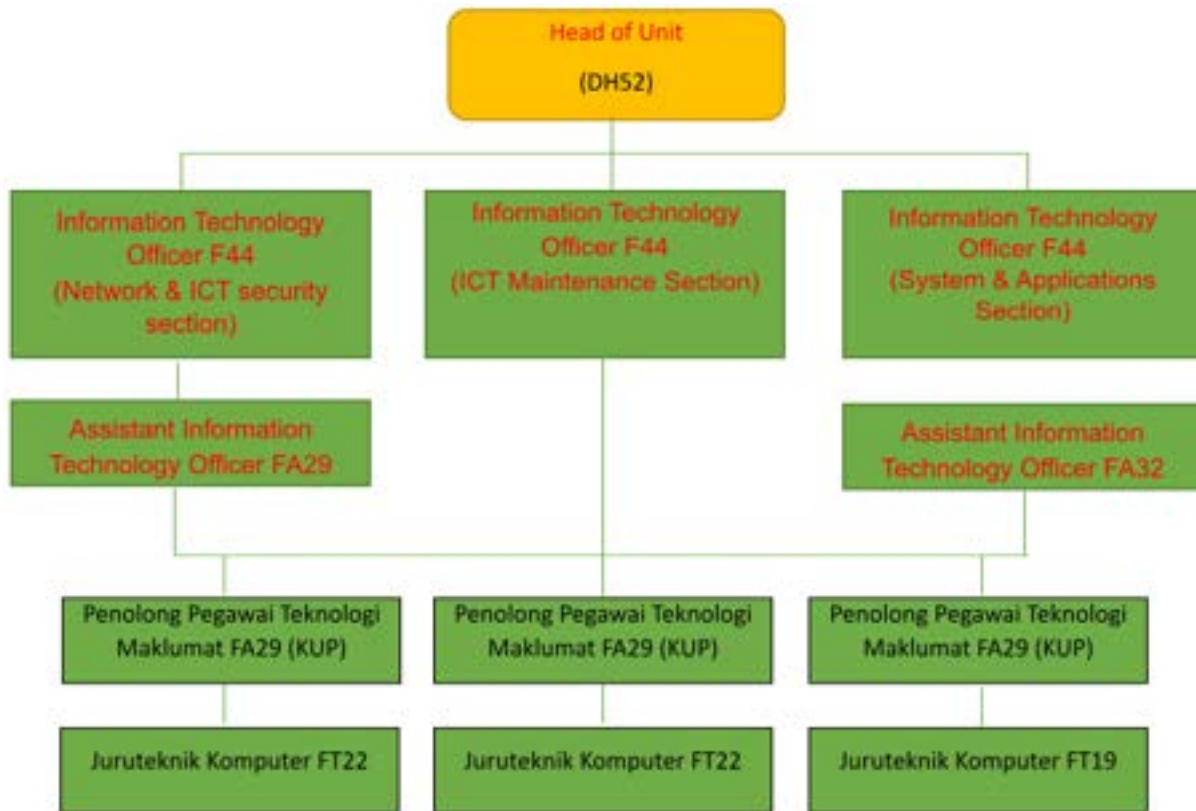# 6.8 INFORMATION AND TECHNOLOGY UNIT

INTRODUCTION

The Information Technology & Communication Unit (UTMK) is a unit that plays a role in maintaining ICT hardware and software, administering and updating application and data systems and providing computer network infrastructure at the Tuanku Sultanah Bahiyah Polytechnic campus (PTSB).
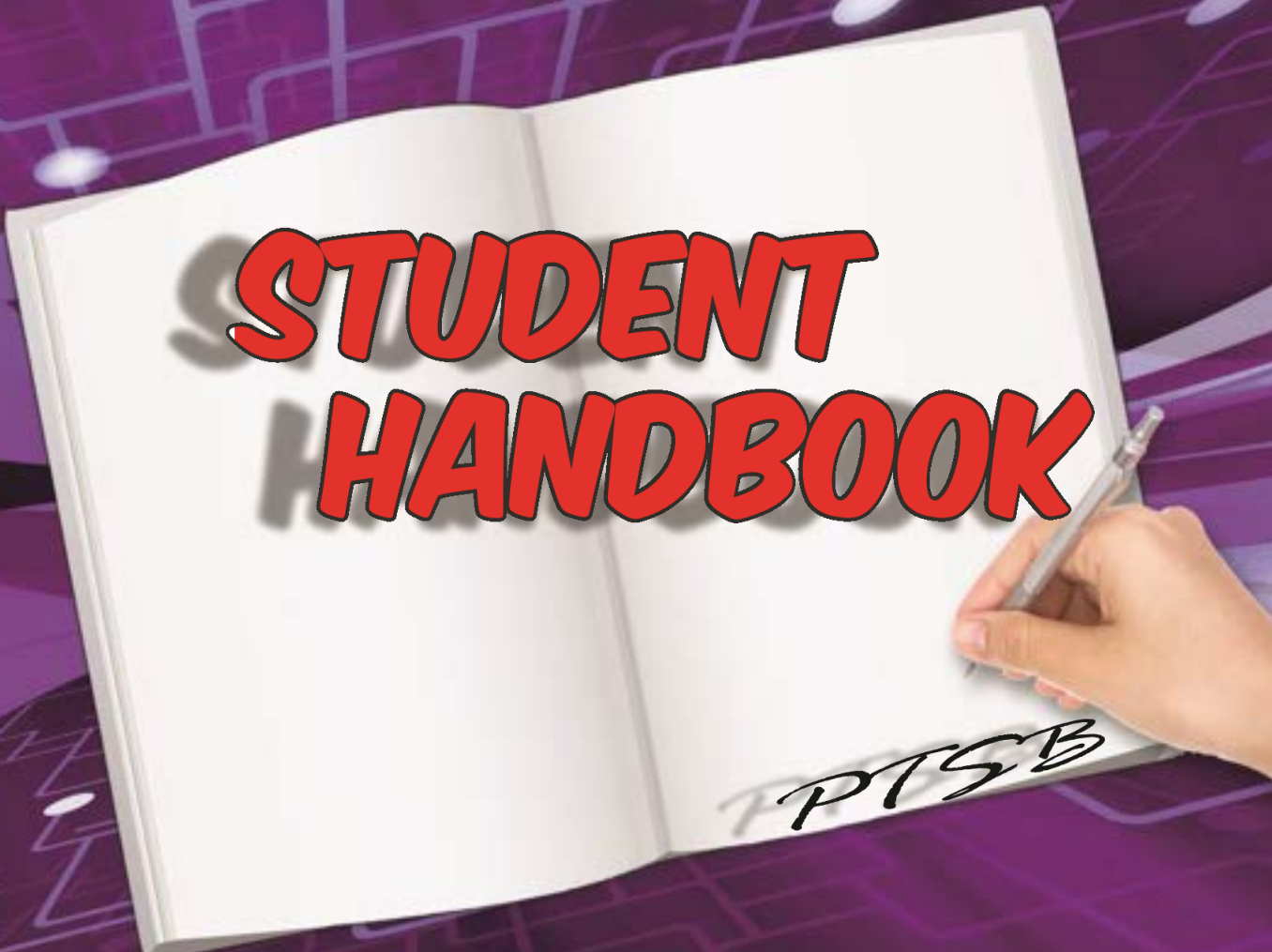

FUNCTIONS & ROLE OF UTMK

  I.Manage and implement maintenance of ICT hardware and software as well as application system
 II.Planning and implementing the procurement of spare parts, assets and ICT facilities
III. Develop, administer and update online systems and applications
IV.Manage server administration, ICT security and campus network
 V.Manage the adoption and implementation of new systems and applications
VI.Planning and managing the implementation of training and inculcating the use of ICT for PTSB staff

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INFORMATION AND TECHNOLOGY UNIT

ORGANIZATION CHART

```
                        ┌─────────────────────┐
                        │    Head of Unit      │
                        │      (DH52)          │
                        └─────────────────────┘
                                   │
        ┌──────────────────────────┼──────────────────────────┐
        │                          │                          │
┌───────────────────┐   ┌───────────────────┐   ┌───────────────────┐
│ Information        │   │ Information        │   │ Information        │
│ Technology         │   │ Technology         │   │ Technology         │
│ Officer F44        │   │ Officer F44        │   │ Officer F44        │
│ (Network & ICT     │   │ (ICT Maintenance   │   │ (System &          │
│ security section)  │   │ Section)           │   │ Applications       │
│                    │   │                    │   │ Section)           │
└───────────────────┘   └───────────────────┘   └───────────────────┘
        │                                                  │
┌───────────────────┐                         ┌───────────────────┐
│ Assistant          │                         │ Assistant          │
│ Information         │                         │ Information         │
│ Technology Officer  │                         │ Technology Officer  │
│ FA29               │                         │ FA32               │
└───────────────────┘                         └───────────────────┘

┌───────────────────┐   ┌───────────────────┐   ┌───────────────────┐
│ Penolong Pegawai   │   │ Penolong Pegawai   │   │ Penolong Pegawai   │
│ Teknologi Maklumat │   │ Teknologi Maklumat │   │ Teknologi Maklumat │
│ FA29 (KUP)         │   │ FA29 (KUP)         │   │ FA29 (KUP)         │
└───────────────────┘   └───────────────────┘   └───────────────────┘
        │                        │                        │
┌───────────────────┐   ┌───────────────────┐   ┌───────────────────┐
│ Juruteknik         │   │ Juruteknik         │   │ Juruteknik         │
│ Komputer FT22      │   │ Komputer FT22      │   │ Komputer FT19      │
└───────────────────┘   └───────────────────┘   └───────────────────┘
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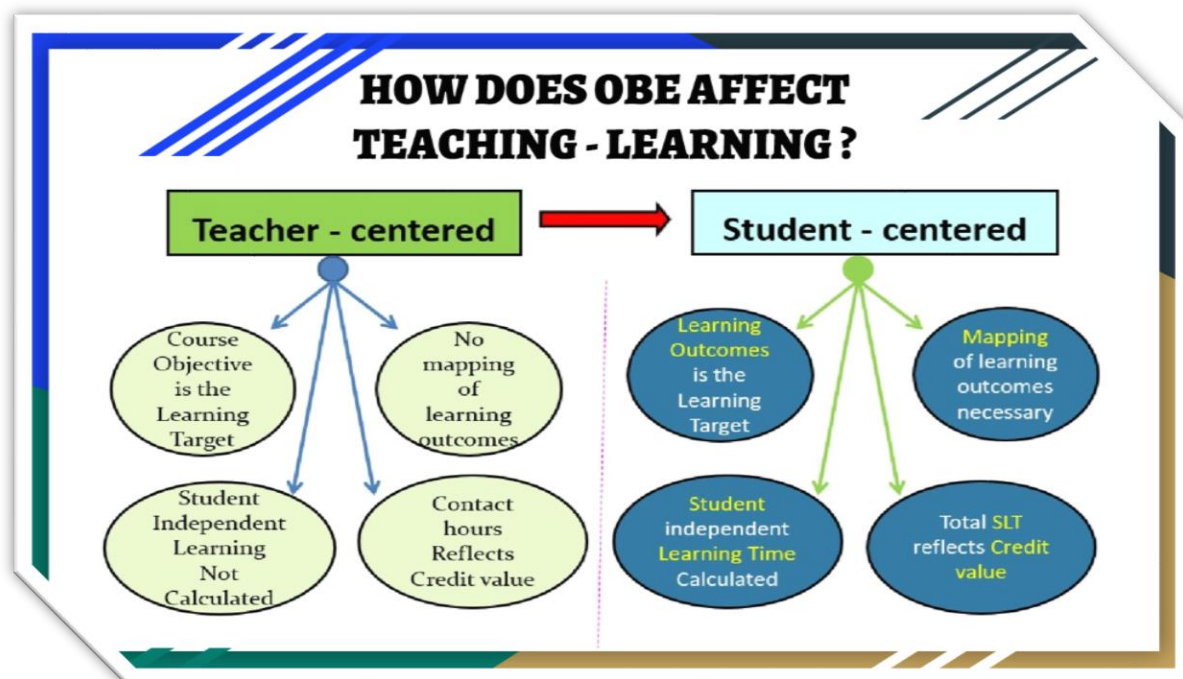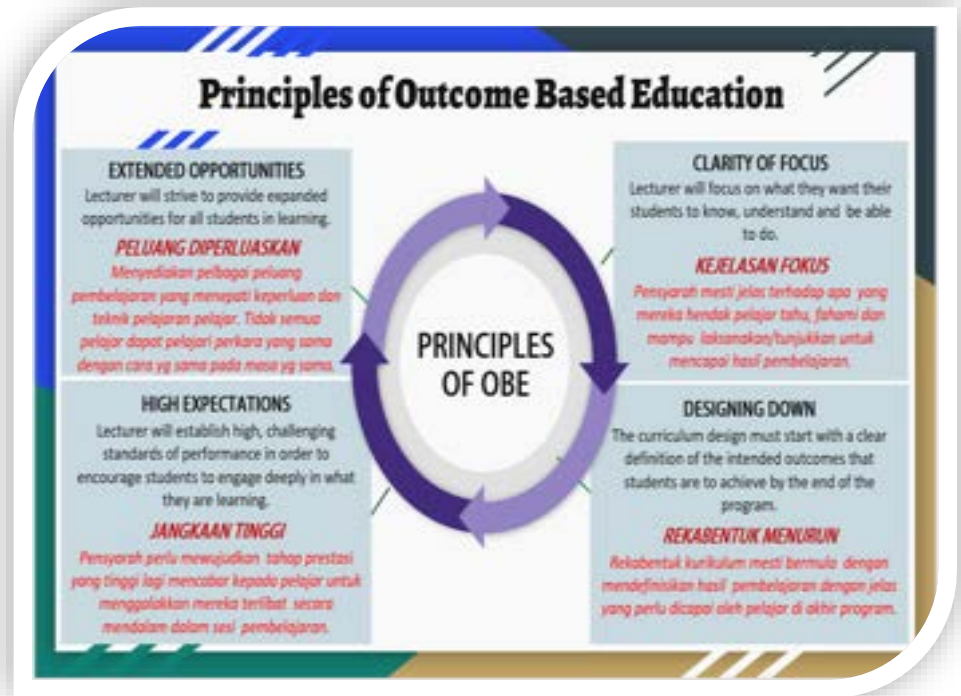
STUDENT HANDBOOK

OUTCOME BASED EDUCATION

WHAT IS OBE?

OBE is a holistic method to develop a student based on defined goals and desired outcomes. Hence, it is…
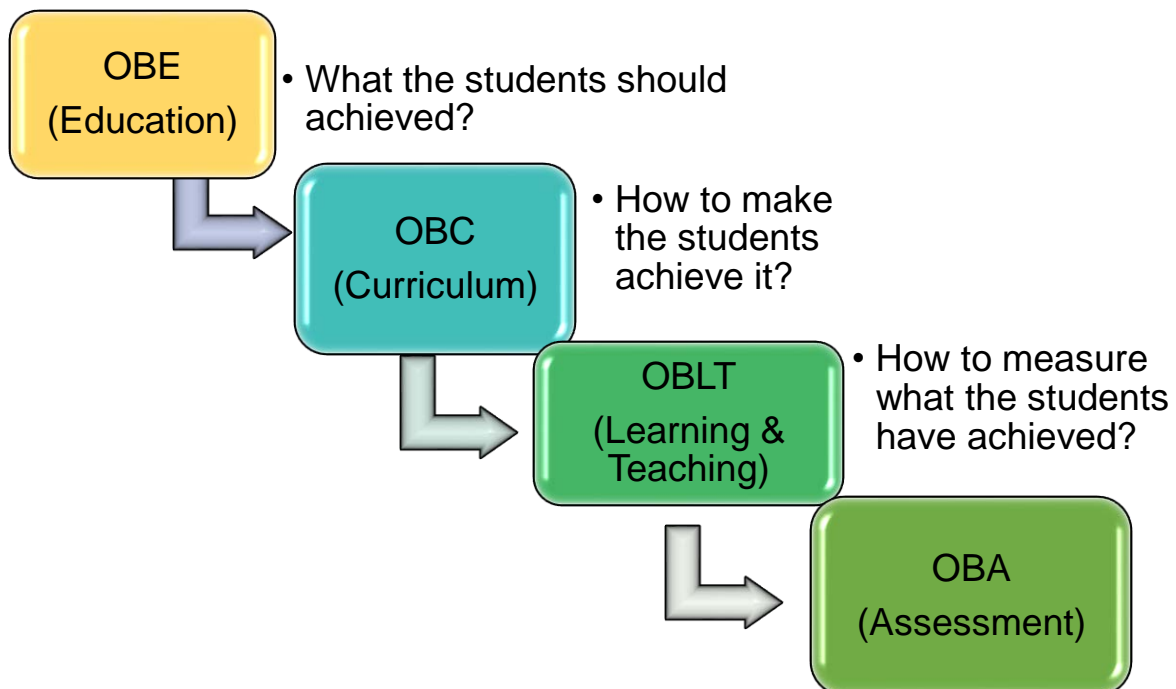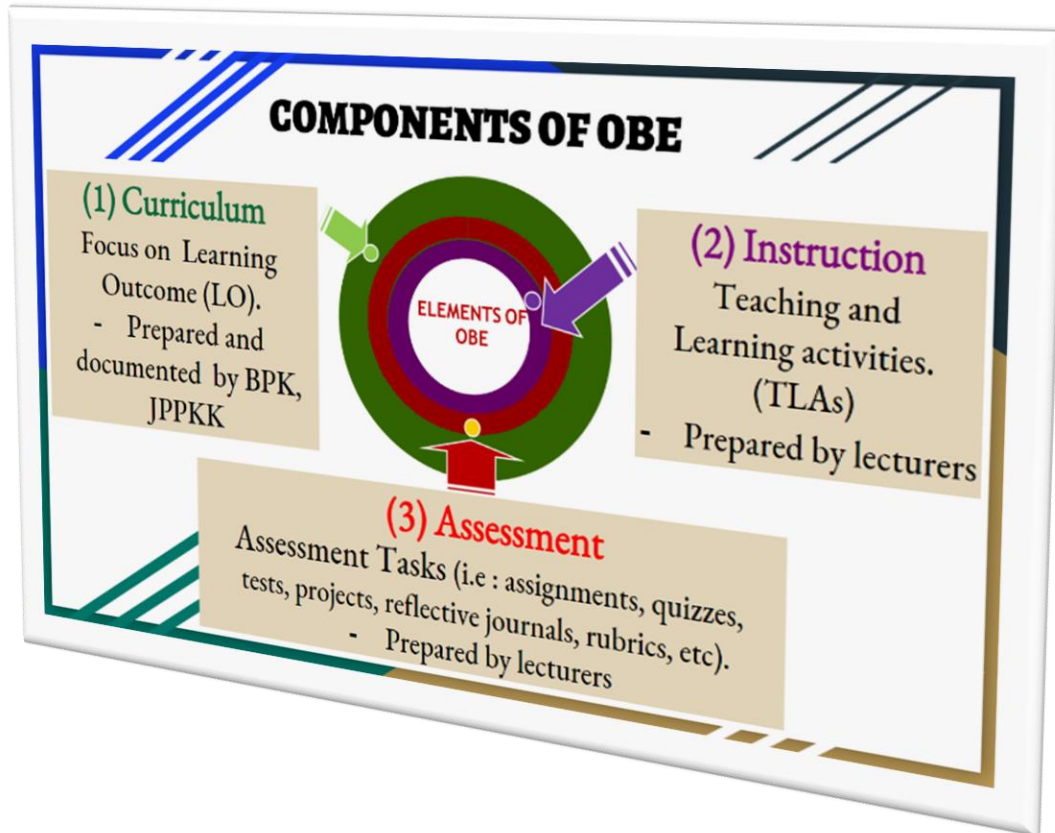
- a method of curriculum design and teaching that focuses on what students can actually **DO** after they are taught.
- Focusing on the outcomes of program implementation.

Principles of Outcome Based Education

EXTENDED OPPORTUNITIES
Lecturer will strive to provide expanded opportunities for all students in learning.

PELUANG DIPERLUASKAN
Menyediakan pelbagai peluang pembelajaran yang menepati keperluan dan teknik pelajaran pelajar. Tidak semua pelajar dapat pelajari perkara yang sama dengan cara yg sama pada masa yg sama.

CLARITY OF FOCUS
Lecturer will focus on what they want their students to know, understand and be able to do.

KEJELASAN FOKUS
Pensyarah mesti jelas terhadap apa yang mereka hendak pelajar tahu, fahami dan mampu laksanakan/tunjukkan untuk mencapai hasil pembelajaran.

PRINCIPLES OF OBE

HIGH EXPECTATIONS
Lecturer will establish high, challenging standards of performance in order to encourage students to engage deeply in what they are learning.

JANGKAAN TINGGI
Pensyarah perlu mewujudkan tahap prestasi yang tinggi lagi mencabar kepada pelajar untuk menggalakkan mereka terlibat secara mendalam dalam sesi pembelajaran.

DESIGNING DOWN
The curriculum design must start with a clear definition of the intended outcomes that students are to achieve by the end of the program.

REKABENTUK MENURUN
Rekabentuk kurikulum mesti bermula dengan mendefinisikan hasil pembelajaran dengan jelas yang perlu dicapai oleh pelajar di akhir program.

- Implemented to ensure that our academic programs, curriculum, delivery system, assessment methods and our graduates meet the requirement of international standards.

HOW DOES OBE AFFECT TEACHING - LEARNING ?

Teacher - centered → **Student - centered**

Teacher - centered:
- Course Objective is the Learning Target
- No mapping of learning outcomes
- Student Independent Learning Not Calculated
- Contact hours Reflects Credit value

Student - centered:
- Learning Outcomes is the Learning Target
- Mapping of learning outcomes necessary
- Student independent Learning Time Calculated
- Total SLT reflects Credit value

7.2 COMPONENTS OF OBE?

COMPONENTS OF OBE

(1) Curriculum
Focus on Learning Outcome (LO).
- Prepared and documented by BPK, JPPKK

ELEMENTS OF OBE

(2) Instruction
Teaching and Learning activities. (TLAs)
- Prepared by lecturers

(3) Assessment
Assessment Tasks (i.e : assignments, quizzes, tests, projects, reflective journals, rubrics, etc).
- Prepared by lecturers

OBE (Education)
- What the students should achieved?

OBC (Curriculum)
- How to make the students achieve it?

OBLT (Learning & Teaching)
- How to measure what the students have achieved?

OBA (Assessment)

Why are Learning Outcomes important?

They are essential because they:

- Define the type and depth of learning, students are expected to achieve.
- Provide an objective benchmark for formative, summative, and prior learning assessment.
- Clearly communicate expectations to learners.

Learning Outcomes

LEARNING DOMAINS	Cognitive	Affective	Psychomotor
	Evaluation	Exhibit, display, demonstrate	Naturalisation
Higher order	Synthesis		Articulation
	Analysis	organisation	Precision
	Application	Valuing	Manipulation
lower order	Comprehension	Responding	Imitation
	Knowledge	Receiving	

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STUDENT HANDBOOK

PTSB

AWARENESS OF ETAC & MQA

Overview Of ETAC

ENGINEERING TECHNOLOGY ACCREDITATION COUNCIL

ETAC is the only recognised accrediting body for engineering diploma programs offered in Malaysia and a delegated body by BEM.

Board of Engineering Malaysia (BEM) evaluates and accredits our engineering diploma programs to ensure that our graduates satisfy the minimum academic requirements and eligible to register as engineering technician with BEM or to further their study in degree level .

BEM-ETAC accreditation ensures that PTSB engineering diploma programs are substantially equivalent to the signatories of Dublin Accord which meet the international standards. Therefore, our engineering diploma graduates are recognised across the members of Dublin Accord.

DUBLIN ACCORD SIGNATORY COUNTRIES

Australia

Korea

Canada

South Africa

Ireland

United Kingdom

New Zealand

United States

MALAYSIA (represented by BEM since 2018)

8.2

Overview Of MQA

MALAYSIAN QUALIFICATIONS AGENCY

What is MQA?

MQA is a statutory body to carry out the Malaysian QUalification Framework (MQF) to **ensure the quality of Malaysia's higher education.**

MQA enforcing program accreditation to regulate the curriculum operational standards of higher learning institutions. So, when a program is fully accredited by MQA, it means that the program **meets the quality of MQA.**

The programs successfully accredited by MQA will be listed in Malaysian Qualifications Register (MQR). There are two types of accreditation; **Fully Accredited (FA) or Provisionally Accredited (PA).**

All listed accredited programs can be checked at MQR website:
https://www2.mqa. gov.my/mqr/

Why should you care if your program is accredited by MQA?

You can be assured of the quality of your education

A program accredited by MQA is an indicator of high quality assurance and complied with the MQF.

You'll be able to apply for PTPTN or other study loans

One of the requirements for PTPTN study loan is that the program must be MQA accredited. Additionally, other education loans, grants, and scholarships may also required a program that is MQA accredited.

You'll be able to work for the Government

An MQA accredited qualification is a must, if you are aspired to join the public sector. Some professional industries may also require accredited qualifications.

You'll be able to further your study at local public universities, as well as overseas.

e-LEARNING & BLENDED LEARNING

WHAT IS e-LEARNING?

In essence, e-Learning is a computer based educational tool or system that enables you to learn anywhere and at any time. e-Learning is the way of learning which connected to electronic media.
The courses are available 24 hours a day, 7 days a week, and can be access from anywhere as long as the student has the internet access, and computer or smart phone.

Advantages of Online Learning

Efficiency	Online learning has a number of tools such as videos, PDFs, podcasts, and teachers can use all these tools as part of their lesson plans
Accessibility	Allows students to attend classes from any location of their choice
Interactively	Interactive learning elements, and friendly interface
Flexibility	Able to plan study time around the rest of their day, instead of the other way around

WHAT IS BLENDED LEARNING?

Blended learning combines online delivery of educational content with the best features of classroom interaction and live instruction to personalize learning, allow thoughtful reflection and differentiate instruction from student to student across a diverse group of learners.

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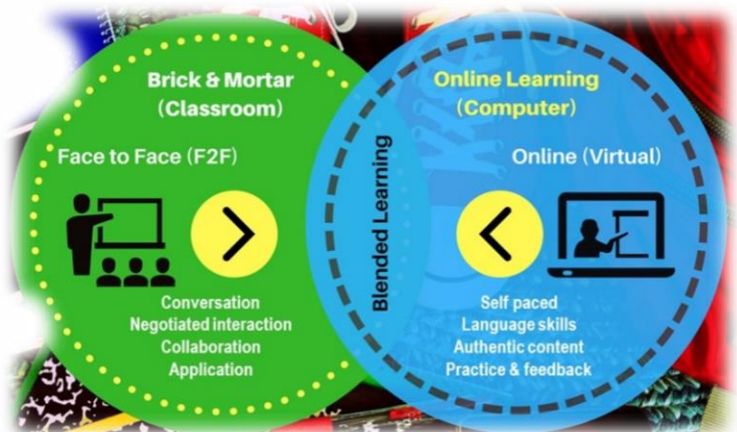
Blended learning involves:

- Courses that integrate online with face to face activities.
- Courses that are taught both in the classroom (face to face) and at a distance.
- Mixing or combining instructional technology with actual job tasks, in order to create harmonious effect of teaching and learning.
- Combining computers with traditional teaching. It is also referred to as reverse teaching, flip classroom, backwards classroom, or reverse instruction.

Learning Environment

Learning Management System (CIDOS)

Online Setting & Blended Learning

Use of Technology

Strategic Planning

Enhancing the implementation of online learning for all program in polytechnics

Improve the quality of system capabilities, infrastructure and online learning facilities at PTSB

Enhance the capability and the quality of PTSB teaching and learning delivery resources, research and innovation at PTSB

e-Learning @ptsb

EMPOWERING DIGITAL LEARNING

Digital Materials
Development and coordination of PTSB digital teaching and learning materials (ebook & TnL video)

CIDOS
Consumption empowerment of Learning Management System (LMS) CIDOS

eDOLA
Involvement and participation of lecturers and students in the CIDOS Inspiring Learning Award (eDOLA) competition

Welcome to Home of eDOLA!

TECC
Use of Technology Enable Collaborative Classroom (TECC) in TnL activities

Technology Skills
Improvement of lecturers' skills in the latest technology skills for e-Learning

9.2

PORTAL CIDOS LMS MALAYSIA

https://polycc.cidos.edu.my
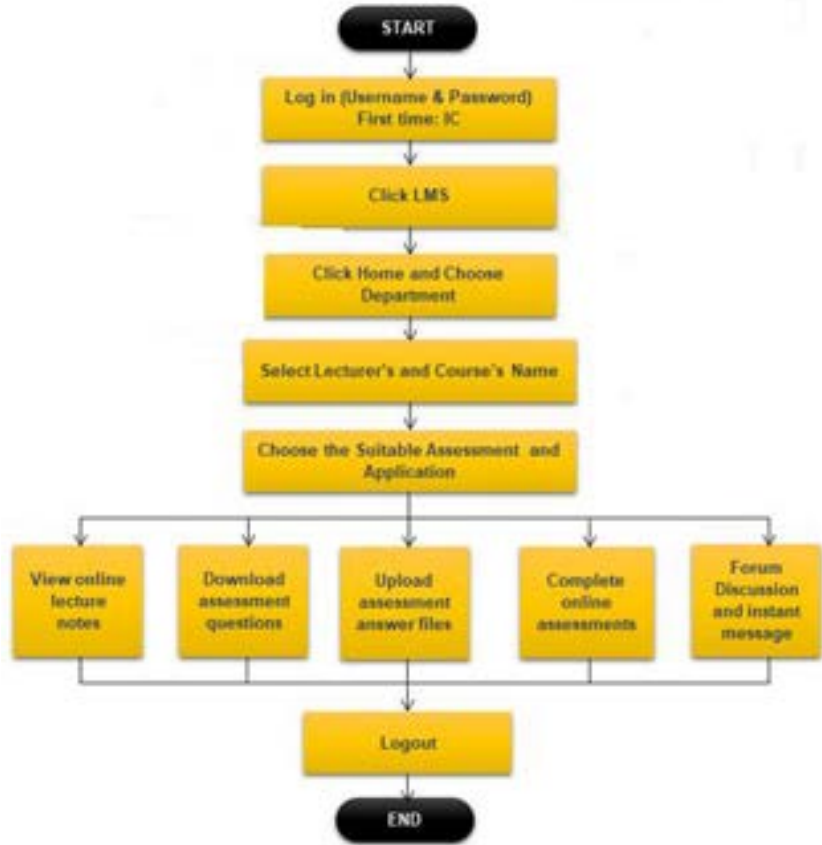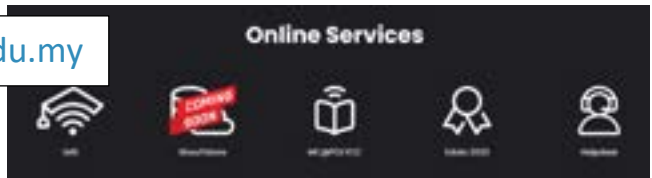
9.3 TECHNOLOGY ENABLED COLLABORATIVE CLASSROOM (TECC)

Collaborative classrooms are another tool in the educator's resource to achieve their mission of improving learning outcomes. The design of the collaborative classroom emphasizes group learning. Collaborative designs are extremely flexible and fully compatible with emerging styles of learning, including personalized learning, flipped classroom, and gamification.

POLITEKNIK

MALAYSIA

TUANKU SULTANAH BAHIYAH

STUDENT HANDBOOK

PTSB

DEPARTMENT OF ELECTRICAL ENGINEERING

10.1 ELECTRICAL ENGINEERING DEPARTMENT ORGANIZATION CHART

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10.1.1 NAME OF LECTURERS

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1	Ida Safinar Bt Aziz	EIDA	safinar@ptsb.edu.my
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22	Akma Binti Che Ishak	EAKM	akma@ptsb.edu.my
23	Anira Binti Abdul Rashid	ENIR	anira@ptsb.edu.my
24	Azizul Amri Bin Ahmad Salleh	EZUL	azizulamri@ptsb.edu.my
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32	Rahimah Binti Abdul Rahman	ERMH	rahimah@ptsb.edu.my

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No	Name	Name Code	Email
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46	Nurasykin Binti Fazil	EKIN	nurasykin@ptsb.edu.my
47	Nur Hasni Bt Marzuki	ENHM	nurhasni@ptsb.edu.my
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10.2   ENTRY REQUIREMENTS

The implementation of the policies towards achieving the targeted enrollment is oversees by the Student Admission Division with the support of Student Affairs Department in the respective polytechnics.

10.2.1 Process for Admission

Student admission is carried out twice a year, in June and December respectively during the June intake, application is done through Centralised Admission Agency at the Ministry of Higher Education via the http://upu.mohe.gov.my. Application for the December intake is opened via the Student Admission Division portal at http://politeknik.edu.my. Both intakes are done using online application procedures.

Admission requirements and all information related to admission can be obtained from the student admission portal at http://politeknik.edu.my.

10.2.2 For Malaysian Certificate of Education (SPM) holders:

- Malaysian Citizen
- Has PASSED SPM or its equivalent and meets the following minimum entry requirements:
    i.   Pass in Bahasa Melayu
    ii.   Pass in English Language
    iii. Pass in History (SPM 2013 onwards)
    iv.   THREE (3) credits for the following subjects in SPM
        - Mathematics or Additional Mathematics
        - One (1) subject from the science/technical/vocational grouping of subjects
        - Any subjects not accounted for from (i, ii, iii, & iv)
        - Or any other credit that has not been included
        - Does not have any disability that will hinder practical work.

10.2.3 Ministry of Education Malaysia (KPM) Matriculation Certificate holders:

- Malaysian Citizen
- Has PASSED the Ministry of Education's Matriculation Program

STUDENT HANDBOOK

PTSB

DIPLOMA IN ELECTRICAL & ELECTRONIC ENGINEERING

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11.1   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 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 six semesters of coursework with one full semester of industrial training.

11.2   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 sustainable energy.

11.3   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 program will enable them to participate in the job market as:-

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

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11.4   PROGRAMME AIM

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

11.5   PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The engineering programme should produce balanced TVET graduates who are:
1.   Practicing technician in electrical engineering related field.
2.   Contributing to society with professional ethic and responsibilities.
3.   Engaging in enterprising activities that apply engineering knowledge and technical skills.
4.   Engaging in activities to enhance knowledge for successful career advancement.

11.6   PROGRAMME LEARNING OUTCOMES (PLO)

Upon completion of the programme, students should be able to:
1.   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.   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.   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.   Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements.
5.   Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6).
6.   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.   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).

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8.   Understand and commit to professional ethics and responsibilities and norms of technician practice.

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

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

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

Notes:

DK1:   A descriptive, formula-based understanding of the natural sciences applicable in a sub-discipline

DK2:   Procedural mathematics, numerical analysis, statistics applicable in a subdiscipline.

DK3:   A coherent procedural formulation of engineering fundamentals required in an accepted sub-discipline.

DK4:   Engineering specialist knowledge that provides the body of knowledge for an accepted sub-discipline.

DK5:   Knowledge that supports engineering design based on the techniques and procedures of a practice area.

DK6:   Codified practical engineering knowledge in recognised practice area

DK 7:   Knowledge of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts.

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11.7   PROGRAMME STRUCTURES

Semester 1

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU24XX1	Sukan	COMP	-	0	2	0	1
MPU24XX1	Unit Beruniform 1						
DUE10012	Communicative English 1	COMP	-	1	0	2	2
DBS10012	Engineering Science	CC	-	2	1	0	2
DUW10022	Occupational, Safety & Health for Engineering	CC	-	2	0	0	2
DBM10013	Engineering Mathematics 1	CC	-	2	0	2	3
DEE10013	Measurement Devices	DC	-	2	2	0	3
DET10013	Electrical Technology	DC	-	2	2	0	3
DET10022	Electrical Wiring	DC	-	1	3	0	2
TOTAL					**26**		**18**

Semester 2

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU24XX1	Kelab/ Persatuan	COMP	-	0	2	0	1
MPU24XX1	Unit Beruniform 2		MPU24XX1				
MPU21032	Penghayatan Etika dan Peradaban	COMP	-	1	0	2	2
DBM20023	Engineering Mathematics 2	CC	DBM10013	2	0	2	3
DEE20033	Digital Electronics	DC	-	2	2	0	3
DEC20012	Fundamental Programming	DC	-	1	2	0	2
DET20033	Electrical Circuits	DC	DET10013	2	2	0	3
DEE20023	Semiconductor Devices	DC	-	2	2	0	3
TOTAL					**24**		**17**

Semester 3

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUE 30022	Communicative English 2	COMP	DUE10012	1	0	2	2
DBM30043	Electrical Engineering Mathematics	CC	DBM20023	2	0	2	3
DEE30043	Electronic Circuits	DC	-	2	2	0	3
DEE30061	Computer Aided Electrical Drawing	DC	-	0	2	0	1
DEE30071	Electronic Computer Aided Design	DC	-	0	2	0	1
DEE30052	Electronic Equipment Repair	DC	DEE20023	1	3	0	2
DET30053	Power System	DC	DET20033	2	2	0	3
DEP30013	Communication System Fundamentals	DC	-	2	2	0	3
TOTAL					27		18

Semester 4

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUE50032	Communicative English 3	COMP	DUE30022	1	0	2	2
MPU22012	Entrepreneurship	COMP	-	1	0	2	2
DEC40053	Embedded System Application	DC	DEC20012	2	2	0	3
DEC30023	Computer Networking Fundamentals	DC	-	2	2	0	3
DEJ40033	Programmable Logic Controller (PLC) and Automation	DC	-	2	2	0	3
DEE40082	Project 1	CC	-	1	2	0	2
	Elective 1	DC	-	0	0	0	2
TOTAL					21		17

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Semester 5

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU23052	Sains Teknologi & Kejuruteraan Islam	COMP		1	0	2	2
MPU23042	Nilai Masyarakat Malaysia						
DEE50102	Project 2	DC	DEE40082	0	3	0	2
DET30043	Electrical Machine	DC	-	2	2	0	3
DET40073	Power Electronics	DC	-	2	2	0	3
DEG30013	Fundamental of Renewable Energy	DC	-	2	2	0	3
	Elective 2			0	0	0	2
TOTAL					**18**		**15**

Semester 6

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUT600610	Engineering Industrial Training	DC	-	0	0	0	10
TOTAL					**0**		**10**

11.8   COURSE SYNOPSIS & COURSE LEARNING OUTCOMES (CLO)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	MPU24XX1 SUKAN	**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. **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus yang berkaitan. (P2,CLS 4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif.(A3, CLS 3d)
1	MPU24XX1 UNIT BERUNIFORM 1	**UNIT BERUNIFORM 1** 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. **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus yang berkaitan. (P2,CLS 4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif.(A3, CLS 3d)
1	DUE10012 Communicative English 1	**COMMUNICATIVE ENGLISH 1** focuses on developing students' speaking skills to enable them to communicate effectively and confidently in group discussions and in a variety of social interactions. It is designed to provide students with appropriate reading skills to comprehend a variety of texts. The students are equipped with effective presentation skills as a preparation for academic and work purposes. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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 current issues. (A3, CLS 3b) 3. Present a topic of interest that carries identifiable values coherently using effective verbal and non-verbal communication skills. (A2, CLS 4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Use basic physics concept to solve engineering physics problems (C3, CLS 1) 2. Apply knowledge of fundamental physics in activities to mastery physics concept (C3, CLS 1) 3. Perform appropriate activities related to physics concept (P3, CLS 3a).
1	**DBM10013 Engineering Mathematics 1**	**ENGINEERING MATHEMATICS 1** exposes students to the basic algebra including resolve partial fractions. This course also covers the concept of trigonometry and the method to solve trigonometry problems by using basic identities, compound angle and double angle formulae. Students will be introduced to the theory of complex number and concept of vector and scalar. Students will explore advanced matrices involving 3x3 matrix. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Use mathematical statement to describe relationship between various physical phenomena.(C3, CLS 1) 2. Show mathematical solutions using the appropriate techniques in mathematics.(C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	**DUW10022** Occupational, Safety & Health for Engineering	**OCCUPATIONAL, SAFETY AND HEALTH FOR ENGINEERING** course is designed to impart understanding of the self-regulatory concepts and provisions under the Occupational Safety & Health Act (OSHA). This course presents the responsibilities of workers in implementing and complying with the safety procedures at work. Understanding of notifications of accidents, dangerous occurrence, poisoning and diseases and liability for offences will be imparted upon students. This course will also provide an understanding of the key issues in OSH Management, Incident Prevention, Fire Safety, Hazard Identification Risk Control and Risk Assessment (HIRARC), Workplace Environment and Ergonomics and guide the students gradually into this multi-disciplinary science. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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.(A3, PLO8) 3. Demonstrate communication skill in group to explain the factor that can lead to accident in workplace.(A3, PLO10)
1	**DET10022** Electrical Wiring	**ELECTRICAL WIRING** course exposes students to the various aspects of wiring installation according to the MS IEC 60364 standard. Students will be able to relate theoretical aspect in practical work on electrical wiring during workshop 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. **CREDIT(S) : 2** **PRE REQUISITE(S) : NONE**	1. Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to MS IEC 60364. (C3, PLO1) 2. Construct single phase domestic wiring according to MS IEC 60364. (P4, PLO5) 3. Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms during performing single phase domestic wiring task. (A3, PLO8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	**DEE 10013 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 and AC 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 . **CREDIT(S) : 3** **PRE REQUISITE(S) : NONE**	1. Apply the concept of measurement in electrical and electronic equipment using appropriate theorem.(C3, PLO1) 2. Perform meter calibrating and measuring technique using the correct measuring equipment.(P4, PLO5) 3. Demonstrate good communication skill in oral presentation with in stipulated time frame .(A3, PLO10)
1	**DET10013 Electrical Technology**	**ELECTRICAL TECHNOLOGY** course will introduce students to the principles related to DC electrical circuits. It covers the fundamental laws, theorems and circuit techniques of the electrical technology basic fundamental. This course also covers inductor, capacitor, magnetic and electromagnetic circuits. **CREDIT(S) : 3** **PRE REQUISITE(S) : 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, PLO1) 2. Construct DC circuit and measure related electrical parameters using appropriate electrical equipments (P4, PLO5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame**.** (A3, PLO9)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	MPU21032 Penghayatan Etika Dan Peradaban	**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 alam sekitar daripada perspektif etika dan peradaban dapat melahirkan pelajar yang bermoral dan profesional. Penerapan amalan pendidikan berimpak tinggi (HIEPs) yang bersesuaian digunakan dalam penyampaian kursus ini. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Membentangkan konsep etika dan peradaban dalam kepelbagaian tamadun. (A2, CLS5) 2. Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia. (A2,CLS5) 3. Mencadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban. (A3, CLS4)
2	MPU24XX1 Kelab/Persatuan	**KELAB/PERSATUAN** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus berkaitan.(P3, CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)
2	MPU24XX1 Unit Beruniform 2	**UNIT BERUNIFORM 2** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif **CREDIT(S) : 1** **PRE-REQUISITE(S) : MPU24XX1**	1. Mempamerkan kemahiran khusus bagi kursus berkaitan.(P3, CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	DBM20023 Engineering Mathematics 2	**ENGINEERING MATHEMATICS 2** exposes students to the basic laws of indices and logarithms. This course introduces the basic rules of differentiation concepts to solve problems that relates maximum, minimum and calculate the rates of changes. This course discusses integration concepts in order to strengthen student's knowledge for solving area and volume bounded region problems. In addition, students will learn application of both techniques of differentiation and integration. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DBM10013**	1. Use algebra and calculus knowledge to describe relationship between various physical phenomena.(C3, CLS 1) 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)
2	DEE20023 Semiconductor Devices	**SEMICONDUCTOR DEVICES** introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistors and field effect transistors. The content encompasses devices structure to biasing basic applications **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem. (C3, PLO2) 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, PLO10)
2	DEE20033 Digital Electronics	**DIGITAL ELECTRONICS** introduces the theories on the basic of digital systems.This course emphasizes on the digital system fundamentals and applications. Thiscourse mainly covers number systems, code systems, logic gates, Boolean operations,flip-flops, counters and registers. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit (C3, PLO1) 2. Construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop .(P4,PLO5) 3. Demonstrate ability to work in team to complete assigned task during practical work sessions.(A3, PLO9)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	DEC20012 Programming Fundamentals	**PROGRAMMING FUNDAMENTALS** course provides the skills necessary for the effective of application of computation and computer programming in engineering applications. Students will develop their programming skills through a variety of assignments and labs and by reviewing case studies and example programs. The learning outcome is proficiency in writing small to medium programs in a procedural programming language. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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,PLO1) 2. Build programs written in C language for assigned mini project during practical work sessions. (P4, PLO5) 3. Demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project. (A3, PLO12)
2	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 three phase system and operation of various types of transformers. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DET10013**	1. Apply the concept and principle in solving problems of electrical circuits using the appropriate AC electrical laws and theorem (C3,PLO1) 2. Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4,PLO5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO9)
3	DUE30022 Communicative English 2	**COMMUNICATIVE ENGLISH 2** emphasises the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints. **CREDIT(S): 2** **PRE-REQUISITE(S) : DUE10012**	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 effective communication and social skills in handling enquiries and complaints amicably and professionally. (A3, CLS 3b)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	DBM30043 Electrical Engineering Mathematics	**ELECTRICAL ENGINEERING MATHEMATICS** exposes students to the statistical and probability concepts and their applications in interpreting data. The course also introduces numerical methods concept to solve simultaneous equations by using Gaussian Elimination method, LU Decomposition using Doolittle and Crout methods, polynomial problems using Simple Fixed Point Iteration methods and Newton Raphson method. In additional, the course also discuss Ordinary Differential Equation (ODE). In order to strengthen the students in solving engineering problems, Laplace Transform by using the Table of Laplace is also included. It is designed to build students' teamwork and problems solving skill. **CREDIT(S) : 3 PRE-REQUISITE(S) : DBM20023**	1. Demonstrate an understanding of the common body of knowledge in mathematics. (C3, CLS 1) 2. Demonstrate problems solving skills in engineering problems.(C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically.(A3, CLS 3b)
3	DEE30061 Computer Aided Electrical Drawing	**COMPUTER AIDED ELECTRICAL DRAWING** provides knowledge and exposure on the usage of AutoCAD software. The course focuses on the application of the software to produce drawings of graphics, electrical / electronic component symbols, circuit schematics and electrical wiring layout diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software. **CREDIT(S): 1 PRE-REQUISITE(S): NONE**	1. Apply computer aided design concept, applications and capabilities in electrical engineering environment .(C3, PLO1) 2. Construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American/British technical symbol standard .(P4, PLO5) 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, PLO8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	**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 mixed-signal circuits using various types of simulation analysis. Printed Circuit Board (PCB) layout is then produced for the circuits. The simulation and the PCB layout are done using electronic software package such as Protel / Altium Designer, ORCAD, PSpice, Circuit Maker or Electronic Workbench. **CREDIT(S): 1** **PRE-REQUISITE(S): NONE**	1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations (C3, PLO1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO5)
3	**DEE30052** Electronic Equipment Repair	**ELECTRONIC EQUIPMENT REPAIR** provides the knowledge and skills on troubleshooting and repairing the electronics equipment. This course focuses on the identification of faults in regulated dc power supply, audio equipment and television system. This course also provides knowledge and skills on troubleshooting and repairing broken cell phones. **CREDIT (S) : 2** **PREREQUISITE (S) : DEE20023**	1. Diagnose fault of electronic equipment related to electronic equipment repair using the correct diagnosis technique and tools. (C4, PLO2) 2. Fix the post-consumer's electronic equipment fault using the correct diagnosis technique. (P4, PLO5) 3. Fix the electronic equipment fault using the correct diagnosis technique . (P4, PLO5) 4. Demonstrate good social responsibility in solving well defined engineering problems during performing electronic system and appliances maintenance task. (A3, PLO6)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	DEE30043 Electronic Circuits	**ELECTRONIC CIRCUITS** emphasizes the concept of electronic device applications. The course covers the fundamental of electronic circuit application which include power supply unit, oscillator, operational amplifier, timer, filters and AD/DA converters. The content cover circuit configurations, operation and application of the electronic circuits. **CREDIT(S): 3** **PRE-REQUISITE(S) : NONE**	1. Apply the principles of electronic circuits devices by using block diagram or circuit diagram. (C3, PLO1) 2. Construct the various applications of electronic circuits based on the theory and principle operation of the circuits(P4, PLO5) 3. Demonstrate good written communication skill through essay writing in group within a stipulated time frame.(A3, PLO10)
3	DEP30013 Communication System Fundamentals	**COMMUNICATION SYSTEM FUNDAMENTALS** introduces the students to the concepts of communication system. This course covers the principles of communications, analog and digital modulation techniques, multiplexing and transmission medium. It also exposes the students to the basic data communication systems. **CREDIT (S) : 3** **PREREQUISITE (S) : NONE**	1. Apply the concept of electronic communication system by using appropriate diagram and standard formula. (C3, PLO1) 2. Assemble the related communication equipment systematically in performing the measurement of appropriate signal parameter. (P4,P LO5) 3. Demonstrate ability to work in a team to complete assigned tasks during practical work sessions (A3, PLO9)
3	DET30053 Power System	**POWER SYSTEM** course will provide students with the concepts of non-renewable and renewable energy. It also annotate on the environmentally friendly electrical power generation, transmission, distribution and consumerization of the electrical power. **CREDIT (S) : 3** **PREREQUISITE (S) : DET20033**	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, PLO1) 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 methodes of transmission and distribution system. (A3, PLO7)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	DUE50032 Communicative English 3	**COMMUNICATIVE ENGLISH 3** aims to develop the necessary skills in students to analyse and interpret graphs and charts from data collected as well as to apply the job hunting mechanics effectively in their related fields. Students will learn to gather data and present them through the use of graphs and charts. Students will also learn 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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : DUE30022**	1. Present gathered data in graphs and charts effectively using appropriate language forms and functions.(A2, CLS 3b) 2. Prepare a high impact resume and a 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)
4	MPU22012 Entrepreneurship	**ENTERPRENEUSHIP** focuses on the fundamentals and concept of entrepreneurship in order to inculcate the value and interest in students to choose entrepreneurship as a career. This course can help students to initiate creative and innovative entrepreneurial ideas. It also emphasizes a preparation of a business plan framework through business model canvas. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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. Organise the online presence business in social media marketing platform. (A3, CLS 4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	DEC40053 Embedded System Application	**EMBEDDED SYSTEM APPLICATION** cover the basic concept and application of microcontroller system based on Peripheral Interface Controller (PIC) microcontroller. Students will learn software and hardware development on PIC16F/PIC18F microcontroller development system and understand how to do interfacing with external devices using suitable internal chip features. Students are exposed to the new Microcontroller Unit (MCU) simulation software such as Proteus. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DEC20012**	1. Investigate internal features of PIC16F/PIC18F to interface properly with external devices.(C4, PLO4) 2. Design embedded system application based on PIC16F/PIC18F microcontroller effectively.(C6, PLO3) 3. Construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively.(P4, PLO5) 4. Demonstrate knowledge of engineering project management principles through a written report on an assigned mini project. (A3, PLO11)
4	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, programming, constructing and PLC maintenance method. This course also provides knowledge and skills in designing environmentally friendly of automation control system based on conventional/hardwired/relay ladder logic (RLL) and PLC. **CREDIT (S) : 3** **PREREQUISITE (S) : NONE**	1. Explain clearly blocks, parts, components and instructions found in the automation systems. (C2,PLO1) 2. Design simple automation sequential control using electromechanical devices and PLC.(C5, PLO4)3. 3. Display the ability to do troubleshooting and maintenance of hardwired and PLC systems using appropriate equipment. (P4, PLO5) 4. Demonstrate understanding of PLC automation system norm and standard which are IEC and NEMA standards during practical work session. (A3, PLO10)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	DEE40082 Project 1	**PROJECT 1** provides knowledge regarding the implementation and development methods of a project based on hardware or software or a combination of hardware and software. This course provides exposure to the project management and finance, techniques to develop project and proposal preparation. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Investigate well defined problem in order to make improvements on 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, PLO2) 3. Perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically. (P4, PLO5) 4. Display good project management and finance through a Gantt Chart (milestone) and final proposal.(A3, PLO11) 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, PLO12) 6. Display written communication skill through a final proposal.(A3, PLO10) 7. Describe the impact of the proposed project to the society in the final proposal.(A3, PLO6)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	DEC30023 Computer Networking Fundamentals	**COMPUTER NETWORKING FUNDAMENTALS** introduce students to the concepts and principles of data transmission and computer networks. This course enables students to correctly use standard terminology in describing the main Local Area Network (LAN) topologies, hardware and software components used in networking. This course provides students with the knowledge and skills to build a network infrastructure using copper cabling, and wireless devices wisely. Students also learn to troubleshoot and secure the network. **CREDIT (S)　　: 3** **PREREQUISITE (S) : NONE**	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, PLO5) 3. Demonstrate awareness of the norm practice of professional bodies such as IEEE or TIA/EIA-568-A/B during practical work session.(A3, PLO8)
5	MPU23052 Sains Teknologi & Kejuruteraan Islam*	**SAINS TEKNOLOGI & 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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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. Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam.(A4, CLS 4)
5	MPU23042 Nilai Masyarakat Malaysia**	**NILAI MASYARAKAT MALAYSIA** membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran- cabaran dalam membentuk masyarakat Malaysia5. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia. (A2, CLS 4) 2. Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotisme masyarakat Malaysia (A3, CLS 5) 3. Menghubungkait minda ingin tahu dengan cabaran-cabaran dalam membentuk masyarakat Malaysia. (A4, CLS 4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	DET40073 Power Electronics	**POWER ELECTRONICS** course is aimed to equip students with the knowledge and skills related to power electronic devices and its application in power conversion. This course also will focus on the operational principle of rectifiers, choppers, inverters and AC voltage controller circuits. Emphasis is given more on producing the output voltage waveforms of the converters. **CREDIT (S) : 3** **PREREQUISITE (S) : NONE**	1. Analyze and investigate the well-defined operational behaviour, 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 leadership skills to complete assigned power electronics tasks.(A3, PLO9)
5	DEE50102 Project 2	**PROJECT 2** is the continuation of DEE40082 PROJECT 1 course. The course focuses on methods of circuit construction, testing, troubleshooting, debugging, repair and also completion of the project which was planned during the previous semester. This course also requires students to manage an economical engineering based project, prepare a project report in a given format and deliver a project presentation at the end of the semester. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course. **CREDIT(S) : 2** **PRE-REQUISITE(S) : DEE40082**	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)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	DEG30013 Fundamental of Renewable Energy	**FUNDAMENTAL OF RENEWABLE ENERGY** course is aimed to provide students with the knowledge and skills related to meet the demands of the new economy that will rely on the primary source. The focus is on the renewable energy sources such as solar, wind, bioenergy, geothermal, hydroelectric, tidal and fuel cell. The importance and public benefits of renewable energy used and the environmental impact of renewable energy technologies will also be discussed. **CREDIT(S) : 3** **PRE-REQUISITE(S) : 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)
5	DET 30043 Electrical Machine	**ELECTRICAL MACHINE** course expose students to the basic construction, principle of operation and control of various type of motor and generator. This course provides students with the basic knowledge and skills to solve various problem related to motors and generators. **CREDIT (S) : 3** **PREREQUISITE (S) : NONE**	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 equipments. (P4, PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks.(A3, PLO9)

POLITEKNIK MALAYSIA
TUANKU SULTANAH BAHIYAH

STUDENT HANDBOOK

PTSB

DIPLOMA IN ELECTRONIC ENGINEERING (COMMUNICATION)

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12.1   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 Higher Education 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. Students are prepared for their future roles in the economy by building a solid foundation in technical knowledge and the necessary skills related to the field of electronic communication engineering.

12.2   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.

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12.3   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

12.4   PROGRAMME AIMS

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

12.5   PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The engineering programme should produce balanced TVET graduates who are:

1.   Practicing technician in electrical engineering related field

2.   Contributing to society with professional ethic and responsibilities

3.   Engaging in enterprising activities that apply engineering knowledge and technical skills

4   Engaging in activities to enhance knowledge for successful career advancement

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12.6   PROGRAMME LEARNING OUTCOMES (PLO)

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

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

5.   Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)

6.   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.   Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)

8.   Understand and commit to professional ethics and responsibilities and norms of technician practice

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

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

12.   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 sub discipline

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 recognized practice area

DK 7: Knowledge of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts

12.7   PROGRAMME STRUCTURES

Semester 1

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUE10012	Communicative English 1	Comp	-	1	0	2	2
MPU24XX1 MPU24XX1	Sukan Unit Beruniform 1	Comp	-	0	2	0	1
DUW10022	Occupational, Safety and Health for Engineering	CC	-	2	0	0	2
DBM10013	Engineering Mathematics 1	CC	-	2	0	2	3
DBS10012	Engineering Science	CC	-	2	1	0	2
DET10013	Electrical Technology	DC	-	2	2	0	3
DET10022	Electrical Wiring	DC	-	1	3	0	2
DEE10013	Measurement Devices	DC	-	2	2	0	3
TOTAL					26		18

Semester 2

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU21032	Penghayatan Etika dan Peradaban	Comp	-	1	0	2	2
MPU24XX1	Kelab/Persatuan	Comp	-	0	2	0	1
MPU24XX1	Unit Beruniform 2	Comp	MPU24XX1				
DBM20023	Engineering Mathematics 2	CC	DBM10013	2	0	2	3
DET20033	Electrical Circuits	DC	DET10013	2	2	0	3
DEE20023	Semiconductor Devices	DC	-	2	2	0	3
DEE20033	Digital Electronics	DC	-	2	2	0	3
DEC20012	Programming Fundamentals	DC	-	1	2	0	2
TOTAL					24		17

Semester 3

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUE30022	Communicative English 2	Comp	DUE10012	1	0	2	2
DBM30043	Electrical Engineering Mathematics	CC	DBM20023	2	0	2	3
DEE30043	Electronic Circuits	DC	-	2	2	0	3
DEE30052	Electronic Equipment Repair	DC	DEE20023	1	3	0	2
DEE30071	Electronic Computer Aided Design	DC	-	0	2	0	1
DEP30013	Communication System Fundamentals	DC	-	2	2	0	3
DEP30083	Telecommunication Network	S	-	2	2	0	3
TOTAL					25		17

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Semester 4

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUE50032	Communicative English 3	Comp	DUE30022	1	0	2	2
MPU22012	Entrepreneurship	Comp	-	1	0	2	2
DEC40053	Embedded System Application	DC	DEC20012	2	2	0	3
DEP40053	Fibre Optic Communication System	S	-	2	2	0	3
DEE40113	Signal and System	S	DBM20023	2	2	0	3
DEE40082	Project 1	S	-	1	2	0	2
	Elective 1	E	-	0	0	0	2
TOTAL					21		17

Semester 5

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU23052 MPU23042	Sains Teknologi dan Kejuruteraan Islam* Nilai Masyarakat Malaysia**	Comp	-	1	0	2	2
DEE30061	Computer Aided Electrical Drawing	DC	-	0	2	0	1
DEP50033	Data Communication and Networking	S	DEP30013	2	2	0	3
DEP50043	Microwave Devices	S	-	2	2	0	3
DEP50063	Wireless Communication	S	-	2	2	0	3
DEE50102	Project 2	S	DEE40082	0	3	0	2
	Elective 2	E	-	0	0	0	2
TOTAL					20		16

Semester 6

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUT600610	Engineering Industrial Training		-	0	0	0	10
TOTAL					0		10

12.8 COURSE SYNOPSIS & COURSE LEARNING OUTCOMES (CLO)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	DUE10012 Communicative English 1	**COMMUNICATIVE ENGLISH 1** focuses on developing students' speaking skills to enable them to communicate effectively and confidently in group discussions and in a variety of social interactions. It is designed to provide students with appropriate reading skills to comprehend a variety of texts. The students are equipped with effective presentation skills as a preparation for academic and work purposes. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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 current issues. (A3, CLS 3b) 3. Present a topic of interest that carries identifiable values coherently using effective verbal and non-verbal communication skills. (A2, CLS 4)
1	MPU24XXX1 Sukan	**SUKAN** adalah aktiviti yang mengandungi latihan kemahiran berguna secara rekreasi dan peraturan-peraturan tertentu dalam mengejar kecemerlangan bagi penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus yang berkaitan. (P2,CLS 4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif. (A3, CLS 3d)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	MPU24XX1 Unit Beruniform 1	**UNIT BERUNIFORM 1** 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. **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus yang berkaitan. (P2,CLS 4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif. (A3, CLS 3d)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) **Upon completion of this course students should be able to :**
1	**DUW10022** **Occupational, Safety & Health for Engineering**	**OCCUPATIONAL, SAFETY AND HEALTH FOR ENGINEERING** course is designed to impart understanding of the self-regulatory concepts and provisions under the Occupational Safety & Health Act (OSHA). This course presents the responsibilities of workers in implementing and complying with the safety procedures at work. Understanding of notifications of accidents, dangerous occurrence, poisoning and diseases and liability for offences will be imparted upon students. This course will also provide an understanding of the key issues in OSH Management, Incident Prevention, Fire Safety, Hazard Identification Risk Control and Risk Assessment (HIRARC), Workplace Environment and Ergonomics and guide the students gradually into this multi-disciplinary science. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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. (A3, PLO8) 3. Demonstrate communication skill in group to explain the factor that can lead to accident in workplace. (A3, PLO10)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	DBM10013 Engineering Mathematics 1	**ENGINEERING MATHEMATICS 1** exposes students to the basic algebra including resolve partial fractions. This course also covers the concept of trigonometry and the method to solve trigonometry problems by using basic identities, compound angle and double angle formulae. Students will be introduced to the theory of complex number and concept of vector and scalar. Students will explore advanced matrices involving 3x3 matrix. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Use mathematical statement to describe relationship between various physical phenomena (C3, CLS 1) 2. Show mathematical solutions using the appropriate techniques in mathematics.(C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)
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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Use basic physics concept to solve engineering physics problems (C3, CLS 1) 2. Apply knowledge of fundamental physics in activities to mastery physics concept (C3, CLS 1) 3. Perform appropriate activities related to physics concept (P3, CLS 3a).

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	DET10013 Electrical Technology	**ELECTRICAL TECHNOLOGY** course will introduce students to the principles related to DC electrical circuits. It covers the fundamental laws, theorems and circuit techniques of the electrical technology basic fundamental. This course also covers inductor, capacitor, magnetic and electromagnetic circuits. **CREDIT(S) : 3** **PRE-REQUISITE(S) : 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)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	DET10022 Electrical Wiring	**ELECTRICAL WIRING** course exposes students to the various aspects of wiring installation according to the MS IEC 60364 standard. Students will be able to relate theoretical aspect in practical work on electrical wiring during workshop 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. **CREDIT(S) : 2** **PRE REQUISITE(S) : NONE**	1. Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to MS IEC 60364. (C3, PLO1) 2. Construct single phase domestic wiring according to MS IEC 60364. (P4, PLO5) 3. Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms during performing single phase domestic wiring task. (A3, PLO8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) **Upon completion of this course students should be able to :**
1	**DEE 10013** **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 and AC 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. **CREDIT(S) : 3** **PRE REQUISITE(S) : NONE**	1. Apply the concept of measurement in electrical and electronic equipment using appropriate theorem. (C3, PLO1) 2. Perform meter calibrating and measuring technique using the correct measuring equipment. (P4, PLO5) 3. Demonstrate good communication skill in oral presentation with in stipulated time frame. (A3, PLO10)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) **Upon completion of this course students should be able to :**
2	**MPU21032** Penghayatan Etika dan Peradaban	**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 alam sekitar daripada perspektif etika dan peradaban dapat melahirkan pelajar yang bermoral dan profesional. Penerapan amalan pendidikan berimpak tinggi (HIEPs) yang bersesuaian digunakan dalam penyampaian kursus ini.. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Membentangkan konsep etika dan peradaban dalam kepelbagaian tamadun. (A2, CLS5) 2. Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia. (A2,CLS5) 3. Mencadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban. (A3, CLS4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	MPU24XX1 Kelab/Persatuan	**KELAB/PERSATUAN** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus berkaitan.(P3, CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)
2	MPU24XX1 Unit Beruniform 2	**UNIT BERUNIFORM 2** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif **CREDIT(S) : 1** **PRE-REQUISITE(S): MPU24XX1**	1. Mempamerkan kemahiran khusus bagi kursus berkaitan. (P3, CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif. (A3, CLS 3d)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	DBM20023 Engineering Mathematics 2	**ENGINEERING MATHEMATICS 2** exposes students to the basic laws of indices and logarithms. This course introduces the basic rules of differentiation concepts to solve problems that relates maximum, minimum and calculate the rates of changes. This course discusses integration concepts in order to strengthen student's knowledge for solving area and volume bounded region problems. In addition, students will learn application of both techniques of differentiation and integration. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DBM10013**	1. Use algebra and calculus knowledge to describe relationship between various physical phenomena. (C3, CLS 1) 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)
2	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 three phase system and operation of various types of transformers. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DET10013**	1. Apply the concept and principle in solving problems of electrical circuits using the appropriate AC electrical laws and theorem. (C3,PLO1) 2. Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4,PLO5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO9)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	DEE20023 Semiconductor Devices	**SEMICONDUCTOR DEVICES** introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistors and field effect transistors. The content encompasses devices structure to biasing basic applications **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem. (C3, PLO2) 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, PLO10)
2	DEE20033 Digital Electronics	**DIGITAL ELECTRONICS** introduces the theories on the basic of digital systems.This course emphasizes on the digital system fundamentals and applications. Thiscourse mainly covers number systems, code systems, logic gates, Boolean operations, flip-flops, counters and registers. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit. (C3, PLO1) 2. Construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop. (P4,PLO5) 3. Demonstrate ability to work in team to complete assigned task during practical work sessions. (A3, PLO9)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) **Upon completion of this course students should be able to :**
2	**DEC20012** **Programming Fundamentals**	**PROGRAMMING FUNDAMENTALS** course provides the skills necessary for the effective of application of computation and computer programming in engineering applications. Students will develop their programming skills through a variety of assignments and labs and by reviewing case studies and example programs. The learning outcome is proficiency in writing small to medium programs in a procedural programming language. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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,PLO1) 2. Build programs written in C language for assigned mini project during practical work sessions. (P4, PLO5) 3. Demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project. (A3, PLO12)
3	**DUE30022** **Communicative English 2**	**COMMUNICATIVE ENGLISH 2** emphasises the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints. **CREDIT(S): 2** **PRE-REQUISITE(S) : DUE10012**	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 effective communication and social skills in handling enquiries and complaints amicably and professionally. (A3, CLS 3b)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) **Upon completion of this course students should be able to :**
3	**DBM30043** **Electrical Engineering Mathematics**	**ELECTRICAL ENGINEERING MATHEMATICS** exposes students to the statistical and probability concepts and their applications in interpreting data. The course also introduces numerical methods concept to solve simultaneous equations by using Gaussian Elimination method, LU Decomposition using Doolittle and Crout methods, polynomial problems using Simple Fixed Point Iteration methods and Newton Raphson method. In additional, the course also discuss Ordinary Differential Equation (ODE). In order to strengthen the students in solving engineering problems, Laplace Transform by using the Table of Laplace is also included. It is designed to build students' teamwork and problems solving skill. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DBM20023**	1. Demonstrate an understanding of the common body of knowledge in mathematics. (C3, CLS 1) 2. Demonstrate problems solving skills in engineering problems. (C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) **Upon completion of this course students should be able to :**
3	**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 mixed-signal circuits using various types of simulation analysis. Printed Circuit Board (PCB) layout is then produced for the circuits. The simulation and the PCB layout are done using electronic software package such as Protel / Altium Designer, ORCAD, PSpice, Circuit Maker or Electronic Workbench. **CREDIT(S): 1** **PRE-REQUISITE(S): NONE**	1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations. (C3, PLO1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO5)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	DEE30043 Electronic Circuits	**ELECTRONIC CIRCUITS** emphasizes the concept of electronic device applications. The course covers the fundamental of electronic circuit application which include power supply unit, oscillator, operational amplifier, timer, filters and AD/DA converters. The content cover circuit configurations, operation and application of the electronic circuits. **CREDIT(S): 3** **PRE-REQUISITE(S) : NONE**	1. Apply the principles of electronic circuits' devices by using block diagram or circuit diagram. (C3, PLO1) 2. Construct the various applications of electronic circuits based on the theory and principle operation of the circuits. (P4, PLO5) 3. Demonstrate good written communication skill through essay writing in group within a stipulated time frame. (A3, PLO10)
3	DEE30052 Electronic Equipment Repair	**ELECTRONIC EQUIPMENT REPAIR** provides the knowledge and skills on troubleshooting and repairing the electronics equipment. This course focuses on the identification of faults in regulated dc power supply, audio equipment and television system. This course also provides knowledge and skills on troubleshooting and repairing broken cell phones. **CREDIT(S): 2** **PRE-REQUISITE(S) : DEE20023**	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)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	**DEP30083** **Telecommunication Network**	**TELECOMMUNICATION NETWORK** provides students with the basic knowledge of telecommunication network of Next Generation Networks (NGN). This course focuses on NGN architectures, protocols and services, including technologies and regulation. Students are also expose to NGN convergence between the traditional telecommunications and the internet to facilitate voice and data communications. **CREDIT(S): 3** **PRE-REQUISITE(S): 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)
3	**DEP30013** **Communication System Fundamentals**	**COMMUNICATION SYSTEM FUNDAMENTALS** introduces the students to the concepts of communication system. This course covers the principles of communications, analog and digital modulation techniques, multiplexing and transmission medium. It also exposes the students to the basic of data communication system. **CREDIT(S): 3** **PRE-REQUISITE(S) : 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)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	**DUE50032** **Communicative English 3**	**COMMUNICATIVE ENGLISH 3** aims to develop the necessary skills in students to analyse and interpret graphs and charts from data collected as well as to apply the job hunting mechanics effectively in their related fields. Students will learn to gather data and present them through the use of graphs and charts. Students will also learn 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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : DUE30022**	1. Present gathered data in graphs and charts effectively using appropriate language forms and functions. (A2, CLS 3b) 2. Prepare a high impact resume and a 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)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	MPU22012 Enterpreneurship	**ENTERPRENEUSHIP** focuses on the fundamentals and concept of entrepreneurship in order to inculcate the value and interest in students to choose entrepreneurship as a career. This course can help students to initiate creative and innovative entrepreneurial ideas. It also emphasizes a preparation of a business plan framework through business model canvas. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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. Organise the online presence business in social media marketing platform. (A3, CLS 4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	**DEC40053** Embedded System Application	**EMBEDDED SYSTEM APPLICATION** cover the basic concept and application of microcontroller system based on Peripheral Interface Controller (PIC) microcontroller. Students will learn software and hardware development on PIC16F/PIC18F microcontroller development system and understand how to do interfacing with external devices using suitable internal chip features. Students are exposed to the new Microcontroller Unit (MCU) simulation software such as Proteus. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DEC20012**	1. Investigate internal features of PIC16F/PIC18F to interface properly with external devices. (C4, PLO4) 2. Design embedded system application based on PIC16F/PIC18F microcontroller effectively. (C6, PLO3) 3. Construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively. (P4, PLO5) 4. Demonstrate knowledge of engineering project management principles through a written report on an assigned mini project. (A3, PLO11)

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SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) **Upon completion of this course students should be able to :**
4	**DEE40082** **Project 1**	**PROJECT 1** provides knowledge regarding the implementation and development methods of a project based on hardware or software or a combination of hardware and software. This course provides exposure to the project management and finance, techniques to develop project and proposal preparation. CREDIT(S) : 2 PRE-REQUISITE(S) : NONE	1. Investigate well defined problem in order to make improvements on 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, PLO2) 3. Perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically. (P4, PLO5) 4. Display good project management and finance through a Gantt chart (milestone) and final proposal. (A3, PLO11) 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, PLO12) 6. Display written communication skill through a final proposal. (A3, PLO10) 7. Describe the impact of the proposed project to the society in the final proposal. (A3, PLO6)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	**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. **CREDIT(S) : 3** **PRE-REQUISITE(S) : 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, PLO 4) 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, PLO 7)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	DEE40113 Signal And System	**SIGNAL AND SYSTEM** provides knowledge on the signals and systems, the Linear Time-Invariant (LTI) systems, the Laplace transform the Z-transform and Fourier analysis. The course focuses on the mathematical description of signals and systems, the input-output relationship for Linear Time-Invariant (LTI) systems, the Laplace transform and Z-transform and their application techniques for analyzing the systems and Fourier analysis of signals and systems. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DBM20023**	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)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	MPU23052 Sains Teknologi dan Kejuruteraan Islam*	**SAINS TEKNOLOGI & 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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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. Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam. (A4, CLS 4)
5	MPU23042 Nilai Masyarakat Malaysia*	**NILAI MASYARAKAT MALAYSIA** membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran- cabaran dalam membentuk masyarakat Malaysia5. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	4. Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia. (A2, CLS 4) 5. Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotisme masyarakat Malaysia. (A3, CLS 5) 6. Menghubungkait minda ingin tahu dengan cabaran-cabaran dalam membentuk masyarakat Malaysia. (A4, CLS 4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	DEE30061 Computer Aided Electrical Drawing	**COMPUTER AIDED ELECTRICAL DRAWING** provides knowledge and exposure on the usage of AutoCAD software. The course focuses on the application of the software to produce drawings of graphics, electrical / electronic component symbols, circuit schematics and electrical wiring layout diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software. **CREDIT(S): 1** **PRE-REQUISITE(S): NONE**	1. Apply computer aided design concept, applications and capabilities in electrical engineering environment. (C3, PLO1) 2. Construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American/British technical symbol standard. (P4, PLO5) 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, PLO8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) **Upon completion of this course students should be able to :**
5	**DEE50102** **Project 2**	**PROJECT 2** is the continuation of DEE40082 PROJECT 1 course. The course focuses on methods of circuit construction, testing, troubleshooting, debugging, repair and also completion of the project which was planned during the previous semester. This course also requires students to manage an economical engineering based project, prepare a project report in a given format and deliver a project presentation at the end of the semester. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course. **CREDIT(S) : 2** **PRE-REQUISITE(S) : DEE40082**	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)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	**DEP50033** Data Communication And Networking	**DATA COMMUNICATION AND NETWORKING** exposes the student to the principle of data communication and networking. This course covers basic concept of data communication and networking fundamental for a quality data transmission. Students are expose to Open Systems Interconnection (OSI) Model and Network Protocol. Students are also introduced to Local Area Network and public digital network. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DEP30013**	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)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	**DEP50043** **Microwave Devices**	MICROWAVE DEVICES introduces the existence, characteristic and the effect of electromagnetic wave to the surrounding. This course also focuses on the devices used in microwave communication system such as waveguide (transmission lines), basic accessories, sources, microwave antennas as well as the techniques of measurement used in microwave system. **CREDIT(S) : 3** **PRE-REQUISITE(S) : 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)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	DEP50063 Wireless Communication	**WIRELESS COMMUNICATION** introduces student to the basic of wireless communication includes several specialized topics. Students are expose to wireless networking, evolution of mobile communication, cellular network channels, techniques used to enhance capacity and speed, interferences, radio wave propagation and multiple access techniques. **CREDIT(S) : 3** **PRE-REQUISITE(S) : 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 equipments 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)
6	DUT600610 Industrial Training	**INDUSTRIAL TRAINING** **CREDIT(S) : 10** **PRE-REQUISITE(S) : NONE**	

STUDENT HANDBOOK

PTSB

DIPLOMA IN ELECTRONIC ENGINEERING (COMPUTER)

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13.1   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 Higher Education 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.

13.2   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.

13.3   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

13.4 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.

13.5 PROGRAMMME EDUCATIONAL OBJECTIVES (PEO)

The engineering programme should produce balanced TVET graduates who are:

1. Practicing technician in electrical engineering related field.

2. Contributing to society with professional ethic and responsibilities.

3. Engaging in enterprising activities that apply engineering knowledge and technical skills.

4. Engaging in activities to enhance knowledge for successful career advancement.

13.6 PROGRAMME LEARNING OUTCOMES (PLO)

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

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

5. Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6).

6. 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).

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7. Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7).

8. Understand and commit to professional ethics and responsibilities and norms of technician practice.

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

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

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

Notes:

DK1:   A descriptive, formula-based understanding of the natural sciences applicable in a sub-discipline

DK2:   Procedural mathematics, numerical analysis, statistics applicable in a subdiscipline.

DK3:   A coherent procedural formulation of engineering fundamentals required in an accepted sub-discipline.

DK4:   Engineering specialist knowledge that provides the body of knowledge for an accepted sub-discipline.

DK5:   Knowledge that supports engineering design based on the techniques and procedures of a practice area.

DK6:   Codified practical engineering knowledge in recognised practice area

DK 7:   Knowledge of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts.

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13.7   PROGRAMME STRUCTURES

Semester 1

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU24XX1	Sukan	COMP	-	0	2	0	1
MPU24XX1	Unit Beruniform 1						
DUE10012	Communicative English 1	COMP	-	1	0	2	2
DBS10012	Engineering Science	CC	-	2	1	0	2
DUW10022	Occupational, Safety & Health for Engineering	CC	-	2	0	0	2
DBM10013	Engineering Mathematics 1	CC	-	2	0	2	3
DEE10013	Measurement Devices	DC	-	2	2	0	3
DET10013	Electrical Technology	DC	-	2	2	0	3
DET10022	Electrical Wiring	DC	-	1	3	0	2
TOTAL					**26**		**18**

Semester 2

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU24XX1	Kelab/ Persatuan	COMP	-	0	2	0	1
MPU24XX1	Unit Beruniform 2		MPU24XX1				
MPU21032	Penghayatan Etika dan Peradaban	COMP	-	1	0	2	2
DBM20023	Engineering Mathematics 2	CC	DBM10013	2	0	2	3
DEE20033	Digital Electronics	DC	-	2	2	0	3
DEC20012	Fundamental Programming	DC	-	1	2	0	2
DET20033	Electrical Circuits	DC	DET10013	2	2	0	3
DEE20023	Semiconductor Devices	DC	-	2	2	0	3
TOTAL					**24**		**17**

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Semester 3

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUE 30022	Communicative English 2	COMP	DUE10012	1	0	2	2
DBM30043	Electrical Engineering Mathematics	CC	DBM20023	2	0	2	3
DEE30043	Electronic Circuits	DC	-	2	2	0	3
DEC30023	Computer Networking Fundamentals	DC	-	2	2	0	3
DEE30071	Electronic Computer Aided Design	DC	-	0	2	0	1
DEC30032	Computer Architecture and Organization	S	DEE20033	2	0	0	2
DEC30043	Microprocessor Fundamentals	S	DEC20012	2	2	0	3
TOTAL					23		17

Semester 4

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUE50032	Communicative English 3	COMP	DUE30022	1	0	2	2
MPU22012	Entrepreneurship	COMP	-	1	0	2	2
DEE30061	Computer Aided Electrical Drawing	DC	-	0	2	0	1
DEC40053	Embedded System Application	DC	DEC20012	2	2	0	3
DEC50132	Internet Based Controller	S	-	1	2	0	2
DEC40073	Database System	S	-	2	2	0	3
DEE40082	Project 1	S	-	1	2	0	2
	Elective 1	E	-	0	0	0	3
TOTAL					22		17

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Semester 5

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU23052	Sains Teknologi & Kejuruteraan Islam	COMP		1	0	2	2
MPU23042	Nilai Masyarakat Malaysia						
DEE50102	Project 2	S	DEE40082	0	3	0	2
DEC50103	Operating Systems	S	-	2	2	0	3
DEC50113	Computer System Diagnosis and Maintenance	S	-	2	2	0	3
DEC50143	CMOS Integrated Circuit Design and Fabrication	S	-	2	2	0	3
	Elective 2	E		0	0	0	2
TOTAL					**18**		**15**

Semester 6

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUT600610	Engineering Industrial Training	IT	-	0	0	0	10
TOTAL					**0**		**10**

13.8   COURSE SYNOPSIS & COURSE LEARNING OUTCOMES (CLO)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	MPU24XX1 SUKAN	**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. **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus yang berkaitan. (P2,CLS 4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif.(A3, CLS 3d)
1	MPU24XX1 UNIT BERUNIFORM 1	**UNIT BERUNIFORM 1** 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. **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus yang berkaitan. (P2,CLS 4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif.(A3, CLS 3d)
1	DUE10012 Communicative English 1	**COMMUNICATIVE ENGLISH 1** focuses on developing students' speaking skills to enable them to communicate effectively and confidently in group discussions and in a variety of social interactions. It is designed to provide students with appropriate reading skills to comprehend a variety of texts. The students are equipped with effective presentation skills as a preparation for academic and work purposes. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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 current issues. (A3, CLS 3b) 3. Present a topic of interest that carries identifiable values coherently using effective verbal and non-verbal communication skills. (A2, CLS 4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Use basic physics concept to solve engineering physics problems (C3, CLS 1) 2. Apply knowledge of fundamental physics in activities to mastery physics concept (C3, CLS 1) 3. Perform appropriate activities related to physics concept (P3, CLS 3a).
1	**DBM10013** Engineering Mathematics 1	**ENGINEERING MATHEMATICS 1** exposes students to the basic algebra including resolve partial fractions. This course also covers the concept of trigonometry and the method to solve trigonometry problems by using basic identities, compound angle and double angle formulae. Students will be introduced to the theory of complex number and concept of vector and scalar. Students will explore advanced matrices involving 3x3 matrix. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Use mathematical statement to describe relationship between various physical phenomena.(C3, CLS 1) 2. Show mathematical solutions using the appropriate techniques in mathematics.(C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	DUW10022 Occupational, Safety & Health for Engineering	**OCCUPATIONAL, SAFETY AND HEALTH FOR ENGINEERING** course is designed to impart understanding of the self-regulatory concepts and provisions under the Occupational Safety & Health Act (OSHA). This course presents the responsibilities of workers in implementing and complying with the safety procedures at work. Understanding of notifications of accidents, dangerous occurrence, poisoning and diseases and liability for offences will be imparted upon students. This course will also provide an understanding of the key issues in OSH Management, Incident Prevention, Fire Safety, Hazard Identification Risk Control and Risk Assessment (HIRARC), Workplace Environment and Ergonomics and guide the students gradually into this multi-disciplinary science. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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.(A3, PLO8) 3. Demonstrate communication skill in group to explain the factor that can lead to accident in workplace.(A3, PLO10)
1	DET10022 Electrical Wiring	**ELECTRICAL WIRING** course exposes students to the various aspects of wiring installation according to the MS IEC 60364 standard. Students will be able to relate theoretical aspect in practical work on electrical wiring during workshop 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. **CREDIT(S) : 2** **PRE REQUISITE(S) : NONE**	1. Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to MS IEC 60364. (C3, PLO1) 2. Construct single phase domestic wiring according to MS IEC 60364. (P4, PLO5) 3. Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms during performing single phase domestic wiring task. (A3, PLO8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	**DEE 10013** **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 and AC 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 . **CREDIT(S) : 3** **PRE REQUISITE(S) : NONE**	1. Apply the concept of measurement in electrical and electronic equipment using appropriate theorem.(C3, PLO1) 2. Perform meter calibrating and measuring technique using the correct measuring equipment.(P4, PLO5) 3. Demonstrate good communication skill in oral presentation with in stipulated time frame .(A3, PLO10)
1	**DET10013** **Electrical Technology**	**ELECTRICAL TECHNOLOGY** course will introduce students to the principles related to DC electrical circuits. It covers the fundamental laws, theorems and circuit techniques of the electrical technology basic fundamental. This course also covers inductor, capacitor, magnetic and electromagnetic circuits. **CREDIT(S) : 3** **PRE REQUISITE(S) : 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, PLO1) 2. Construct DC circuit and measure related electrical parameters using appropriate electrical equipments (P4, PLO5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame**.** (A3, PLO9)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	MPU21032 Penghayatan Etika Dan Peradaban	**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 alam sekitar daripada perspektif etika dan peradaban dapat melahirkan pelajar yang bermoral dan profesional. Penerapan amalan pendidikan berimpak tinggi (HIEPs) yang bersesuaian digunakan dalam penyampaian kursus ini. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Membentangkan konsep etika dan peradaban dalam kepelbagaian tamadun. (A2, CLS5) 2. Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia. (A2,CLS5) 3. Mencadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban. (A3, CLS4)
2	MPU24XX1 Kelab/Persatuan	**KELAB/PERSATUAN** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus berkaitan.(P3, CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)
2	MPU24XX1 Unit Beruniform 2	**UNIT BERUNIFORM 2** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif **CREDIT(S) : 1** **PRE-REQUISITE(S) : MPU24XX1**	1. Mempamerkan kemahiran khusus bagi kursus berkaitan.(P3, CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	DBM20023 Engineering Mathematics 2	**ENGINEERING MATHEMATICS 2** exposes students to the basic laws of indices and logarithms. This course introduces the basic rules of differentiation concepts to solve problems that relates maximum, minimum and calculate the rates of changes. This course discusses integration concepts in order to strengthen student's knowledge for solving area and volume bounded region problems. In addition, students will learn application of both techniques of differentiation and integration. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DBM10013**	1. Use algebra and calculus knowledge to describe relationship between various physical phenomena.(C3, CLS 1) 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)
2	DEE20023 Semiconductor Devices	**SEMICONDUCTOR DEVICES** introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistors and field effect transistors. The content encompasses devices structure to biasing basic applications **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem. (C3, PLO2) 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, PLO10)
2	DEE20033 Digital Electronics	**DIGITAL ELECTRONICS** introduces the theories on the basic of digital systems.This course emphasizes on the digital system fundamentals and applications. Thiscourse mainly covers number systems, code systems, logic gates, Boolean operations,flip-flops, counters and registers. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit (C3, PLO1) 2. Construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop .(P4,PLO5) 3. Demonstrate ability to work in team to complete assigned task during practical work sessions.(A3, PLO9)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	**DEC20012** Programming Fundamentals	**PROGRAMMING FUNDAMENTALS** course provides the skills necessary for the effective of application of computation and computer programming in engineering applications. Students will develop their programming skills through a variety of assignments and labs and by reviewing case studies and example programs. The learning outcome is proficiency in writing small to medium programs in a procedural programming language. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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,PLO1) 2. Build programs written in C language for assigned mini project during practical work sessions. (P4, PLO5) 3. Demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project. (A3, PLO12)
2	**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 three phase system and operation of various types of transformers. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DET10013**	1. Apply the concept and principle in solving problems of electrical circuits using the appropriate AC electrical laws and theorem (C3,PLO1) 2. Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4,PLO5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO9)
3	**DUE30022** Communicative English 2	**COMMUNICATIVE ENGLISH 2** emphasises the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints. **CREDIT(S): 2** **PRE-REQUISITE(S) : DUE10012**	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 effective communication and social skills in handling enquiries and complaints amicably and professionally. (A3, CLS 3b)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	**DBM30043** Electrical Engineering Mathematics	**ELECTRICAL ENGINEERING MATHEMATICS** exposes students to the statistical and probability concepts and their applications in interpreting data. The course also introduces numerical methods concept to solve simultaneous equations by using Gaussian Elimination method, LU Decomposition using Doolittle and Crout methods, polynomial problems using Simple Fixed Point Iteration methods and Newton Raphson method. In additional, the course also discuss Ordinary Differential Equation (ODE). In order to strengthen the students in solving engineering problems, Laplace Transform by using the Table of Laplace is also included. It is designed to build students' teamwork and problems solving skill. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DBM20023**	1. Demonstrate an understanding of the common body of knowledge in mathematics. (C3, CLS 1) 2. Demonstrate problems solving skills in engineering problems.(C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically.(A3, CLS 3b)
3	**DEC30023** Computer Networking Fundamentals	**COMPUTER NETWORKING FUNDAMENTALS** introduce students to the concepts and principles of data transmission and computer networks. This course enables students to correctly use standard terminology in describing the main Local Area Network (LAN) topologies, hardware and software components used in networking. This course provides students with the knowledge and skills to build a network infrastructure using copper cabling, and wireless devices wisely. Students also learn to troubleshoot and secure the network. **CREDIT (S) : 3** **PREREQUISITE (S) : NONE**	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, PLO5) 3. Demonstrate awareness of the norm practice of professional bodies such as IEEE or TIA/EIA-568-A/B during practical work session.(A3, PLO8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	**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 mixed-signal circuits using various types of simulation analysis. Printed Circuit Board (PCB) layout is then produced for the circuits. The simulation and the PCB layout are done using electronic software package such as Protel / Altium Designer, ORCAD, PSpice, Circuit Maker or Electronic Workbench. **CREDIT(S): 1** **PRE-REQUISITE(S): NONE**	1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations (C3, PLO1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO5)
3	**DEE30043** Electronic Circuits	**ELECTRONIC CIRCUITS** emphasizes the concept of electronic device applications. The course covers the fundamental of electronic circuit application which include power supply unit, oscillator, operational amplifier, timer, filters and AD/DA converters. The content cover circuit configurations, operation and application of the electronic circuits. **CREDIT(S): 3** **PRE-REQUISITE(S) : NONE**	1. Apply the principles of electronic circuits devices by using block diagram or circuit diagram. (C3, PLO1) 2. Construct the various applications of electronic circuits based on the theory and principle operation of the circuits(P4, PLO5). 3. Demonstrate good written communication skill through essay writing in group within a stipulated time frame.(A3, PLO10)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	**DEC30032** **Computer Architecture and Organization**	**COMPUTER ARCHITECTURE AND ORGANIZATION** course introduces studentsto 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. **CREDIT(S): 2** **PRE-REQUISITE(S) : DEE20033**	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)
3	**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. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DEC20012**	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, PLO1) 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 assigned essay (A3, PLO 1)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	DUE50032 Communicative English 3	**COMMUNICATIVE ENGLISH 3** aims to develop the necessary skills in students to analyse and interpret graphs and charts from data collected as well as to apply the job hunting mechanics effectively in their related fields. Students will learn to gather data and present them through the use of graphs and charts. Students will also learn 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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : DUE30022**	1. Present gathered data in graphs and charts effectively using appropriate language forms and functions.(A2, CLS 3b) 2. Prepare a high impact resume and a 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)
4	MPU22012 Entrepreneurship	**ENTERPRENEUSHIP** focuses on the fundamentals and concept of entrepreneurship in order to inculcate the value and interest in students to choose entrepreneurship as a career. This course can help students to initiate creative and innovative entrepreneurial ideas. It also emphasizes a preparation of a business plan framework through business model canvas. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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. Organise the online presence business in social media marketing platform. (A3, CLS 4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	**DEC40053** Embedded System Application	**EMBEDDED SYSTEM APPLICATION** cover the basic concept and application of microcontroller system based on Peripheral Interface Controller (PIC) microcontroller. Students will learn software and hardware development on PIC16F/PIC18F microcontroller development system and understand how to do interfacing with external devices using suitable internal chip features. Students are exposed to the new Microcontroller Unit (MCU) simulation software such as Proteus. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DEC20012**	1. Investigate internal features of PIC16F/PIC18F to interface properly with external devices.(C4, PLO4) 2. Design embedded system application based on PIC16F/PIC18F microcontroller effectively.(C6, PLO3) 3. Construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively.(P4, PLO5) 4. Demonstrate knowledge of engineering project management principles through a written report on an assigned mini project. (A3, PLO11)
4	**DEE30061** Computer Aided Electrical Drawing	**COMPUTER AIDED ELECTRICAL DRAWING** provides knowledge and exposure on the usage of AutoCAD software. The course focuses on the application of the software to produce drawings of graphics, electrical / electronic component symbols, circuit schematics and electrical wiring layout diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software. **CREDIT(S): 1** **PRE-REQUISITE(S): NONE**	1. Apply computer aided design concept, applications and capabilities in electrical engineering environment .(C3, PLO1) 2. Construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American/British technical symbol standard .(P4, PLO5) 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, PLO8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	**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. **CREDIT(S): 2** **PRE-REQUISITE(S): NONE**	1. Apply knowledge of basic concept, structure and component of Internet of Things in electrical and electronic engineering field (C3, PLO 1) 2. Manipulate various types of input/output application, data acquisition and communication during practical work using embedded system platform/board (P4, PLO 5) 3. Demonstrate social responsibility in making our environment more sustainable through mini project development theme-based (A3, PLO 7)
4	**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 manipulating data using Structured Query Language (SQL). **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Investigate the requirements of database models by applying normalization technique in logical database designs (C4, PLO 4) 2. Manipulate correctly Structured Query Language (SQL) for database using a database management system during practical works (P4, PLO 5) 3. Demonstrate good ability in managing a well-defined Structured Query Language (SQL) project in a cost effective manner (A3 ,PLO 11)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	DEE40082 Project 1	**PROJECT 1** provides knowledge regarding the implementation and development methods of a project based on hardware or software or a combination of hardware and software. This course provides exposure to the project management and finance, techniques to develop project and proposal preparation. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Investigate well defined problem in order to make improvements on 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, PLO2) 3. Perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically. (P4, PLO5) 4. Display good project management and finance through a Gantt Chart (milestone) and final proposal.(A3, PLO11) 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, PLO12) 6. Display written communication skill through a final proposal.(A3, PLO10) 7. Describe the impact of the proposed project to the society in the final proposal.(A3, PLO6)
5	MPU23052 Sains Teknologi & Kejuruteraan Islam*	**SAINS TEKNOLOGI & 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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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. Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam.(A4, CLS 4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	MPU23042 Nilai Masyarakat Malaysia**	**NILAI MASYARAKAT MALAYSIA** membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran- cabaran dalam membentuk masyarakat Malaysia5. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia. (A2, CLS 4) 2. Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotisme masyarakat Malaysia (A3, CLS 5) 3. Menghubungkait minda ingin tahu dengan cabaran-cabaran dalam membentuk masyarakat Malaysia. (A4, CLS 4)
5	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. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	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 , PLO 4) 2. Perform installation for workstation and domain server using MS Windows server or Open Source server operating system (P4 , PLO 5) 3. Demonstrate awareness of professionalism and computer ethics during practical work to comply with professional bodies such as ACM or IEEE (A3 , PLO 8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	**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. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Evaluate the fault in personal computer, laptop, printer and computer peripherals using diagnostic procedures (C5,PLO 2) 2. Construct systematically the installation, configuration, optimization, upgrade and preventive maintenance on personal computer, laptop, computer peripherals and security system (P4, PLO 5) 3. Demonstrate awareness of social responsibility safety and health in practical work during computer troubleshooting and maintenance using proper troubleshooting procedures(A3,PLO 6)
5	**DEC50143** 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 an 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. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DEE20023 & DEE20033**	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, PLO 3) 2. Construct the layout design of CMOS circuits using layout design software based on specific CMOS layout design rules (P4, PLO 5) 3. Demonstrate elements of environmental sustainability in implementing reduce and reuse techniques in design parameters and design consideration through practical work (A3 , PLO 7)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	DEE50102 Project 2	**PROJECT 2** is the continuation of DEE40082 PROJECT 1 course. The course focuses on methods of circuit construction, testing, troubleshooting, debugging, repair and also completion of the project which was planned during the previous semester. This course also requires students to manage an economical engineering based project, prepare a project report in a given format and deliver a project presentation at the end of the semester. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course. **CREDIT(S) : 2** **PRE-REQUISITE(S) : DEE40082**	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)

STUDENT HANDBOOK

DIPLOMA IN ELECTRICAL ENGINEERING

14.1   INTRODUCTION

Electrical engineering is the field of study which generally deals with the application of electricaland 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 the studentsfor 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 and electrical discipline as well as 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 Engineering is a three-year full-time programme comprising of five semesters course work with one full semester of industrial training.

14.2   SYNOPSIS

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

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14.3 JOB PROSPECT

This programme provides the knowledge and skills in Electronics Engineering (Computer) that can be applied in a broad range of careers in engineering industry. The knowledge and skills that the students acquire from the program 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

14.4 PROGRAMME AIMS

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

14.5 PROGRAMME EDUCATIONAL OBJECTIVES

The engineering programme should produce balanced TVET graduates who are:

  1.   Practicing technician in electrical engineering related field
  2.   Contributing to society with professional ethic and responsibilities
  3.   Engaging in enterprising activities that apply engineering knowledge and technical skills
  4.   Engaging in activities to enhance knowledge for successful career advancement.

14.6 PROGRAMME LEARNING OUTCOMES (PLO)
Upon completion of the programme, students should be able to:

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

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

5.   Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)

6.   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.   Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)

8.   Understand and commit to professional ethics and responsibilities and norms of technician practice

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

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

12. 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

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DK 7: Knowledge of issues and approaches in engineering technician practice: ethics, financial, cultural, environmental and sustainability impacts.

14.7 PROGRAMME STRUCTURES

Semester 1

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU24XX1	Sukan	COMP	-	0	2	0	1
MPU24XX1	Unit Beruniform 1						
DUE10012	Communicative English 1	COMP	-	1	0	2	2
DBS10012	Engineering Science	CC	-	2	1	0	2
DUW10022	Occupational, Safety & Health for Engineering	CC	-	2	0	0	2
DBM10013	Engineering Mathematics 1	CC	-	2	0	2	3
DEE10013	Measurement Devices	DC	-	2	2	0	3
DET10013	Electrical Technology	DC	-	2	2	0	3
DET10022	Electrical Wiring	DC	-	1	3	0	2
TOTAL					**26**		**18**

Semester 2

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU24XX1	Kelab/ Persatuan	COMP	-	0	2	0	1
MPU24XX1	Unit Beruniform 2		MPU24XX1				
MPU21032	Penghayatan Etika dan Peradaban	COMP	-	1	0	2	2
DBM20023	Engineering Mathematics 2	CC	DBM10013	2	0	2	3
DEE20033	Digital Electronics	DC	-	2	2	0	3
DEC20012	Fundamental Programming	DC	-	1	2	0	2
DET20033	Electrical Circuits	DC	DET10013	2	2	0	3
DEE20023	Semiconductor Devices	DC	-	2	2	0	3
TOTAL					**24**		**17**

Semester 3

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUE 30022	Communicative English 2	COMP	DUE10012	1	0	2	2
DBM30043	Electrical Engineering Mathematics	CC	DBM20023	2	0	2	3
DEE30043	Electronic Circuits	DC	-	2	2	0	3
DEE30061	Computer Aided Electrical Drawing	DC	-	0	2	0	1
DEC30023	Computer Networking Fundamental	DC	-	2	2	0	3
DET30043	Electrical Machines	DC	-	2	2	0	3
DET30053	Power System	DC	DET20033	2	2	0	3
TOTAL					25		18

Semester 4

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUE50032	Communicative English 3	COMP	DUE30022	1	0	2	2
MPU22012	Entrepreneurship	COMP	-	1	0	2	2
DEC40053	Embedded System Application	DC	DEC20012	2	2	0	3
DEE30071	Electronic Computer Aided Design	DC	-	0	2	0	1
DEJ40033	Programmable Logic Controller (PLC) and Automation	DC	-	2	2	0	3
DET40073	Power Electronics	DC	-	2	2	0	3
DEE40082	Project 1	CC	-	1	2	0	2
	Elective 1	DC	-	0	0	0	2
TOTAL					23		18

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Semester 5

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
MPU23052	Sains Teknologi & Kejuruteraan Islam	COMP		1	0	2	2
MPU23042	Nilai Masyarakat Malaysia						
DEE50102	Project 2	DC	DEE40082	0	3	0	2
DET50063	Motor Control and Drives	DC	DET40073	2	2	0	3
DET50083	Power System Protection	DC	DET30053	2	2	0	3
DET50093	Electrical Maintenance and Repair	DC	-	2	2	0	3
	Elective 2			0	0	0	2
TOTAL					**18**		**15**

Semester 6

COURSE CODE	COURSE	STR	PREQ	L	P	T	C
DUT600610	Engineering Industrial Training	DC	-	0	0	0	10
TOTAL					**0**		**10**

14.8   COURSE SYNOPSIS & COURSE LEARNING OUTCOMES (CLO)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	MPU24XX1 SUKAN	**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. **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus yang berkaitan. (P2,CLS 4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif.(A3, CLS 3d)
1	MPU24XX1 UNIT BERUNIFORM 1	**UNIT BERUNIFORM 1** 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. **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus yang berkaitan. (P2,CLS 4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif.(A3, CLS 3d)
1	DUE10012 Communicative English 1	**COMMUNICATIVE ENGLISH 1** focuses on developing students' speaking skills to enable them to communicate effectively and confidently in group discussions and in a variety of social interactions. It is designed to provide students with appropriate reading skills to comprehend a variety of texts. The students are equipped with effective presentation skills as a preparation for academic and work purposes. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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 current issues. (A3, CLS 3b) 3. Present a topic of interest that carries identifiable values coherently using effective verbal and non-verbal communication skills. (A2, CLS 4)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Use basic physics concept to solve engineering physics problems (C3, CLS 1) 2. Apply knowledge of fundamental physics in activities to mastery physics concept (C3, CLS 1) 3. Perform appropriate activities related to physics concept (P3, CLS 3a).
1	**DBM10013** Engineering Mathematics 1	**ENGINEERING MATHEMATICS 1** exposes students to the basic algebra including resolve partial fractions. This course also covers the concept of trigonometry and the method to solve trigonometry problems by using basic identities, compound angle and double angle formulae. Students will be introduced to the theory of complex number and concept of vector and scalar. Students will explore advanced matrices involving 3x3 matrix. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Use mathematical statement to describe relationship between various physical phenomena.(C3, CLS 1) 2. Show mathematical solutions using the appropriate techniques in mathematics.(C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	**DUW10022** Occupational, Safety & Health for Engineering	**OCCUPATIONAL, SAFETY AND HEALTH FOR ENGINEERING** course is designed to impart understanding of the self-regulatory concepts and provisions under the Occupational Safety & Health Act (OSHA). This course presents the responsibilities of workers in implementing and complying with the safety procedures at work. Understanding of notifications of accidents, dangerous occurrence, poisoning and diseases and liability for offences will be imparted upon students. This course will also provide an understanding of the key issues in OSH Management, Incident Prevention, Fire Safety, Hazard Identification Risk Control and Risk Assessment (HIRARC), Workplace Environment and Ergonomics and guide the students gradually into this multi-disciplinary science. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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.(A3, PLO8) 3. Demonstrate communication skill in group to explain the factor that can lead to accident in workplace.(A3, PLO10)
1	**DET10022** Electrical Wiring	**ELECTRICAL WIRING** course exposes students to the various aspects of wiring installation according to the MS IEC 60364 standard. Students will be able to relate theoretical aspect in practical work on electrical wiring during workshop 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. **CREDIT(S) : 2** **PRE REQUISITE(S) : NONE**	1. Apply the concept and principle of electrical safety and regulation in performing electrical wiring according to MS IEC 60364. (C3, PLO1) 2. Construct single phase domestic wiring according to MS IEC 60364. (P4, PLO5) 3. Demonstrate an understanding and commit to professional ethics and responsibilities of engineering norms during performing single phase domestic wiring task. (A3, PLO8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
1	**DEE 10013** **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 and AC 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 . **CREDIT(S) : 3** **PRE REQUISITE(S) : NONE**	1. Apply the concept of measurement in electrical and electronic equipment using appropriate theorem.(C3, PLO1) 2. Perform meter calibrating and measuring technique using the correct measuring equipment.(P4, PLO5) 3. Demonstrate good communication skill in oral presentation with in stipulated time frame .(A3, PLO10)
1	**DET10013** **Electrical Technology**	**ELECTRICAL TECHNOLOGY** course will introduce students to the principles related to DC electrical circuits. It covers the fundamental laws, theorems and circuit techniques of the electrical technology basic fundamental. This course also covers inductor, capacitor, magnetic and electromagnetic circuits. **CREDIT(S) : 3** **PRE REQUISITE(S) : 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, PLO1) 2. Construct DC circuit and measure related electrical parameters using appropriate electrical equipments (P4, PLO5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame**.** (A3, PLO9)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	**COURSE LEARNING OUTCOMES (CLO)** Upon completion of this course students should be able to :
2	**MPU21032** Penghayatan Etika Dan Peradaban	**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 alam sekitar daripada perspektif etika dan peradaban dapat melahirkan pelajar yang bermoral dan profesional. Penerapan amalan pendidikan berimpak tinggi (HIEPs) yang bersesuaian digunakan dalam penyampaian kursus ini. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Membentangkan konsep etika dan peradaban dalam kepelbagaian tamadun. (A2, CLS5) 2. Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia. (A2,CLS5) 3. Mencadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban. (A3, CLS4)
2	**MPU24XX1** Kelab/Persatuan	**KELAB/PERSATUAN** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif **CREDIT(S) : 1** **PRE-REQUISITE(S) : NONE**	1. Mempamerkan kemahiran khusus bagi kursus berkaitan.(P3, CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)
2	**MPU24XX1** Unit Beruniform 2	**UNIT BERUNIFORM 2** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif **CREDIT(S) : 1** **PRE-REQUISITE(S) : MPU24XX1**	1. Mempamerkan kemahiran khusus bagi kursus berkaitan.(P3, CLS4) 2. Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3, CLS 3d)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	DBM20023 Engineering Mathematics 2	**ENGINEERING MATHEMATICS 2** exposes students to the basic laws of indices and logarithms. This course introduces the basic rules of differentiation concepts to solve problems that relates maximum, minimum and calculate the rates of changes. This course discusses integration concepts in order to strengthen student's knowledge for solving area and volume bounded region problems. In addition, students will learn application of both techniques of differentiation and integration. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DBM10013**	1. Use algebra and calculus knowledge to describe relationship between various physical phenomena.(C3, CLS 1) 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)
2	DEE20023 Semiconductor Devices	**SEMICONDUCTOR DEVICES** introduces students to the basic electronic theories and devices. It covers the fundamentals of electronic devices which includes diodes, bipolar junction transistors and field effect transistors. The content encompasses devices structure to biasing basic applications **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Apply the theoretical characteristics and electrical properties of semiconductor by using appropriate measuring operations and theorem. (C3, PLO2) 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, PLO10)
2	DEE20033 Digital Electronics	**DIGITAL ELECTRONICS** introduces the theories on the basic of digital systems.This course emphasizes on the digital system fundamentals and applications. Thiscourse mainly covers number systems, code systems, logic gates, Boolean operations,flip-flops, counters and registers. **CREDIT(S) : 3** **PRE-REQUISITE(S) : NONE**	1. Apply the knowledge of logic operations using Boolean Algebra or Karnaugh Map in digital logic circuit (C3, PLO1) 2. Construct the logic diagrams, truth tables and timing diagrams using logic gates and flip-flop .(P4,PLO5) 3. Demonstrate ability to work in team to complete assigned task during practical work sessions.(A3, PLO9)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
2	**DEC20012** Programming Fundamentals	**PROGRAMMING FUNDAMENTALS** course provides the skills necessary for the effective of application of computation and computer programming in engineering applications. Students will develop their programming skills through a variety of assignments and labs and by reviewing case studies and example programs. The learning outcome is proficiency in writing small to medium programs in a procedural programming language. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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,PLO1) 2. Build programs written in C language for assigned mini project during practical work sessions. (P4, PLO5) 3. Demonstrate continuous learning skill in independent acquisition of new knowledge and skill in developing a mini project. (A3, PLO12)
2	**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 three phase system and operation of various types of transformers. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DET10013**	1. Apply the concept and principle in solving problems of electrical circuits using the appropriate AC electrical laws and theorem (C3,PLO1) 2. Construct of an AC electrical circuit and measured related electrical parameter using appropriate electrical equipments. (P4,PLO5) 3. Demonstrate ability to work in team to complete assigned tasks within the stipulated time frame. (A3, PLO9)
3	**DUE30022** Communicative English 2	**COMMUNICATIVE ENGLISH 2** emphasises the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints. **CREDIT(S): 2** **PRE-REQUISITE(S) : DUE10012**	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 effective communication and social skills in handling enquiries and complaints amicably and professionally. (A3, CLS 3b)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	DBM30043 Electrical Engieering 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 discuss Ordinary Differential Equation (ODE). In order to strengthen the students in solving engineering problems, Laplace Transform by using the Table of Laplace is also included. It is designed to build students' teamwork and problems solving skill. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DBM20023**	1. Demonstrate an understanding of the common body of knowledge in mathematics. (C3, CLS 1) 2. Demonstrate problems solving skills in engineering problems.(C3, CLS 3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically.(A3, CLS 3b)
3	DEE30061 Computer Aided Electrical Drawing	**COMPUTER AIDED ELECTRICAL DRAWING** provides knowledge and exposure on the usage of AutoCAD software. The course focuses on the application of the software to produce drawings of graphics, electrical / electronic component symbols, circuit schematics and electrical wiring layout diagram. The skills acquired from this course will also equip students with the ability to learn and use other similar software. **CREDIT(S): 1** **PRE-REQUISITE(S): NONE**	1. Apply computer aided design concept, applications and capabilities in electrical engineering environment .(C3, PLO1) 2. Construct simple and complex electrical wiring diagrams and electronic schematics using AutoCAD software and based on American/British technical symbol standard .(P4, PLO5) 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, PLO8)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	**DEE30043 Electronic Circuits**	**ELECTRONIC CIRCUITS** emphasizes the concept of electronic device applications. The course covers the fundamental of electronic circuit application which include power supply unit, oscillator, operational amplifier, timer, filters and AD/DA converters. The content cover circuit configurations, operation and application of the electronic circuits. **CREDIT(S): 3** **PRE-REQUISITE(S) : NONE**	1. Apply the principles of electronic circuits devices by using block diagram or circuit diagram. (C3, PLO1) 2. Construct the various applications of electronic circuits based on the theory and principle operation of the circuits(P4, PLO5) Demonstrate good written communication skill through essay writing in group within a stipulated time frame.(A3, PLO10)
3	**DEC30023 Computer Networking Fundamentals**	**COMPUTER NETWORKING FUNDAMENTALS** introduce students to the concepts and principles of data transmission and computer networks. This course enables students to correctly use standard terminology in describing the main Local Area Network (LAN) topologies, hardware and software components used in networking. This course provides students with the knowledge and skills to build a network infrastructure using copper cabling, and wireless devices wisely. Students also learn to troubleshoot and secure the network. **CREDIT (S) : 3** **PREREQUISITE (S) : NONE**	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, PLO5) 3. Demonstrate awareness of the norm practice of professional bodies such as IEEE or TIA/EIA-568-A/B during practical work session.(A3, PLO8)
3	**DET 30043 Electrical Machine**	**ELECTRICAL MACHINE** course expose students to the basic construction, principle of operation and control of various type of motor and generator. This course provides students with the basic knowledge and skills to solve various problem related to motors and generators. **CREDIT (S) : 3** **PREREQUISITE (S) : NONE**	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 equipments. (P4, PLO 5) 3. Demonstrate ability to work in team to complete assigned tasks.(A3, PLO9)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
3	DET30053 Power System	**POWER SYSTEM** course will provide students with the concepts of non-renewable and renewable energy. It also annotate on the environmentally friendly electrical power generation, transmission, distribution and consumerization of the electrical power. **CREDIT (S) : 3** **PREREQUISITE (S) : DET20033**	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, PLO1) 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 methodes of transmission and distribution system. (A3, PLO7)
4	DUE50032 Communicative English 3	**COMMUNICATIVE ENGLISH 3** aims to develop the necessary skills in students to analyse and interpret graphs and charts from data collected as well as to apply the job hunting mechanics effectively in their related fields. Students will learn to gather data and present them through the use of graphs and charts. Students will also learn 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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : DUE30022**	1. Present gathered data in graphs and charts effectively using appropriate language forms and functions.(A2, CLS 3b) 2. Prepare a high impact resume and a 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)

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4	**MPU22012 Entrepreneurship**	**ENTERPRENEUSHIP** focuses on the fundamentals and concept of entrepreneurship in order to inculcate the value and interest in students to choose entrepreneurship as a career. This course can help students to initiate creative and innovative entrepreneurial ideas. It also emphasizes a preparation of a business plan framework through business model canvas. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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. Organise the online presence business in social media marketing platform. (A3, CLS 4)
4	**DEC40053 Embedded System Application**	**EMBEDDED SYSTEM APPLICATION** cover the basic concept and application of microcontroller system based on Peripheral Interface Controller (PIC) microcontroller. Students will learn software and hardware development on PIC16F/PIC18F microcontroller development system and understand how to do interfacing with external devices using suitable internal chip features. Students are exposed to the new Microcontroller Unit (MCU) simulation software such as Proteus. **CREDIT(S) : 3** **PRE-REQUISITE(S) : DEC20012**	1. Investigate internal features of PIC16F/PIC18F to interface properly with external devices.(C4, PLO4) 2. Design embedded system application based on PIC16F/PIC18F microcontroller effectively.(C6, PLO3) 3. Construct and simulate real-time embedded system application based on PIC16F/PIC18F microcontroller effectively.(P4, PLO5) 4. Demonstrate knowledge of engineering project management principles through a written report on an assigned mini project. (A3, PLO11)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	**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, programming, constructing and PLC maintenance method. This course also provides knowledge and skills in designing environmentally friendly of automation control system based on conventional/hardwired/relay ladder logic (RLL) and PLC. **CREDIT (S) : 3** **PREREQUISITE (S) : NONE**	1. Explain clearly blocks, parts, components and instructions found in the automation systems. (C2,PLO1) 2. Design simple automation sequential control using electromechanical devices and PLC.(C5, PLO4)3. 3. Display the ability to do troubleshooting and maintenance of hardwired and PLC systems using appropriate equipment. (P4, PLO5) 4. Demonstrate understanding of PLC automation system norm and standard which are IEC and NEMA standards during practical work session. (A3, PLO10)
4	**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 mixed-signal circuits using various types of simulation analysis. Printed Circuit Board (PCB) layout is then produced for the circuits. The simulation and the PCB layout are done using electronic software package such as Protel / Altium Designer, ORCAD, PSpice, Circuit Maker or Electronic Workbench. **CREDIT(S): 1** **PRE-REQUISITE(S): NONE**	1. Apply the simulation results for the various types of simulation analysis based on the electronic circuit theory and operations (C3, PLO1) 2. Construct the simulation and the PCB layout for digital and analogue circuits using a schematic capture software. (P4, PLO5)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
4	DET40073 Power Electronics	**POWER ELECTRONICS** course is aimed to equip students with the knowledge and skills related to power electronic devices and its application in power conversion. This course also will focus on the operational principle of rectifiers, choppers, inverters and AC voltage controller circuits. Emphasis is given more on producing the output voltage waveforms of the converters. **CREDIT (S) : 3** **PREREQUISITE (S) : NONE**	1. Analyze and investigate the well-defined operational behaviour, 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 leadership skills to complete assigned power electronics tasks.(A3, PLO9)
4	DEE40082 Project 1	**PROJECT 1** provides knowledge regarding the implementation and development methods of a project based on hardware or software or a combination of hardware and software. This course provides exposure to the project management and finance, techniques to develop project and proposal preparation. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Investigate well defined problem in order to make improvements on 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, PLO2) 3. Perform project construction procedures (hardware project) or produce flowchart and draft algorithm for system programme (software project) and record the progress systematically. (P4, PLO5) 4. Display good project management and finance through a Gantt Chart (milestone) and final proposal.(A3, PLO11) 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, PLO12) 6. Display written communication skill through a final proposal.(A3, PLO10) 7. Describe the impact of the proposed project to the society in the final proposal.(A3, PLO6)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	**MPU23052** Sains Teknologi & Kejuruteraan Islam*	**SAINS TEKNOLOGI & 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. **CREDIT(S) : 2** **PRE-REQUISITE(S) : 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. Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam.(A4, CLS 4)
5	**MPU23042** Nilai Masyarakat Malaysia**	**NILAI MASYARAKAT MALAYSIA** membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran- cabaran dalam membentuk masyarakat Malaysia5. **CREDIT(S) : 2** **PRE-REQUISITE(S) : NONE**	1. Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia. (A2, CLS 4) 2. Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotisme masyarakat Malaysia (A3, CLS 5) 3. Menghubungkait minda ingin tahu dengan cabaran-cabaran dalam membentuk masyarakat Malaysia. (A4, CLS 4)
5	**DET50063** Motor Control and Drives	**MOTOR CONTROL & DRIVES** course provide students with the knowledge of the principle operations and applications of motor control and electrical drives. This course covers the methods of speed control and braking methods for ac and dc motors. Emphasis is given on principle operation, characteristic curve and solving the related problems. **CREDIT(S): 3** **PREREQUISITE(S) : DET40073**	1. Evaluate the various control methods based on the concept and principle of motor control and drives by considering energy efficiency. (C5 , PLO 2) 2. Display ability to conduct the various methods of motor control and drives using appropriate electrical equipments. (P4 , PLO 5) 3. Demonstrate the ability to communicate effectively in the assigned tasks. (A3 , PLO 10)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	DET50083 Power System Protection	**POWER SYSTEM PROTECTION** is aimed to provide students with the knowledge and exposure to the electrical power equipment protection. The course focuses on the common protection system applied to power system network, switching equipment and their operation. This course also introduces the methods of selecting suitable protection equipment basedon fault current and apparent powercalculations. **CREDIT(S) : 3** **PREREQUISITE(S) : DET30053**	1. Analyze the operation of protection equipment based on AC electrical laws and theorems (C4 , PLO 4) 2. Perform common protection system to electrical network using the appropriate equipment (P4 , PLO 5) 3. Demonstrate social safety and sustainable energy practices on assigned task within a stipulated time frame. (A3 , PLO 6)
5	DET50093 Electrical Maintenance and Repair	**ELECTRICAL MAINTENANCE AND REPAIR** provides students with the knowledge and exposure to the method used in maintenance and repair of electrical equipment. It emphasizes on maintaining electric powered equipment. It also demonstrates knowledge and understanding of electrical schematic diagram and adheres to all safety procedures, regulations for maintaining and display good practices by considering sustainable energy practices. **CREDIT(S) : 3** **PREREQUISITE(S) : NONE**	1. Evaluate the fault finding of maintaining electrical equipments based on its concept and principles according to MS IEC60364 and Electricity Regulations 1994. (C5 ,PLO 2) 2. Perform the ability to troubleshoot and repair various electrical systemand appliances. (P4 , PLO 5) 3. Demonstrate knowledge of the societal issues on safety and health cultural and the consequence responsibilities relevant to engineering norms and sustainableenergy practices during performing electrical system and appliance maintenance task. (A3 , PLO 6)

SEMESTER	CODE AND COURSE NAME	SYNOPSIS	COURSE LEARNING OUTCOMES (CLO) Upon completion of this course students should be able to :
5	DEE50102 Project 2	**PROJECT 2** is the continuation of DEE40082 PROJECT 1 course. The course focuses on methods of circuit construction, testing, troubleshooting, debugging, repair and also completion of the project which was planned during the previous semester. This course also requires students to manage an economical engineering based project, prepare a project report in a given format and deliver a project presentation at the end of the semester. The students are allowed to do an individual or group project but will be assessed individually through the project assessment tasks throughout the course. **CREDIT(S) : 2** **PRE-REQUISITE(S) : DEE40082**	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)

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