



KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI



SULTAN ABDUL HALIM MU'ADZAM SHAH

PROGRAMME HANDBOOK DIPLOMA MECHATRONIC ENGINEERING



1.0 INTRODUCTION

Politeknik Sultan Abdul Halim Mu'adzam Shah (POLIMAS) is a comprehensive, learner-centered higher education institution that serves its local and regional learners and their communities through high-quality and flexible education and training. It is aimed to develop students' employability skills to meet the needs of a more dynamic economy, which values innovation and productivity. Programs include a global perspective that will enable graduates to make a valuable contribution to the wider society as it changes in response to regional and international competition and demand.

POLIMAS programmes include a variety of Outcome-Based Education teaching approaches, adding value to POLIMAS teaching and learning which cater to students seeking a quality polytechnic education and training.

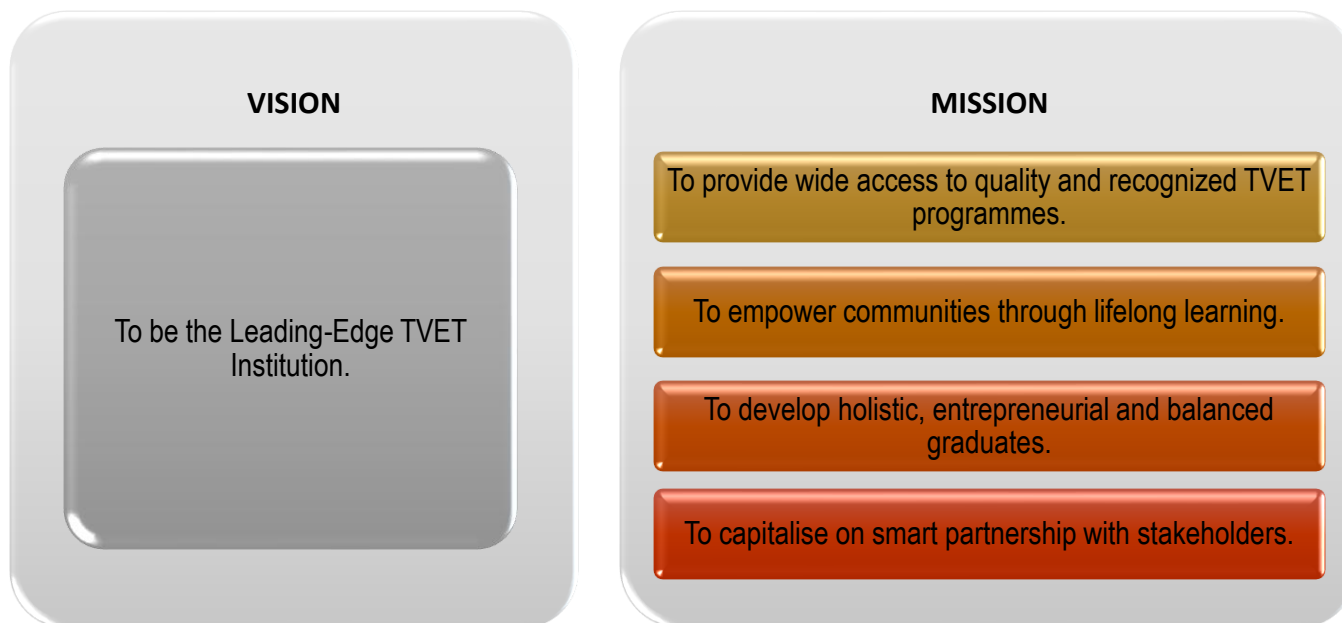
The POLIMAS Programme Handbook provides students with information on many facets of college life such as policies, procedures, and services. It is written for every student enrolled in one or more courses at POLIMAS.

This Handbook is aimed to guide students through the various procedural steps that lead to a Diploma study. It also provides graduate program descriptions, the requirements needed to obtain a graduate Diploma, and a clear outline of the procedural steps that students need to follow. Students are also provided with information on matters related to general administration such as student services and facilities, campus disciplinary measures, student organizations and other relevant matters.

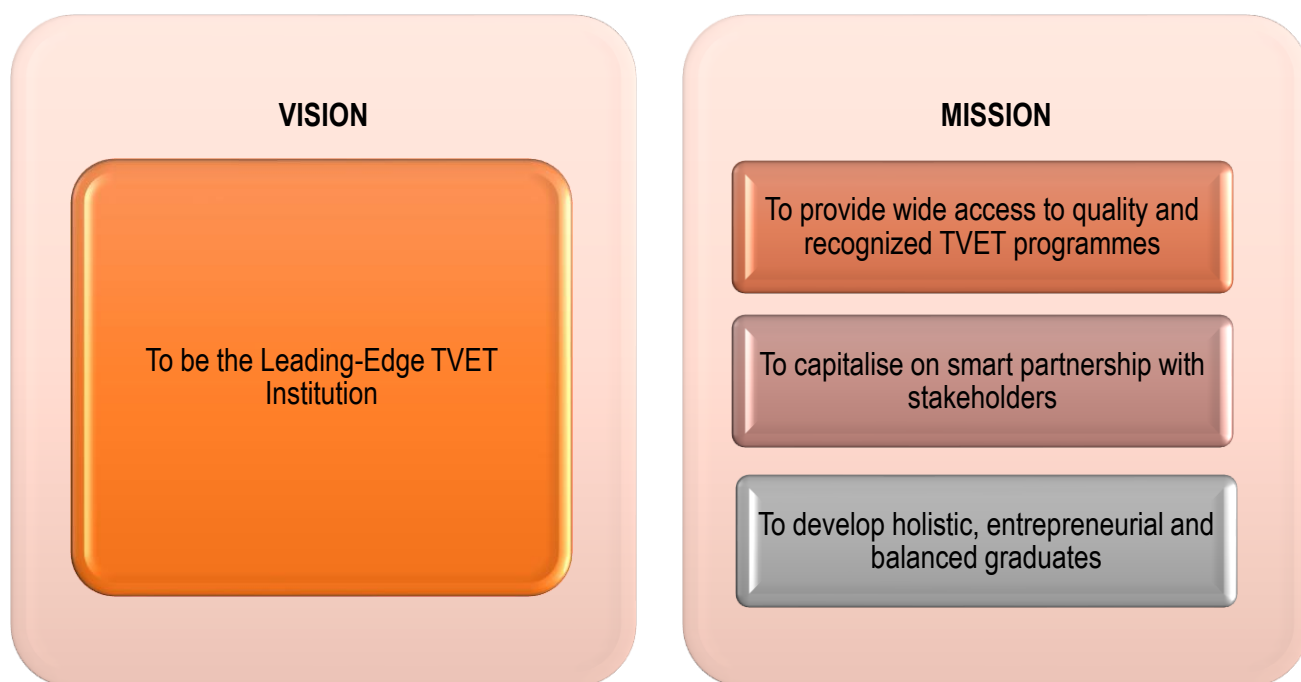
This book serves as a preliminary guide and does not purport to completely address every policy, procedure and regulation. In addition, no claim is made that this document covers all the rules and regulations in effect now at POLIMAS. Students must refer to their event POLIMAS Department programmes and services publications and other Departments and Units Policies for further information.

2.0 VISION & MISSION

DEPARTMENT OF POLYTECHNIC EDUCATION AND COMMUNITY COLLEGE EDUCATION

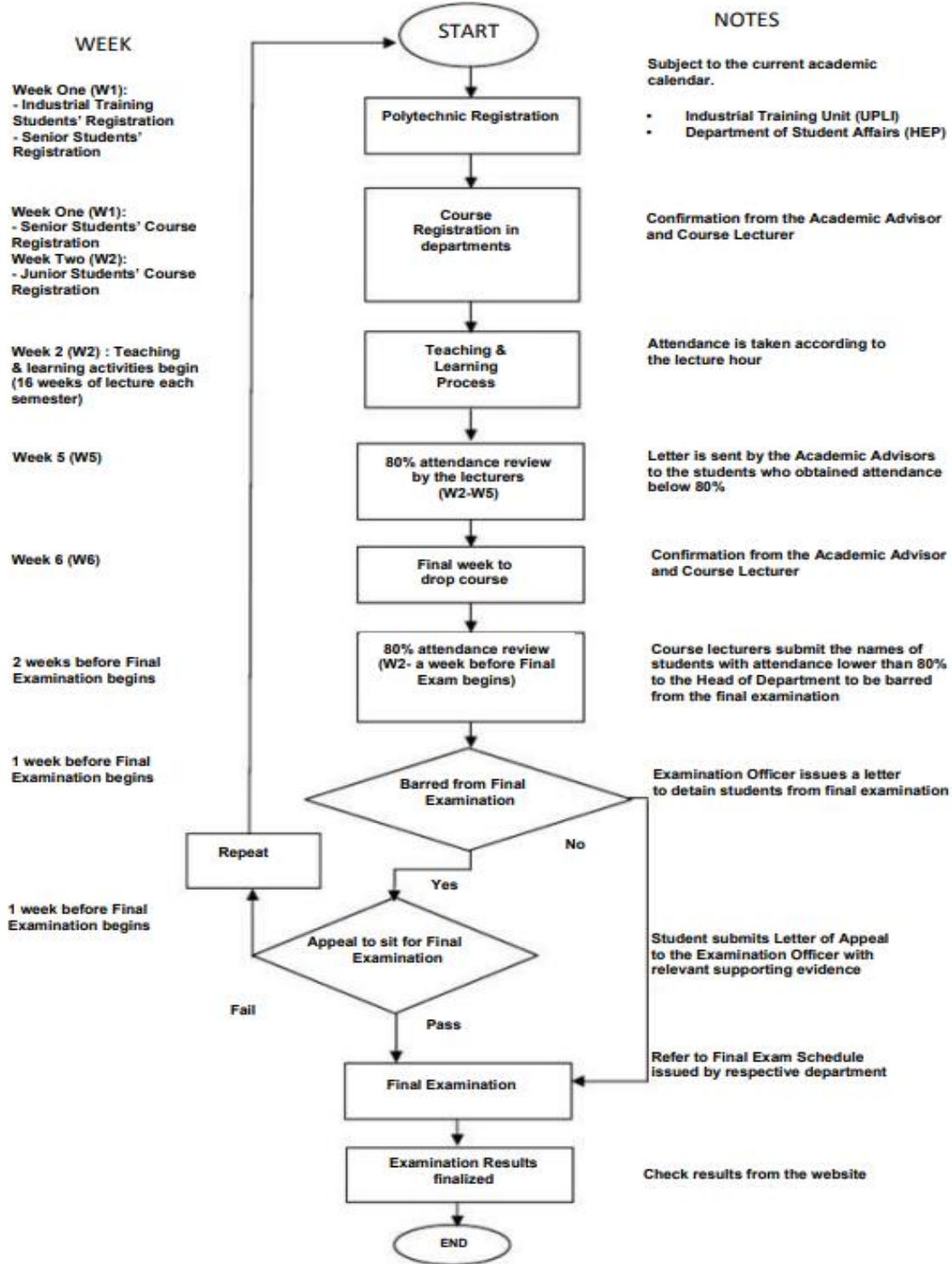


POLITEKNIK SULTAN ABDUL HALIM MU'ADZAM SHAH

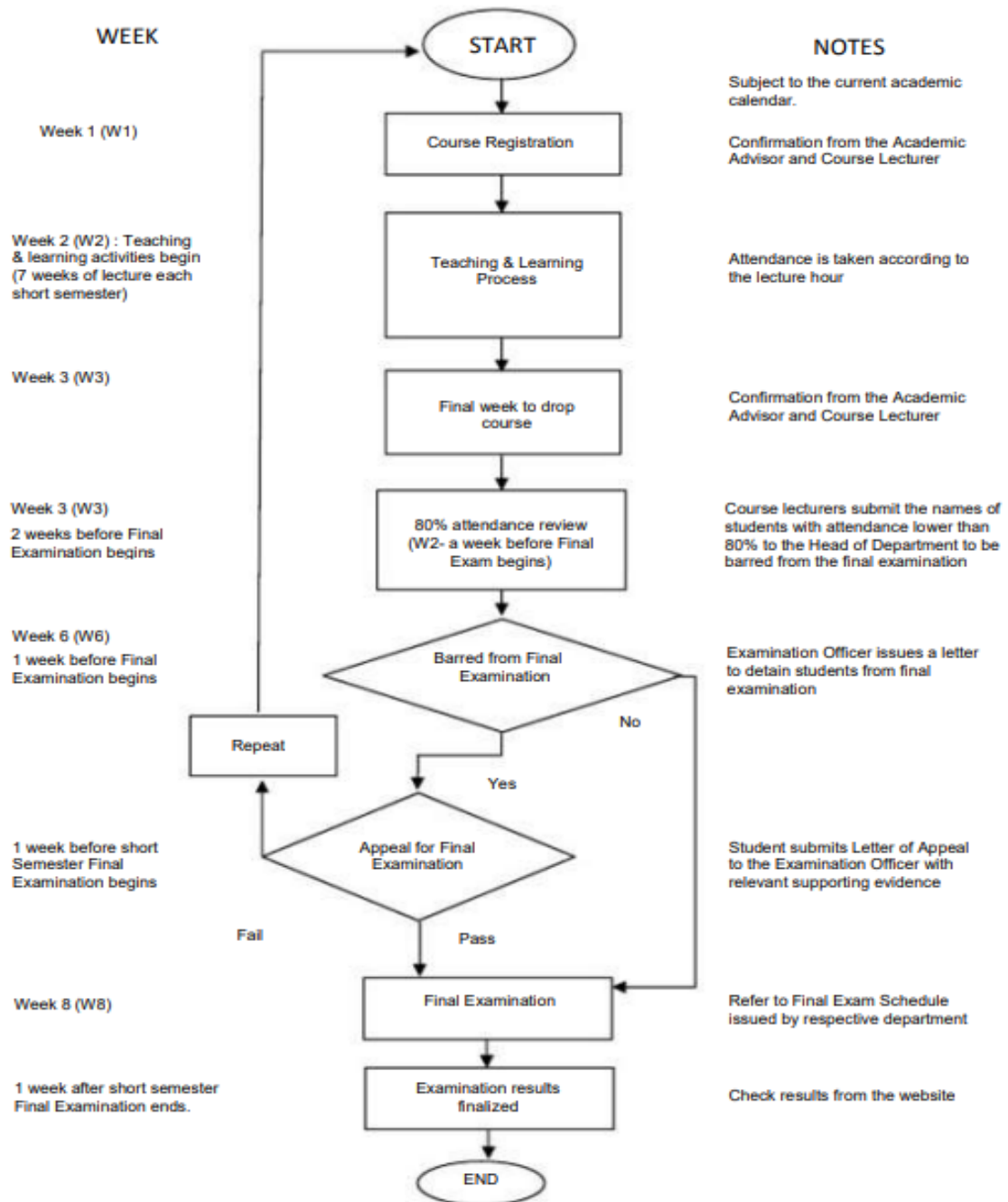


3.0 ACADEMIC FLOW CHART

ACADEMIC FLOW CHART FOR SEMESTER



ACADEMIC FLOW CHART FOR SHORT SEMESTER

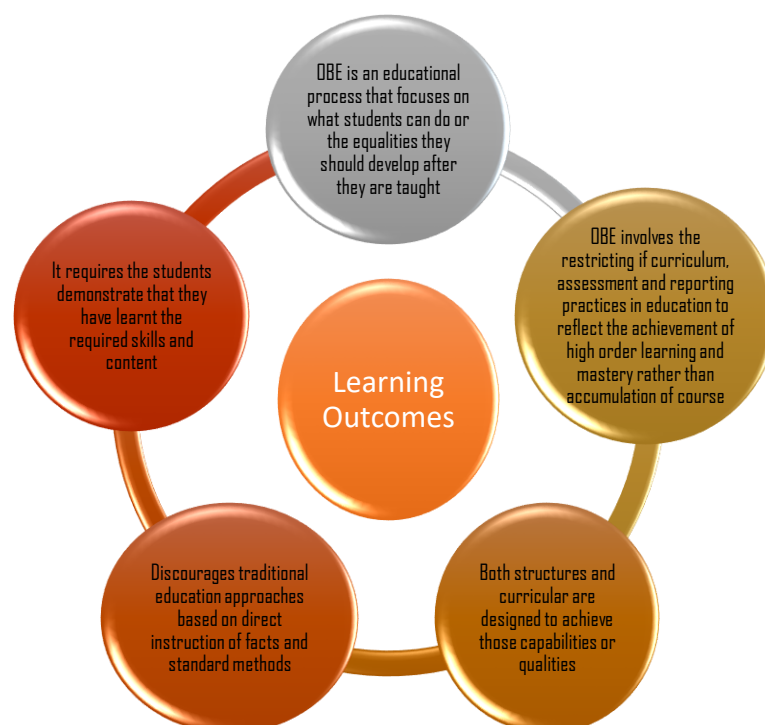


4.0 OUTCOME-BASED EDUCATION [OBE]

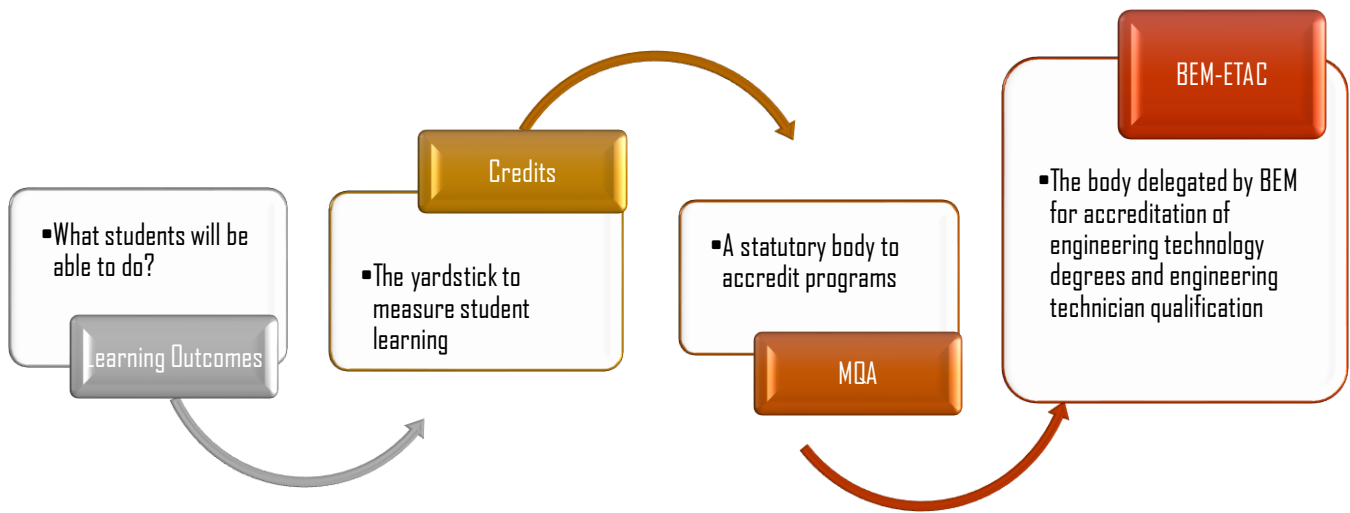
Outcome-based education (OBE) is an educational model for students to demonstrate their knowledge and able to perform according to the required outcomes. It is a student-centered approach that focuses on students' learning. It starts with a clear picture of what students should know, what they should be able to do, and what desirable attitudes and values needed to organize the curriculum, instruction, and assessment to ensure an ultimate learning (Spady, 1994:1). Thus, OBE involves the restructuring of curriculum and assessment that reflects achievement of high learning order and mastery learning.

OBE helps students to be aware of what they should learn, aware of what they are learning, and the control over their learning. It leads to successful student learning and encourages lecturers to be well prepared. It also provides students with appropriate, purposeful learning experiences and opportunities for students to develop originality, self-motivation and independence while acquiring useful knowledge and skills.

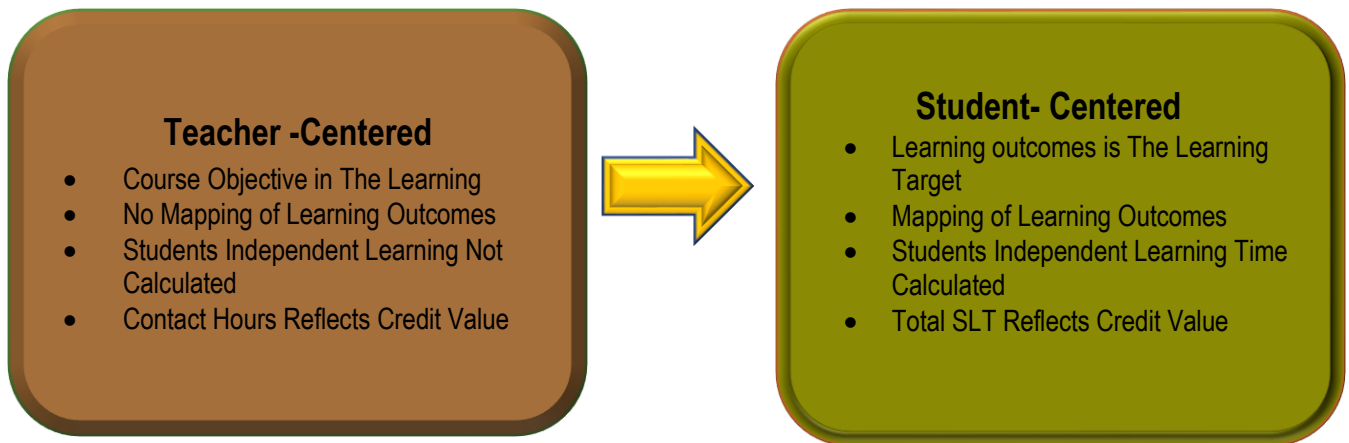
4.1 WHAT IS OUTCOME-BASED EDUCATION [OBE]



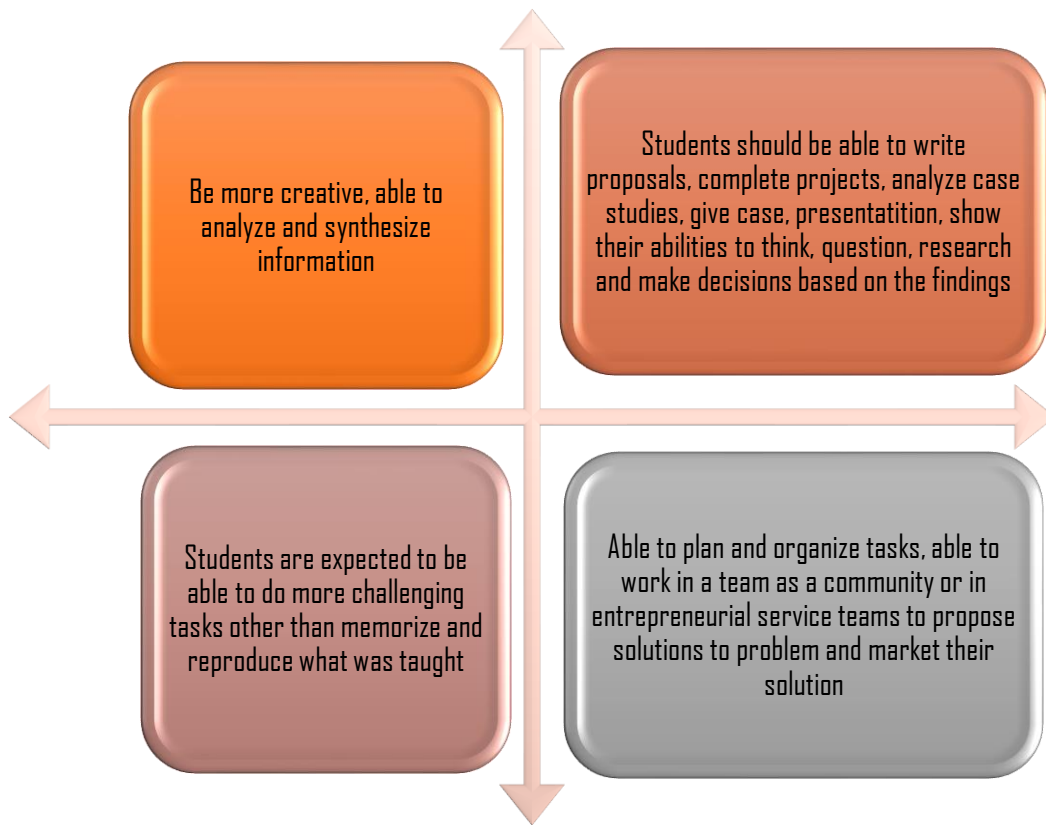
4.2 ACREDITATION PROCESS



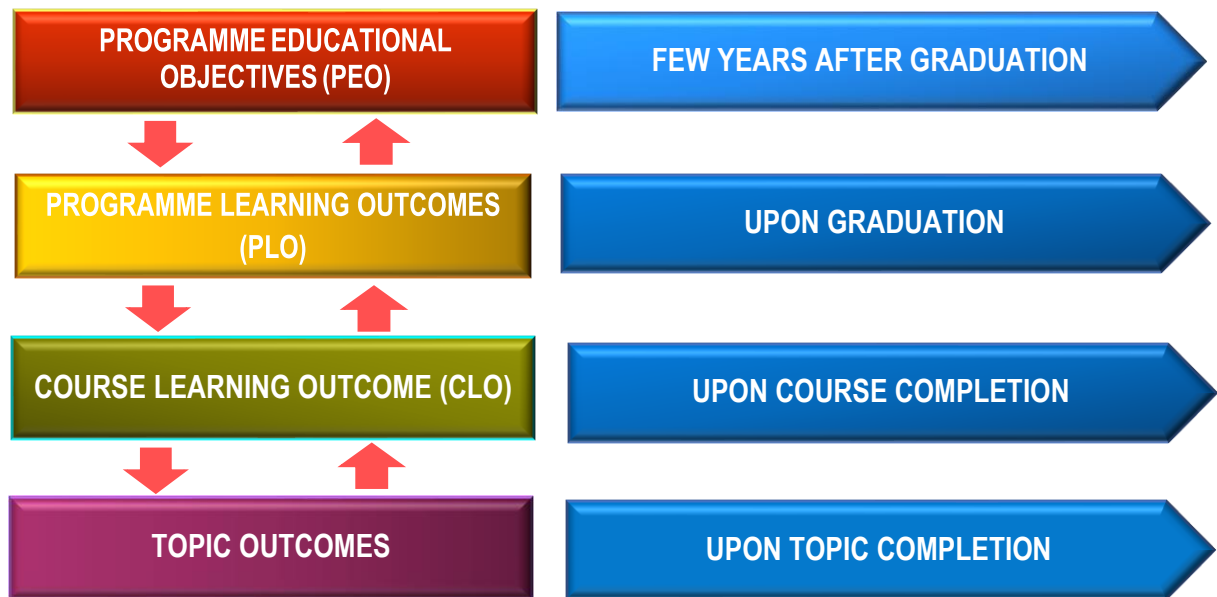
4.3 HOW DOES OBE AFFECT TEACHING-LEARNING?



4.4 EXPECTATIONS ON STUDENTS



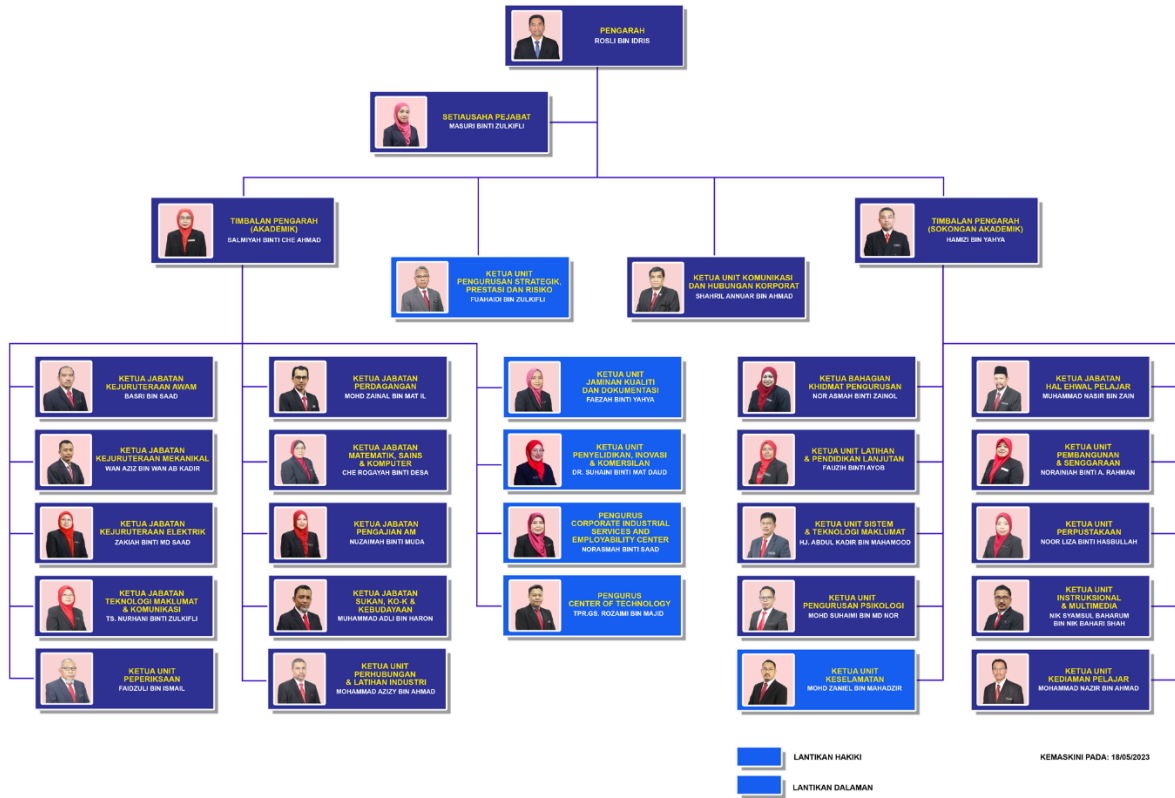
4.5 DIFFERENT LEVELS OF OBE



5.0 MANAGEMENT ORGANISATION CHART



CARTA ORGANISASI PENGURUSAN POLITEKNIK SULTAN ABDUL HALIM MU'ADZAM SHAH



6.0 MECHANICAL ENGINEERING DEPARTMENT



6.1 MECHATRONIC ENGINEERING ORGANISATION CHART



6.2 PROGRAMME MECHATRONIC ENGINEERING LECTURERS

NO.	NAME	DESIGNATION	CONTACT NO.	GED PANGKAT
1.	LIZAWATI BINTI JAAFAR	Head of Programme	04-9146100 ext. 6293	DH44
2.	NORFIDAH BINTI ABDUL HAMID	Senior Lecturer	04-9146100 ext. 6293	DH48
3.	TS. MOHD YAHYA BIN SAAD	Senior Lecturer	04-9146100 ext. 6293	DH52
4.	AZAHAR BIN MOHD NOOR	Senior Lecturer	04-9146100 ext. 6293	DH44
5.	ABDUL LATIF BIN ABD RAZAK	Senior Lecturer	04-9146100 ext. 6293	DH41
6.	SALMI BINTI ABDULLAH	Senior Lecturer	04-9146100 ext. 6293	DH44
7.	SYUKRUL HASSANI BIN JAMALUDIN	Lecturer	04-9146100 ext. 6293	DH48
8.	SITI ARFAH BINTI HASHIM	Lecturer	04-9146100 ext. 6293	DH44
9.	MOHD NAZRI BIN SAAD	Lecturer	04-9146100 ext. 6293	DH44
10.	MOHD ZANIEL BIN MAHADZIR	Lecturer	04-9146100 ext. 6293	DH48
11.	MOHD ZULKIFLEE FAIZAL BIN SALEH	Lecturer	04-9146100 ext. 6293	DH41
12.	SHAIFUL ZAMRI BIN ABDUL SATTAR	Lecturer	04-9146100 ext. 6293	DH48
13.	SHARIMAN BIN JOHARI	Lecturer	04-9146100 ext. 6293	DH44
14.	SOFIAN BIN YUSOFF	Lecturer	04-9146100 ext. 6293	DH41
15.	WAN NOR HARMAN BIN WAN YAHAYA	Lecturer	04-9146100 ext. 6293	DH48

6.3 PROGRAMME DIPLOMA IN MECHATRONIC ENGINEERING

6.3.1 PROGRAMME OVERVIEW

SYNOPSIS

Diploma in Mechatronic Engineering programme is designed to produce holistic graduates that have knowledge and competent skills in the field of mechatronic engineering to fulfil the demand of workers in engineering sector. Five components related to the programme have been identified. Components make up the BOK for Diploma in Mechatronic Engineering are namely Technical, Personal Development, Mathematics, Science and Workplace Competencies. Technical Components is Electronic system, Mechanical System, Computers and Control Systems.

6.3.2 JOB PROSPECT

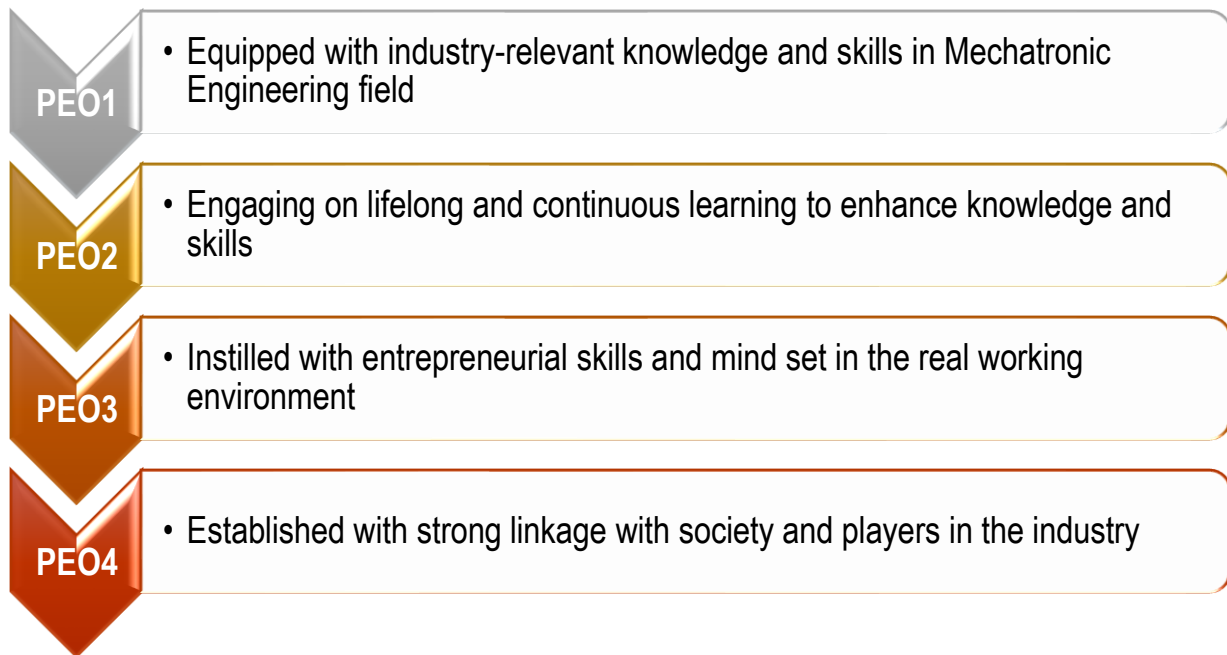
This programme provides the knowledge and skills in Mechatronic Engineering field that can be applied to a broad range of careers in Mechatronic Engineering. The knowledge and skills that the students acquire from the programme will enable them to participate in the job market as:

- a. Assistant Engineer
- b. Technical Assistant
- c. Assistant Service Manager
- d. Service Advisor
- e. Controller system supervisor
- f. Automation and robotic supervisor
- g. Supervisor
- h. Technician
- i. Technical Instructor or Lecturer
- j. Technical Sales Executive / Engineer
- k. Draughter / Designer
- l. Assistant Programmer
- m. Technical Instructor
- n. Entrepreneur
- o. Production Technician

6.3.3 PROGRAMME AIMS

The programme believes that every individual has potential and the programme aims to develop adaptable and responsible Senior Assistant Mechatronic Engineers to support government aspiration to increase workforce in engineering related field.

6.3.4 PROGRAMME EDUCATIONAL OBJECTIVES (PEO)



6.3.5 PROGRAMME LEARNING OUTCOMES(PLO)

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

PLO1	<ul style="list-style-type: none">• Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively for practical procedures and practices
PLO2	<ul style="list-style-type: none">• Identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)
PLO3	<ul style="list-style-type: none">• Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DK5)
PLO4	<ul style="list-style-type: none">• Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements
PLO5	<ul style="list-style-type: none">• Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)
PLO6	<ul style="list-style-type: none">• Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (DK7)
PLO7	<ul style="list-style-type: none">• Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)
PLO8	<ul style="list-style-type: none">• Understand and commit to professional ethics and responsibilities and norms of technician practice
PLO9	<ul style="list-style-type: none">• Function effectively as an individual, and as a member in diverse technical teams PLO10: communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions
PLO11	<ul style="list-style-type: none">• Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments
PLO12	<ul style="list-style-type: none">• Recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

6.3.6 PROGRAMME STRUCTURE FOR DIPLOMA IN MECHATRONIC ENGINEERING

MECHANICAL ENGINEERING DEPARTMENT DIPLOMA IN MECHATRONIC - DEM PROGRAMME STRUCTURE SEM 1, SEM 2 & SEM 3

SEMESTER 1				
NO	COURSE CODE	COURSE	CREDIT HOUR	PREREQUISITE
1	DUE10012	Communicative English 1	2	
2	MPU24XX1	Sukan	1	
		Unit Beruniform 1		
3	DUW10022	Occupational Safety and Health for Engineering	2	
4	DBS10012	Engineering Science	2	
5	DBM10013	Engineering Mathematics 1	3	
6	DJJ10013	Engineering Drawing	3	
7	DJM10012	Mechatronic Workshop Practice 1	2	
8	DJJ10033	Workshop Technology	3	
GRAND TOTAL			18	

SEMESTER 2				
NO	COURSE CODE	COURSE	CREDIT HOUR	PREREQUISITE
1	MPU23052	Sains, Teknologi Dan Kejuruteraan Dalam Islam*	2	PELAJAR ISLAM
	MPU23042	Nilai Masyarakat Malaysia**		PELAJAR BUKAN ISLAM
2	MPU24XX1	Kelab/Persatuan	1	MPU24XX1
		Unit Beruniform 2		
3	DBM20023	Engineering Mathematics 2	3	DBM10013
4	DJJ20053	Electrical Technology	3	
5	DJM20022	Mechatronic Workshop Practice 2	2	
6	DJM20032	C Programming	2	
7	DJM20042	Electronic Systems	2	
8	DJM20053	Thermofluids	3	
GRAND TOTAL			18	

SEMESTER 3				
NO	COURSE CODE	COURSE	CREDIT HOUR	PREREQUISITE
1	DUE30022	Communicative English 2	2	DUE10012
2	DBM30033	Engineering Mathematics 3	3	DBM20023
3	DJM30062	Industrial Electronics	2	
4	DJM30073	Digital System	3	
5	DJJ30093	Engineering Mechanics	3	
6	DJJ30113	Material Science and Engineering	3	
7	DJJ30122	Computer Aided Design	2	DJJ10013
GRAND TOTAL			18	

**MECHANICAL ENGINEERING DEPARTMENT
DIPLOMA IN MECHATRONIC - DEM
PROGRAMME STRUCTURE SEM 4, SEM 5 & SEM 6**

SEMESTER 4				
NO	COURSE CODE	COURSE	CREDIT HOUR	PREREQUISITE
1	DJJ40132	Engineering and Society	2	
2	DJM40082	Programmable Logic Control	2	
3	DJM40092	Control System	2	
4	DJM40103	Power Electronics	3	
5	DJJ40153	Pneumatic & Hydraulics	3	
6	DJJ40182	Project 1	2	
7	DJM52022	Railway 2 - Signalling in Rail	2	ELECTIVE
GRAND TOTAL			16	

SEMESTER 5				
NO	COURSE CODE	COURSE	CREDIT HOUR	PREREQUISITE
1	MPU21032	Penghayatan Etika dan Peradaban	2	
2	DUE50032	Communicative English 3	2	DUE30012
3	MPU22012	Entrepreneurship	2	
4	DJM50113	Industrial Automation	3	
5	DJM50122	Embedded System Application	2	
6	DJJ50193	Project 2	3	DJJ40182
GRAND TOTAL			14	

SEMESTER 6				
NO	COURSE CODE	COURSE	CREDIT HOUR	PREREQUISITE
1	DUT600610	Engineering Industrial Training	10	
GRAND TOTAL			10	
TOTAL CREDIT VALUES			94	

ELECTIVES COURSES				
1	DJJ42022	Industrial Management	2	
2	DJF42032	Instrumentation and Control		
3	DJJ52012	Engineering Plant Technology		
4	DJF41042	CADCAM		
5	DJF51082	Quality Control		
6	DJM42012	Railway 1 - Communication for Rail		
7	DJM52022	Railway 2 - Signalling in Rail		

FREE ELECTIVES*				
1	DUD10012	Design Thinking	2	

Legend:

*For Muslim Students

**For Non Muslim Students

***Only one (1) elective course can be chosen either in semester 4 or 5

Notes:

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

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

3. Co-curriculum pathways:

Path1: Sport and Club

Path 2: Uniform Unit (Students are required to **PASS** Uniform Unit 1 as a prerequisite to Uniform Unit 2)

6.3.7 SYNOPSIS AND COURSE LEARNING OUTCOMES (CLO)

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
1	DBM10013 ENGINEERING MATHEMATICS 1	<p>ENGINEERING MATHEMATICS 1 exposes students to the basic algebra including resolve partial fractions. This course also covers the concept of trigonometry and the method to solve trigonometry problems by using basic identities, compound angle and double angle formulae. Students will be introduced to the theory of complex number and concept of vector and scalar. Students will explore advanced matrices involving 3x3 matrix.</p> <p>Credit(S): 3 Pre-Requisite(S): None</p>	<ol style="list-style-type: none"> 1. Use mathematical statement to describe relationship between various physical phenomena. (C3, CLS1) 2. Show mathematical solutions using the appropriate techniques in mathematics. (C3, CLS3c) 3. Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS3b)
2	DBS10012 ENGINEERING SCIENCE COURSE	<p>ENGINEERING SCIENCE 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.</p> <p>Credit(S): 2 Pre-Requisite(S): None</p>	<ol style="list-style-type: none"> 1. Use basic physics concept to solve engineering physics problems (C3, CLS1) 2. Apply knowledge of fundamental physics in activities to mastery physics concept (C3, CLS 1) 3. Perform appropriate activities related to physics concept (P3, CLS 3a)
3	DJJ10013 ENGINEERING DRAWING	<p>ENGINEERING DRAWING provides the students with the fundamentals of technical drawings and the application Computer Aided Design (CAD) software. For technical drawing, it emphasizes on the practical knowledge of drawing instruments and drawing techniques while for the CAD student will learn to navigate and use the software to create 2D drawing design in engineering. Students shall be able to demonstrate competency in using some standard available features of technical drawing and CAD application to create and manipulate objects or elements in engineering drawing.</p> <p>Credit(S): 3 Pre-Requisite(S): None</p>	<ol style="list-style-type: none"> 1. Apply the fundamentals of technical drawing and features of CAD software in producing engineering drawing. (C3, P1) 2. Construct the technical drawing and 2D CAD drawing according to the engineering drawing standards. (P3, PLO5) 3. Propose a project report with following engineering norms and practices in engineering drawing. (A3, PLO8)

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
4	DJM10012 MECHATRONIC WORKSHOP PRACTICE 1	MECHATRONIC WORKSHOP PRACTICE 1 exposes the students to basic works in an engineering workshop with emphasis on safety practices. Students are exposed to fitting, welding and machining. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Practice and perform correct techniques in handling fitting and machining works and equipments (P3,PLO3) 2. Practice and perform ability to operate gas and arc welding works according to Standard Operation Procedure (SOP) (P4,PLO5) 3. Demonstrate the understanding and awareness of safety procedure in mechanical workshops according to the workshop safety regulations (A3,PLO6)
5	DJJ10033 WORKSHOP TECHNOLOGY	WORKSHOP TECHNOLOGY provides exposure and knowledge in using hand tools, machine operation such as drilling, lathe, milling and computer numerical control. It also covers on gear measurement and inspection welding process in oxy acetylene, Shielded Metal Arc Welding (SMAW), Gas Tungsten Arc Welding (GTAW) and Gas Metal Arc Welding (GMAW). Credit(S): 3 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Apply the knowledge of basic mechanical components and equipment, hand tools and measuring equipment in workshop technology (C3, PLO1) 2. Apply standard practice in operating mechanical tools and component (C3, PLO8) 3. Demonstrate continuous learning and information management skills to complete assigned task (A3, PLO12)
6	DUW10022 OCCUPATIONAL SAFETY AND HEALTH FOR ENGINEERING	OCCUPATIONAL SAFETY AND HEALTH FOR ENGINEERING 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	<ol style="list-style-type: none"> 1. Explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia. (C2, PLO1) 2. CLO2: Initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment. (A3, PLO8) 3. CLO3: Demonstrate communication skill in group to explain the factor that can lead to accident in workplace. (A3, PLO10)

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
7	DJM20022 MECHATRONIC WORKSHOP PRACTICE 2	MECHATRONICS WORKSHOP PRACTICE 2 enhances knowledge on CNC and 3D Printing and also enables student to carry out related task scopes. This course also emphasizes on how to operate CNC machines and 3D printer properly. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Constructs a CNC machine programming according to machining instruction and related tasks. (P3,PLO3) 2. Perform the CNC machining and 3D printing according to Standard Operating Procedure. (P4,PLO5) 3. Demonstrate the ability to work as a team to complete assigned tasks. (A3,PLO9)
8	DJJ20053 ELECTRICAL TECHNOLOGY	ELECTRICAL TECHNOLOGY exposes students to the basic electrical circuit concepts, the application of electromagnetism in electrical machines and transformers. The course focuses on the different types of electrical circuits, the relationship between current and voltage including the resistance. It also provides the skills on the methods of constructing basic circuits and operation of electrical machines and transformers. This course also exposes the students to the demonstration of experiments in Electrical Engineering. Credit(S): 3 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Explain the principles and fundamental of electrical circuits, electromagnetism, transformers and electrical machine (C2, PLO1) 2. Solve the problem related to electrical circuits, electromagnetism, transformers and electrical machine (C3, PLO1) 3. Organize appropriately experiments in groups according to the Standard Operating Procedures. (P4, PLO5)
9	DJM20053 THERMOFLUIDS	THERMOFLUIDS provides student to the basic concepts of thermodynamics and fluids mechanics into one integrated course. This course emphasizes on concepts of conceptual principles in thermofluids, fluid applications, properties of pure substances, first and second law of thermodynamics. This course also provides knowledge and understanding of theory, concepts and application of principles to solve problems related to thermofluids processes Credit(S): 3 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Apply the fundamental concepts of thermodynamics and fluid mechanics to solve the related problem. (C3,PLO1) 2. Perform appropriately experiments according to the Standard Operating Procedures (P4,PLO5) 3. Demonstrate ability to work in team to complete assigned tasks (A3,PLO9)
10	DJM20032 C PROGRAMMING	C Programming course provides an introduction to programme design and development. Student will learn to design, code, debug, test and document wellstructured programs based on technical and engineering problem. Topic covered; software development principle, programming language basic, data types, input and output operation, the use of selection, loops, arrays and function structure. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Explain knowledge of basic concepts of C Programming to solve given problem using an appropriate data type 2. Constructs a high level programming language in solving variety engineering and scientific problems 3. Present a solution for assigned project based on programming which relates to current or upcoming technologies and peripherals

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
11	DJM20042 ELECTRONIC SYSTEMS	ELECTRONIC SYSTEM covers knowledge on basic concepts of semiconductor materials, electronic devices and DC power supply. The course emphasizes on the electrical characteristics and properties of semiconductor materials, linear DC power supplies system, amplifier circuits and sinusoidal wave oscillator circuits. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Apply the characteristics and properties of semiconductor materials. (C3,PLO1) 2. Construct a electronic circuit based on schematic diagram. (P4,PLO5) 3. Demonstrate understanding of electronic circuit. (A3,PLO10)
12	MPU23052 Sains, Teknologi dan Kejuruteraan Dalam Islam*	Sains Teknologi dan Kejuruteraan dalam Islam memberi pengetahuan tentang Konsep Islam sebagai Ad 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	<ol style="list-style-type: none"> 1. Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian. 2. Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam. 3. Menghubungkan minda ingi tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam.
13	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 pepaduan dalam kehidupan di samping cabaran-cabaran dalam membentuk masyarakat Malaysia. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia 2. Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotisme masyarakat Malaysia. 3. Menghubungkan minda ingin tahu dengan cabaran-cabaran dalam membentuk masyarakat Malaysia.
14	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	<ol style="list-style-type: none"> 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)

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
15	DJM30062 INDUSTRIAL ELECTRONICS	INDUSTRIAL ELECTRONICS provides exposure to mechanical, electrical and electronic devices. This course discusses structures of circuits, switches, relays, solenoids, sensors and telemetry systems. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Explain the function of operational principal of switch, relay, solenoid, sensor and telemetry system (C2, PLO1) 2. Display types of switches, relay, solenoid and sensors according to operational principle (P4, PLO5) 3. Comply the switches, relay, solenoid, electronic control devices, converter and sensors in various circuit (A2, PLO10)
16	DJJ30093 ENGINEERING MECHANICS	ENGINEERING MECHANICS focuses on theoretical knowledge in statics and dynamics. This course provides students with fundamental understanding of forces and equilibrium, resultants, equilibrium of a particles and structural analysis. This course also covers kinematics and kinetics of particles. This course also exposes the students to the demonstration of experiments in Engineering Mechanics. Credit(S): 3 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Solve problems related to static and dynamics based on the concepts and principle of engineering mechanics (C3, PLO 1) 2. Analyze engineering related problems based on fundamentals of static and dynamics (C4, PLO 2) 3. Organize appropriately experiment in groups according to Standard Operation Procedures (P4, PLO 5)
17	DJJ30113 MATERIAL SCIENCE AND ENGINEERING	MATERIALS SCIENCE AND ENGINEERING course introduces students a comprehensive coverage of basic fundamentals of materials science and engineering. The course focuses on material structures, properties, fabrication methods, corrosion, thermal processing and material testing mostly of metals and alloys. New fabrication method of powder metallurgy are introduces to student to cater the fabrications of devices, sensors for Industry 4.0 technology. Credit(S): 3 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Apply the fundamental of material science to identify the materials, properties, behavior, processes and treatment.(C3 ,PLO1) 2. Performed appropriate material testing according to the Standard Operating Procedures. (P4, PLO5) 3. Demonstrate the ability to work individually and in groups to complete assigned tasks during the practical work session.
18	DJM30073 DIGITAL SYSTEM	DIGITAL SYSTEM provides the knowledge on the concepts and basic principles of digital circuits used in computer systems. This course focuses on sequential logic circuits, counters and registers. This course also covers the topics on the methods of signal conversion in electronic circuits Credit(S): 3 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Distinguish the characteristics and operations of various digital circuits (C4, PLO1) 2. Construct digital circuits based on schematic diagrams (P4, PLO5) 3. Demonstrate the role of digital circuits in real world applications. (A3, PLO7)

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
19	DJJ30122 COMPUTER AIDED DESIGN	<p>COMPUTER AIDED DESIGN exposes the students to the fundamentals and principles of 3D drawing using 3D CAD software. Students also equip with various method of creating a solid model using extrude, revolve, swept, assembly, simulation and animation. Hands-on exercises drawing of mechanical engineering will also be covered in this course.</p> <p>Credit(S): 3 Pre-Requisite(S): DJJ10013</p>	<ol style="list-style-type: none"> 1. Apply CAD commands in order to produce engineering drawing. (C3, PLO1) 2. Construct 3D drawing of Mechanical Components according Drawing Standards. (P4, PLO5) 3. Demonstrate a presentation with following technical standard Communication. (A3, PLO10)
20	DBM30033 ENGINEERING MATHEMATICS 3	<p>ENGINEERING MATHEMATICS 3 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 and Newton-Raphson methods. In order to strengthen the students in solving engineering problems, Ordinary Differential Equation (ODE) is also included. In additional, the course also discusses optimization problems by using Linear Programming. It is designed to build students' teamwork and problems solving skill.</p> <p>Credit(S): 3 Pre-Requisite(S): DBM20023</p>	<ol style="list-style-type: none"> 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)
21	DJM40082 PROGRAMMABLE LOGIC CONTROLLER	<p>PROGRAMMABLE LOGIC CONTROLLER (PLC) is a course designed to provide students with hardware adaptation and programming skills by employing a PLC for an automation system in the industry. Basic types of automation systems will be studied to assist students in visualizing the application of PLC. The co-relation application of PLC in the automation system will be explored both by theoretical and experimental mode. Practical application of an automation system with PLC will be simulated in a laboratory environment to provide a pseudo industrial based experience.</p> <p>Credit(S): 2 Pre-Requisite(S): None</p>	<ol style="list-style-type: none"> 1. Differentiate the types of automation systems and terminologies used in PLC hardware and programmes. (C2, PLO1) 2. Validate a PLC program related to an industrial automation system. (C5, PLO2) 3. Adapt a PLC for an automated application (P6, PLO3)

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
22	DJM40092 CONTROL SYSTEM	CONTROL SYSTEM provides knowledge regarding various concepts of feedback control system and the required mathematical methods. The emphasis of the course is on control action, transfer functions, and Laplace transforms. This course also provides knowledge in analyzing and data interpretation on different types of controller mode. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Explain the basic concept of control system including controller principle, transfer function and stability (C2, PLO2) 2. Construct experiment on different types of controller mode in order to analyse and interpretation of data (P4, PLO3) 3. Demonstrate the ability to work in team for completing assigned task during practical work sessions (A3, PLO9)
23	DJM40103 POWER ELECTRONICS	POWER ELECTRONICS provides knowledge on widely used motor control concepts especially those in high power industry. The course focuses on basic concepts of Power Electronics and applications with DC and AC motor control covering construction of DC and AC electrical drives. Credit(S): 3 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Distinguish the characteristics and operations of various power electronic devices, AC & DC converters and electrical drives (C3, PLO1) 2. Construct power electronic converter and electrical drive circuits based on schematic diagram. (P4, PLO3) 3. Demonstrate effectively on well-defined engineering of power electronic application. (A3, PLO10)
24	DJJ 40132 ENGINEERING AND SOCIETY	ENGINEERING AND SOCIETY focuses on the introduction to professional ethics, theory and philosophy of ethics, values in professional ethics, engineering bylaws and standards, issues in professional ethics and sustainability. It also relates towards IR 4.0 introduction and green engineering. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Implement the roles of engineering profession towards the developing of society and its challenges in globalization (C3, PLO6) 2. Determine the important of work ethics, by laws and professionalism in engineering profession. (C4, PLO8) 3. Determine the needs for sustainable and green engineering towards providing the solutions in engineering field. (C4, PLO7)
25	DJJ 40153 PNEUMATIC & HYDRAULICS	PNEUMATIC & HYDRAULICS provides knowledge and understanding to the importance of pneumatics and hydraulics circuits, equipment and design along with its usage in the industry. Credit(S): 3 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Analyze the basic concept and function of pneumatics and hydraulics system. (C3, PLO1) 2. Design pneumatic, electro-pneumatic and hydraulic circuit according to assigned tasks. (C5, PLO3) 3. Perform experiment on pneumatic, electro-pneumatic and hydraulic circuit during practical session. (P4, PLO5)

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
26	DJJ40182 PROJECT 1	PROJECT 1 provides students with solid foundation on knowledge and skills in formulating project proposal preparation, writing and presentation Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Identify the engineering problems to be solved (C4, PLO2) 2. Analyze methods to solve problems (C4, PLO7) 3. Propose a solution to problems (A3, PLO11)
27	DJM52022 RAILWAY- SIGNALLING IN RAIL	RAILWAY 2 -SIGNALLING IN RAIL exposes the student to the principle of railway signalling. This course covers basic concept of data Railway Signalling fundamental. Students are exposed to Railway Signalling & Communication System. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Apply the basic concept to railway signalling according to Malaysia Railways mainline. (C3, PLO1) 4. Perform the basic concept of signalling in mainline for the railway's networks. (P4, PLO2) 5. Demonstrate the understanding concept of signalling in railways by using practical work by group. (A3, PLO5)
28	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	<ol style="list-style-type: none"> 1. Membentangkan konsep etika dan peradaban dalam kepelbagaian tamadun 2. Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia 3. Mencadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban.
29	DJM50113 INDUSTRIAL AUTOMATION	The Industrial Automation explains the fundamental concept of industrial automation including the mechanical system, actuator control and sensory devices in based on process specification. It also gives students an understanding of modern industrial automation technology. Credit(S): 3 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Apply the fundamental concept of industrial automation including the mechanical system, actuator control and sensory devices. (C2, PLO1) 2. Develop control structure for industrial automation system based on process specification. (P4, PLO5) 3. Demonstrate good communication skills in group on assigned topic. (A3, PLO10)

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
30	DJM50122 EMBEDDED SYSTEM APPLICATION	EMBEDDED SYSTEM APPLICATION covers the basic concept and application of microcontroller system and embedded system. Students will be able learn programming and hardware on embedded development system and understand how to interface. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Explain basic concept of microprocessor and embedded system. (C2, PLO3) 2. Construct a programming language in solving in hardware interfacing. (P4, PLO5) 3. Perform problem solving skill in assigned practical work. (A2, PLO9)
31	DJJ 50193 PROJECT 2	PROJECT 2 is a continuation of Project 1 focusing on project planning, development, project report and presentation. This course introduces students with ability and skills in conducting project planning, development and management based on their project design. It also provides the student with technical writing and presentation skills. The project will be implemented in a group and each group will work on a project under lecturer(s) supervision. Project titles will be based on specialization and students will be assessed individually. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Demonstrate appropriate and creative solution in solving project problems. (P5, PLO3) 2. Perform project plan to achieve objectives with valid and reliable results. (P4, PLO4) 3. Explain the project work and defend project outcomes effectively with good communication skills. (A4, PLO10) 4. Organize project activities and outcomes in report accordance to the specified standard format that applies engineering management principles. (P4, PLO11)
32	MPU22012 ENTREPRENEURSHIP	ENTREPRENEURSHIP focuses on the fundamentals and concept of entrepreneurship in order to inculcate the value and interest in students to choose entrepreneurship as a career. This course can help students to initiate creative and innovative entrepreneurial ideas. It also emphasizes a preparation of a business plan framework through Business Model Canvas. Credit(S): 2 Pre-Requisite(S): None	<ol style="list-style-type: none"> 1. Propose the value proposition of entrepreneurial idea using Business model Canvas.(A3,CLS 3b) 2. Develop a viable business plan by organizing business objectives according to priorities. (A4, CLS 4) 3. Organize the online presence business in social media marketing platform. (A3, CLS 4)

SEM	COURSE	SYNOPSIS	COURSE LEARNING OUTCOMES
33	DUT600610 ENGINEERING INDUSTRIAL TRAINING	<p>ENGINEERING INDUSTRIAL TRAINING course will provide student with first-hand experience in an engineering practice environment outside the polytechnic. Students will practice their knowledge and skill based on knowledge learned in polytechnic through industry supervision to acquire the craft skill and essential. Student also need to demonstrate their responsibilities and professional ethics, communication, teamwork, and interpersonal and lifelong learning skills at the workplace</p> <p>Credit(S): 10 Pre-Requisite(S): Fulfill requirement industrial training guideline</p>	<ol style="list-style-type: none"> 1. Perform the assigned task accordingly based on job scope requirement (P4, PLO5) 2. Initiate responsibilities as engineering technician while dealing with societal, health, safety, legal, cultural and other issues (A3, PLO6) 3. Practice professional ethic and responsibility as an engineering technician. (A5, PLO8) 4. Display ability to work in team or independtly base on the given task (P4, PLO9) 5. Explain the task by using effectively verbal/ visual communication skill in performing job requirement (A4, PLO 10) 6. Write a report based on the given task accordingly to technical practice (C3, PLO 10) 7. Display life long-learning skill in completing the given task (P4, PLO12)

8.0 SUPPORT SERVICES

8.1 STUDENT AFFAIRS DEPARTMENT (HEP)

The Student Affairs Department basically has two main wings namely:

a. Admission and Data

The main function of this unit is to conduct the admission process efficiently and effectively. The process is conducted twice a year. Coordination and consultation with all the Head of Academic Departments is done in order to ensure the maximum enrolment of students.

b. Welfare and Discipline

The responsibilities of the Welfare and Discipline include the following:

- Scholarship and Education
- Insurance Policy
- Orientation Week
- Discipline
- Welfare
- Registration Of Student Vehicles
- Students' Representative Council

Each student will be covered under the insurance scheme known as *Accident Takaful* and *Family Group Takaful*. Insurance Policy from Takaful Company has been selected to cover the scope and amount of coverage as follows:

Company	Scope	Sum Assured
Takaful Malaysia Premium: RM15.00 yearly Students are insured 24 hours during their studies in POLIMAS	Death caused by accident	RM20,000.00
	Total Permanent/ Disablement	RM20,000.00
	Burial expenses	RM1000.00
	Medical Expenses	RM1000.00 @ RM40.00 per day

Actions to be taken during the occurrence of accidents are as follows: -

- a. Students can get treatment from government or private hospitals in case of accidents.
- b. Academic Advisors / Coordinators of Welfare / Students / Students Next Kin of Guardians / Guardians must report the accident to the Student Affairs Department (HEP), POLIMAS within 14 days from the date of accident. HEP will notify Takaful within 30 days after the report is made for further actions to be taken.
- c. In the case of the student's location is far from POLIMAS and he or she may want to apply for claims from insurance companies, POLIMAS will hand the "Insurance Claim Form" to the student / family / guardian for follow-up actions. The completed claim form and supporting documents can be delivered or mailed to HEP POLIMAS.

Documents that need to be attached with the claim form are: -

- a. A copy of the identity card and student card
- b. A copy of the police report / industry
- c. A copy of driver's license
- d. Doctor report / Original medical bills
- e. A copy of discharge letter
- f. A copy of the death certificate / post mortem
- g. Pictures (scene location / physical)

8.2 EXAMINATION UNIT

Each Polytechnic Ministry of Education is responsible for providing guidance on learning, assessment, control and conduct of the examination. Certificate and Diploma to each student is subject to approval and confirmation of Board of Examination and Certificate / Diploma Polytechnic after students have passed all examinations and meet all the requirements of the course. For a polytechnic, Examination Unit is the unit where responsible for planning, managing and implementing all activities related to student assessment based on the guidelines and evaluation set.

Grading System:

Marks	Grade Points	Grade	Status
90-100	4.00	A+	Excellent
80-89	4.00	A	Excellent
75-79	3.67	A-	Distinction
70-74	3.33	B+	Distinction
65-69	3.00	B	Distinction
60-64	2.67	B-	Passed
55-59	2.33	C+	Passed
50-54	2.00	C	Passed
47-49	1.67	C-	Passed
44-46	1.33	D+	Passed
40-43	1.00	D	Passed
30-39	0.67	E	Failed
20-29	0.33	E-	Failed
0-19	0.00	F	Failed

Complete information about Examination Unit can be referred to **ARAHAN-ARAHAN PEPERIKSAAN DAN KAEDAH PENILAIAN**.

8.3 LIAISON & INDUSTRIAL TRAINING UNIT

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 finalized 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.

Complete information about Liaison & Industrial Training Unit can be referred to ***PENGURUSAN DAN KAEDAH PENILAIAN LATIHAN INDUSTRI POLITEKNIK***.

8.4 LIBRARY UNIT

POLIMAS library provides academic resources and services to all students, staff and other members of POLIMAS community. 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 semiprofessional.

Business Hour:

Sunday-Wednesday	8.30am – 4.45pm
Thursday	8.30am – 3.15 pm
Friday, Saturday and Public Holiday	Closed

8.5 PSYCHOLOGY, COUNSELING AND CAREER UNIT

The main objective of the Psychology, Counselling and Career Unit is to facilitate students' self-development by helping them make the most of their polytechnic experiences. This unit offers to help students in finding and searching for alternative ways to overcome their emotional and psychological difficulties in dealing with problem encountered during their course of study at the polytechnic, guiding students in their career planning as well as helping the acquire better access to the job market in the private and public sectors. The unit helps students to exercise self-determination, achieve and realize their potentials and become positive contributors to the society.

Psychology, Counselling and Career Unit is ready to guide and help students to overcome existing challenges in campus. It is hoped that through the counselling and consultation process offered by this unit, the students are able to achieve:

- Understanding of oneself
- Developing awareness of self-potential
- Able to make wise decision
- Actively participate in academic and co-curriculum activities

8.6 HALLS OF RESIDENCE UNIT

The management and administration consist of two parts:

- a. Hostel management manage the hostel building and equipment
- b. Hostel resident management in-out management, welfare activities, discipline and the resident security.

About 1100 new students been offered to stay at hostel with ratio 550 boys and 550 girls.

All information about support services and be referred to **BUKU PANDUAN DAN PERATURAN AM**.

EDITORIAL COMMITTEES

Chairman : Wan Abdul Aziz Bin Wan Kadir (Head of Department)

Editors : Lizawati binti Jaafar (Head of Programme)