POLITEKNIK MALAYSIA
SULTAN MIZAN ZAINAL ABIDIN

STUDENT STUDY GUIDE

mechanical engineering department

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ACKOWLEDGEMENT

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First Publication 2021

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PREFACE

Sr. Hj. Mohd Fikri Bin Ismail
Director of Politeknik Sultan Mizan Zainal Abidin

Assalammualaikum w.b.t dan Salam Sejahtera

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

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

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

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

Hopefully that this Student Study Guide will provide adequate information about PSMZA and its programmes. It will serve as a reference book that will guide the students throughout their studies here. It will aid the students in planning their activities, goals and further achievements in the near future.

As the director of Politeknik Sultan Mizan Zainal Abidin, I would like to welcome all of you to PSMZA and wish you all the best.

Wassalam.

PREFACE

Ts. Asrudin bin Mat Ali
Head of Mechanical Engineering Department

Assalamu'alaikum w.b.t and Salam Sejahtera.

Welcome to the Mechanical Engineering Department, Politeknik Sultan Mizan Zainal Abidin (PSMZA). I would like to congratulate all the new students for being offered admission to study in various diploma programmes offered by the department. I hope the opportunity given will be take wisely and do your best to acquire the knowledge, experience and exposure necessary to be a successful worker.

Mechanical Engineering Department offers Diploma in Mechanical Engineering, Diploma in Mechanical Engineering (Automotive), Diploma in Mechanical Engineering (Manufacturing) and Diploma in Mechatronics Engineering.

Student Study Guide is created as a brief reference for students throughout their studies and as a guidance to help students in planning their activities, goals and further achievements in the near future.

Student Study Guide also contains the brief information of the department curriculum and syllabus applicable to the students. It also serves as your main source of reference related to your academic affairs and provides the required information by the students especially on the department's administration implementation of the programme and courses offered. Student Study Guide can be used by the students to plan their studies as well as a reference for the programme structure offered by the department.

On behalf of Mechanical Engineering Department, I would like to extend my utmost appreciation and sincere gratitude to all parties involved in the publication of this Student Study Guide.

Thank you.

Best wishes, Wassalam.

ABOUT
POLITEKNIK SULTAN MIZAN ZAINAL ABIDIN

Politeknik Sultan Mizan Zainal Abidin (PSMZA) was inaugurated on July 24, 2006 after obtaining His pleasure Down Royal Highness the Sultan of Terengganu in conjunction with the birthday of His Majesty's 44th. Before the polytechnic is known as the 'Politeknik Dungun Terengganu. PSMZA commenced operations since January 2001 at Sekolah Menengah Teknik Dungun and later moved to the campus from 8 October 2001. PSMZA located at the foot of Bukit Bauk, approximately 8 km from the town, 88 km from Kuala Terengganu Airport and 125 km from Kuantan.

PSMZA area of 76.6 acres, includes the development of academic block, workshops and laboratories, lecture halls, classrooms, seminar rooms, TECC, kamsis that can accommodate up to 5000 students at a time. The other facilities are the Resource Center, the Islamic Center, sports complex, golf softball, courts indoor soccer, canteens and cafeterias.

A total of 9 courses at diploma level are offered in PSMZA and 1 Pre Diploma program. PSMZA has 4 master departments which are the Department of Civil Engineering, Department of Electrical Engineering, Department of Mechanical Engineering, Department of Information Technology and Communications as well as supported by two departments, namely the Department of Mathematics, Science and Computer and the Department of General Studies. The total staff is 410 persons comprising academic staff 304 persons and academic support 106 persons.

VISION & MISSION
POLITEKNIK SULTAN MIZAN ZAINAL ABIDIN

Vision & Mission Politenik Sultan Mizan Zainal Abidin are :

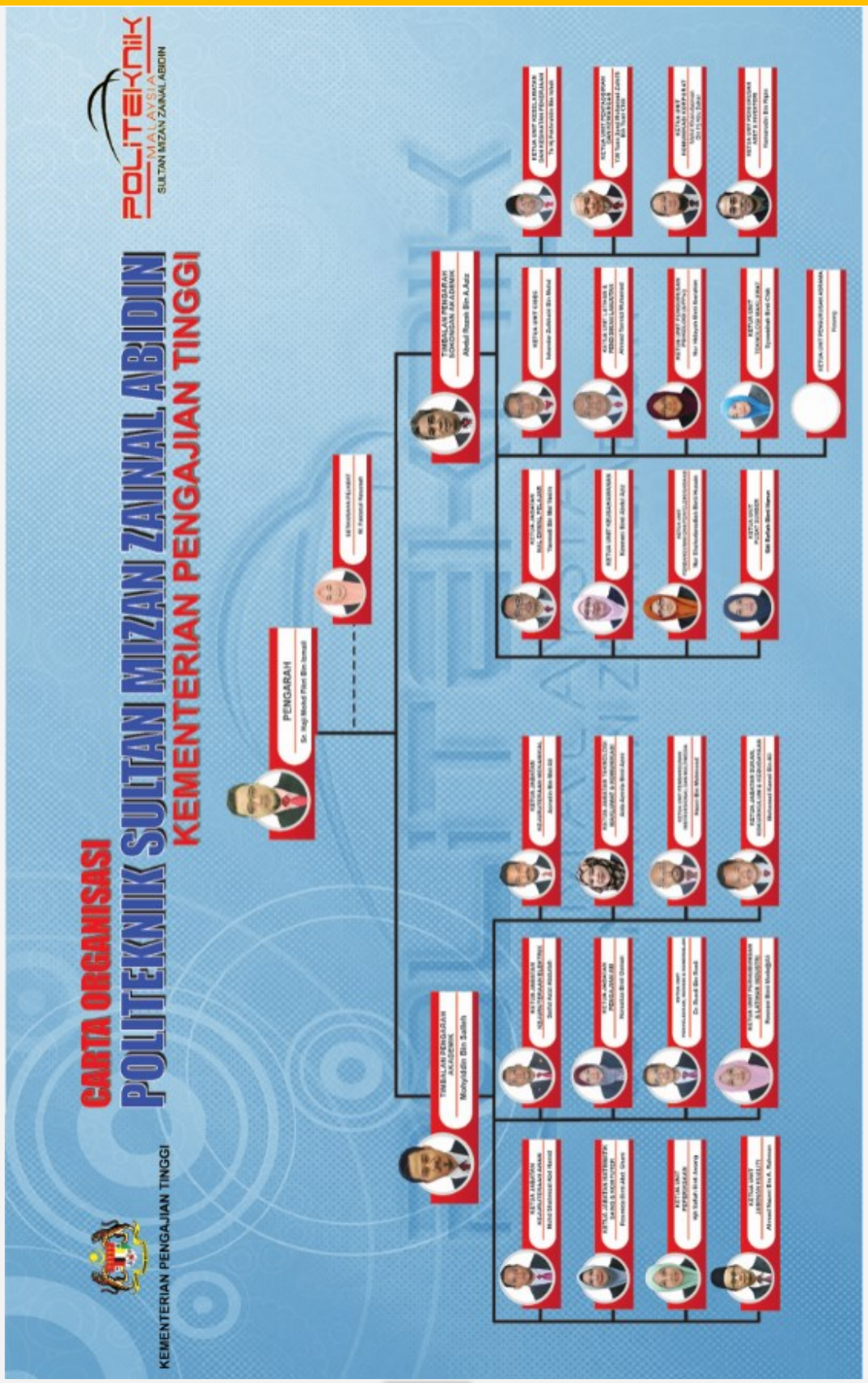
VISION

- To be the Leading-Edge TVET Institution.

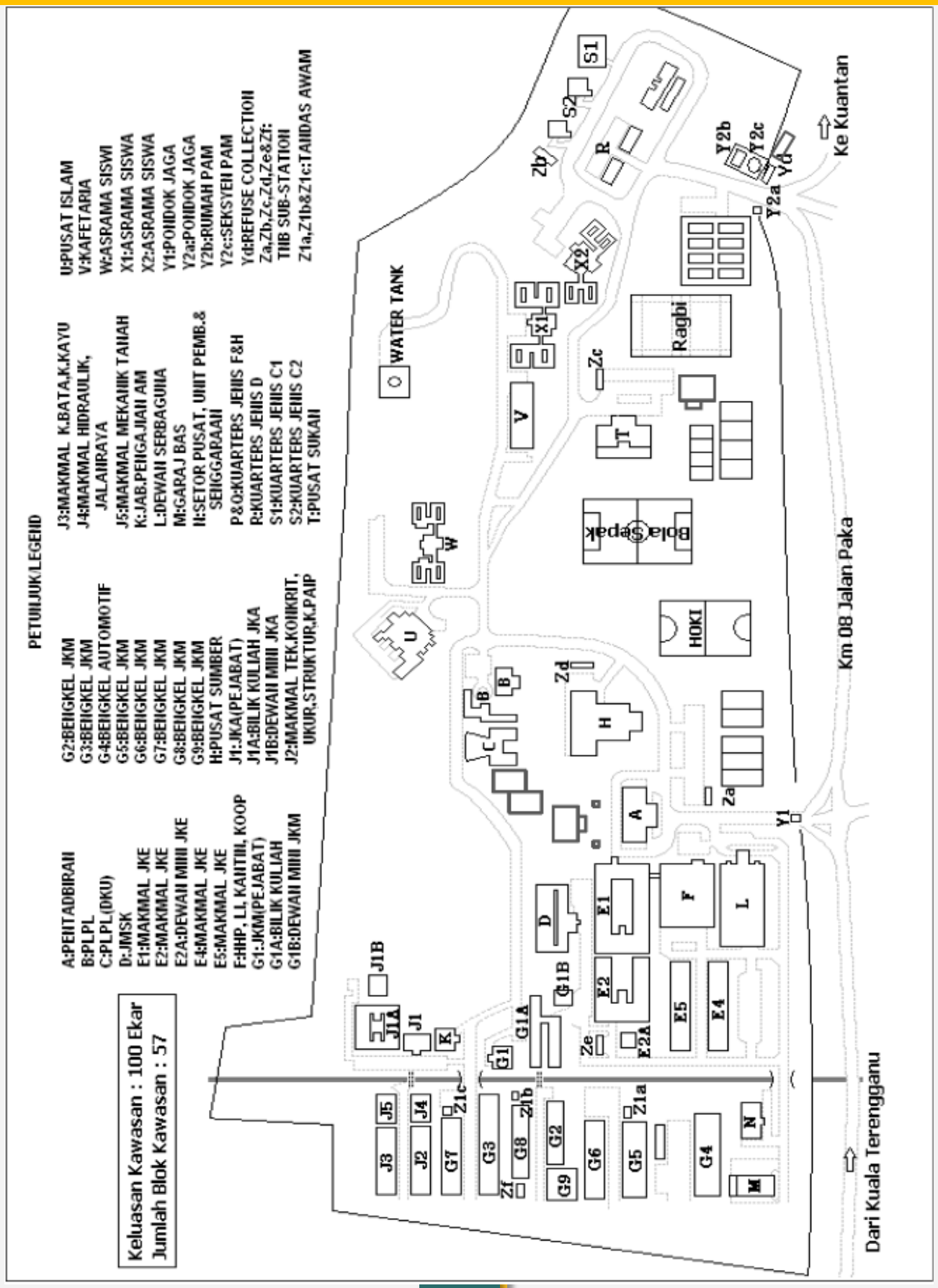
MISSION

- *To provide wide access to quality and recognised TVET programmes*
- *To empower communities through lifelong learning*
- *To develop holistic, entrepreneurial and balanced graduates*
- *To capitalise on smart partnership with stakeholders*

PSMZA
ORGANIZATION CHART



PSMZA FLOOR


PETUNJUK/LEGEND
A:PENTADBIRAN
B:PLPL
C:PLPL(DKU)
D:JMSK
E1:MAKMAL JKE
E2:MAKMAL JKE
E2A:DEWAN MINI JKE
E4:MAKMAL JKE
E5:MAKMAL JKE
F:HHP, LI, KANTIN, KOOP
G1:JKM(PEJABAT)
G1A:BILIK KULIAH
G1B:DEWAN MINI JKM
G2:BENGKEL JKM
G3:BENGKEL JKM
G4:BENGKEL AUTOMOTIF
G5:BENGKEL JKM
G6:BENGKEL JKM
G7:BENGKEL JKM
G8:BENGKEL JKM
G9:BENGKEL JKM
H:PUSAT SUMBER
J1:JKA(PEJABAT)
J1A:BILIK KULIAH JKA
J1B:DEWAN MINI JKA
J2:MAKMAL TEK.KOMKRIT, UKUR,STRUKTUR,K.PAIP
J3:MAKMAL K.BATA,K.KAYU
J4:MAKMAL HIDRAULIK, JALANRAYA
J5:MAKMAL MEKANIK TANAH
K:JAB.PENGAJIAN AM
L:DEWAN SERBAGUNA
M:GARAJ BAS
N:SETOR PUSAT, UNIT PEMB.& SENGGARAAN
P&O:KUARTERS JENIS F&H
R:KUARTERS JENIS D
S1:KUARTERS JENIS C1
S2:KUARTERS JENIS C2
T:PUSAT SUKAN
U:PUSAT ISLAM
V:KAFETARIA
W:ASRAMA SISWI
X1:ASRAMA SISWA
X2:ASRAMA SISWA
Y1:PONDOK JAGA
Y2a:PONDOK JAGA
Y2b:RUMAH PAM
Y2c:SEKSYEN PAM
Yd:REFUSE COLLECTION
Za,Zb,Zc,Zd,Ze&Zf:
TNB SUB-STATION
Z1a,Z1b&Z1c:TANDAS AWAM
Keluasan Kawasan : 100 Ekar
Jumlah Blok Kawasan : 57
WATER TANK
Ragbi
Bola Sepak
HOKI
Km 08 Jalan Paka
Ke Kuantan
Dari Kuala Terengganu

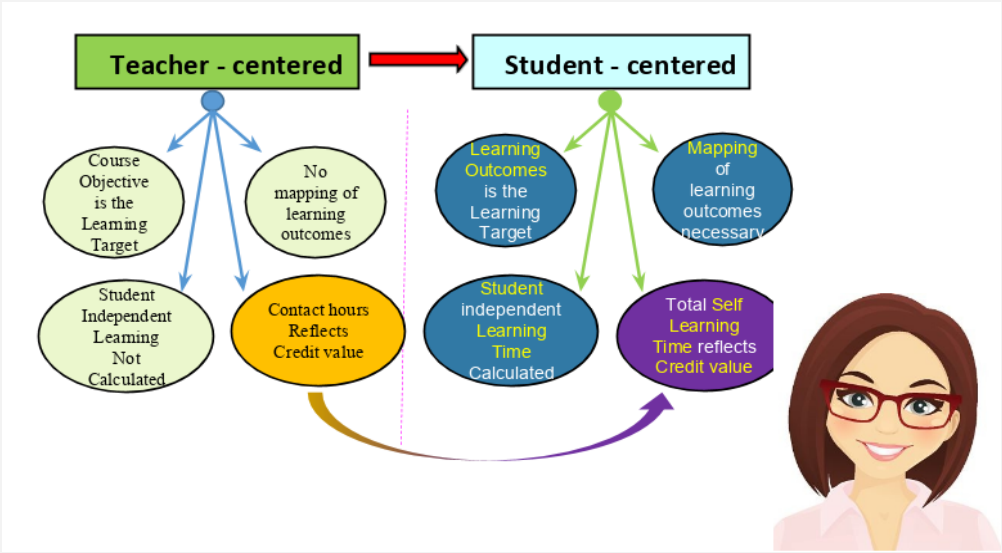
OUTCOME-BASED EDUCATION (OBE)

OUTCOME-BASED EDUCATION OBE

OUTCOME BASED EDUCATION (OBE)

OBE (Outcome-Based Education) is an approach that focuses on the attainment of intended learning outcomes where students develop behaviors that are authentic to their discipline and are assessed holistically within the context of their learning. OBE clearly focuses and organizes everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experiences. This means starting with a clear picture of what is important for all students to be able to do, then organizing curriculum (outcome), instruction (activity), and assessment to make sure this learning ultimately happens.

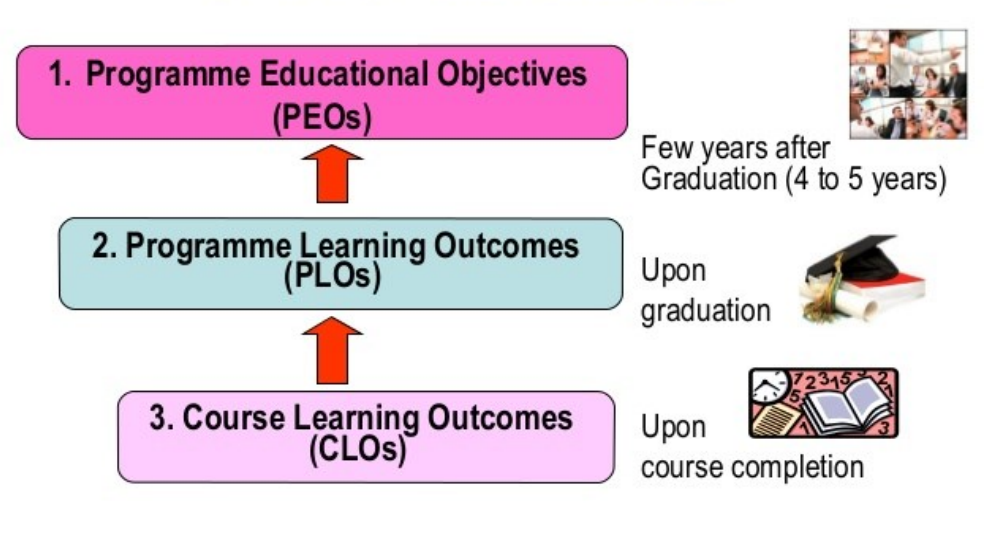
Spady, 1994



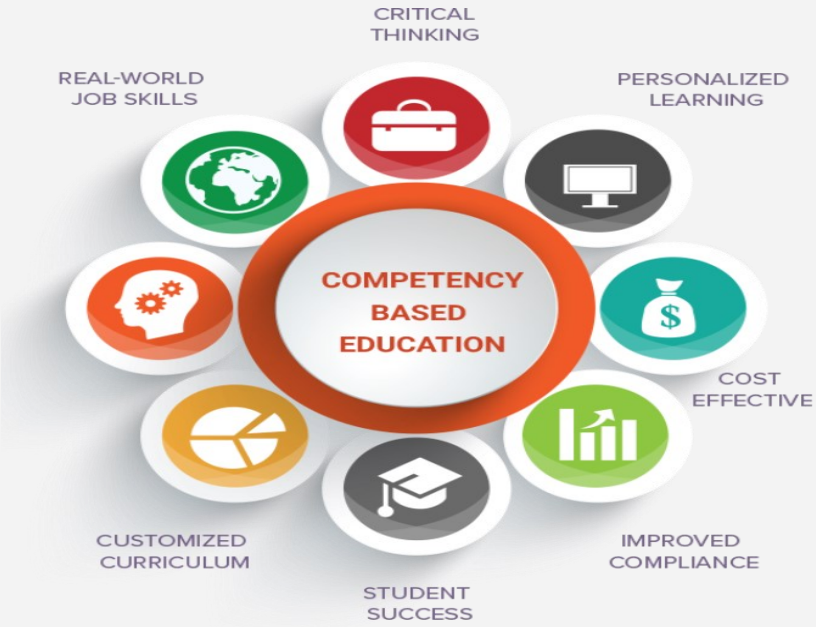
Learning Roles of OBE

OUTCOME-BASED EDUCATION
OBE

OBE is an internationally practised educational model that focuses on the measurement of student outcomes and the implementation of corrective measures to overcome deficiencies in course delivery methods / assessment / student attitude, etc.



CLO, PLO & PEO



Impacts of OBE

MECHANICAL ENGINEERING DEPARTMENT

ABOUT
DEPARTMENT OF MECHANICAL ENGINEERING

Department of Mechanical Engineering is the biggest department at Politeknik Sultan Mizan Zainal Abidin with 82 academic staff and 6 non academic staff.

Programme Offered :	♦ **Diploma in Mechanical Engineering** ♦ **Diploma in Mechanical Engineering (Automotive)** ♦ **Diploma in Mechanical Engineering (Manufacturing)** ♦ **Diploma in Mechatronic Engineering**

Those programmes cater to four categories of courses or subjects. It means that students have to complete all the courses listed for their programmes in order to graduate. The four categories of courses are the core, elective, compulsory and common courses.

This department provides a vast range of facilities as Fitting and Machining Workshop, Welding Workshop, Foundry Workshop, Strength of Materials Laboratory, CADCAM Laboratory, Mechanics of Machines Laboratory, Fluid Mechanics Laboratory, Thermodynamics Laboratory, Drawing Room and etc.

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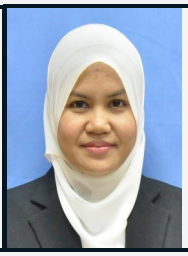

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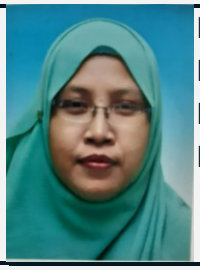

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WORKSHOP
DEPARTMENT OF MECHANICAL ENGINEERING

List of workshop at Department of Mechanical Engineering :

NO	WORKSHOP
1	Fitting Workshop
2	Machining Workshop
3	Welding Workshop
4	Foundry Workshop
5	Automotive Workshop

Machining Workshop

Fitting Workshop

LABORATORY
DEPARTMENT OF MECHANICAL ENGINEERING

List of laboratory at Department of Mechanical Engineering :

NO	LABORATORY
1	Robotic Laboratory
2	CNC Laboratory
3	Robot Soccer Laboratory
4	Pneumatic & Hidraulics Laboratory
5	Mechatronic & Control Laboratory
6	Thermodynamics Laboratory
7	CADCAM Laboratory
8	Quality Control Laboratory
9	Fluid Mechanics Laboratory
10	Strength of Materials Laboratory
11	Mechanics of Machines Laboratory
12	Electric Technology Laboratory
13	Metallurgy Laboratory
14	High Technology Laboratory
15	Drawing Room

CNC Laboratory

Robotic Laboratory

OTHER FACILITIES
DEPARTMENT OF MECHANICAL ENGINEERING

Other facilities at Politeknik Sultan Mizan Zainal Abidin :

NO	OTHER FACILITIES
1	Hostel
2	Classrooms
3	Atec Room
4	Resource Center
5	Islamic Centre
6	Canteen/ cafeterias
7	Lecture hall
8	Seminar rooms
9	*Dewan Dagang*
10	Sports complex
11	Softball complex
12	Courts indoor soccer
13	Student common areas

OTHERS FACILITIES

DEPARTMENT OF MECHANICAL ENGINEERING

Islamic Centre

Hostel

Resource Center

Lecture Hall

Soffball Complex

Classrooms

Student Common areas

DIPLOMA IN MECHANICAL ENGINEERING

DIPLOMA IN MECHANICAL ENGINEERING

INTRODUCTION

In line with the 3rd Industrial Malaysia Plan (IMP3) aiming for the innovative and creative human capital development, via matching talent to expertise with market demand, Diploma in Mechanical Engineering for polytechnic is developed to give balance emphasis on theoretical and practical aspects. The Eleventh Malaysia Plan was drawn to produced 60% out of 1.5 million workers was in TVET sector. Until now a total of 69,475 (51%) of the 136,062 technical education and vocational training (TVET) graduates in Malaysia are working as professionals and skilled workers. Thus, to keep abreast with rapid demand in TVET sector, Department of Polytechnic and Community College Education (DPCCE) progressively collaborates with major industry players in the country in developing the curriculum. The programme will take six semesters to complete, five academic semesters at their respective polytechnics and one semester of industrial training at relevant industries during the final semester. This programme complies with the Board of Engineer (BEM) requirement.

SYNOPSIS

The Diploma in Mechanical Engineering programme is designed to produce holistic graduates that have knowledge and competent skills in the field of mechanical engineering to fulfil the demand of workers in engineering sector. The programme structure focusses on the area of Solid Mechanics, Statics & Dynamics,

Thermodynamics & Heat Transfer, Fluid Mechanics, Materials, Mechanical Design, Workshop Practices, Manufacturing, Instrumentation & Control, Mechanical Maintenance, Electrical & Electronic Technology.

JOB PROSPECT

This programme provides the knowledge and skills in Mechanical Engineering field that can be applied to a broad range of careers in Mechanical 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. Supervisor
f. Technician
g. Technical Instructor or Lecturer
h. Technical Sales Executive / Engineer
i. Draughter / Designer
j. Entrepreneur

DIPLOMA IN MECHANICAL ENGINEERING

VISION

To be the Leading-Edge TVET Institution.

MISSION

a. To provide wide access to quality and recognized TVET programmes.

b. To empower communities through lifelong learning.

c. To develop holistic, entrepreneurial and balanced graduates.

d. To capitalise on smart partnership with stakeholders.

EDUCATIONAL GOAL

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

PROGRAMME AIMS

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The Diploma in Mechanical Engineering programme should produce balanced and competent technical workers who are:

PEO1: Equipped with industry-relevant knowledge and skills in mechanical engineering field

PEO2: Engaging on lifelong and continuous learning to enhance knowledge and skills

PEO3: Instilled with entrepreneurial skills and mind set in the real working environment

PEO4: Established strong linkage with society and players in the industry

DIPLOMA IN MECHANICAL ENGINEERING

PROGRAMME LEARNING OUTCOMES (PLO)

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

PLO1: Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices

PLO2: Identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)

PLO3: Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DK5)

PLO4: Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements

PLO5: Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)

PLO6: Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (DK7)

PLO7: Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)

PLO8: Understand and commit to professional ethics and responsibilities and norms of technician practice

PLO9: Function effectively as an individual, and as a member in diverse technical teams

PLO10: Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions

PLO11: Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments

PLO12: Recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

Notes:

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

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

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

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

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

DK 6: Codified practical engineering knowledge in recognised practice area.

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

DIPLOMA IN MECHANICAL ENGINEERING
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHANICAL ENGINEERING								
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS	PREREQUISITE/ CO-REQUSITE
			L	P	T	O		
SEMESTER 1								
Compulsory	DUE10012	Communicative English 1	1	0	2	0	2	
	MPU24XX1	Sukan / Unit Beruniform 1	0	2	0	0	1	
Common Core	DUW10022	Occupational, Safety & Health Engineering	2	0	0	0	2	
	DBS10012	Engineering Science	2	1	2	0	2	
	DBM10013	Engineering Mathematics 1	2	0	2	0	3	
Discipline Core	DJJ10013	Engineering Drawing	1	3	0	0	3	
	DJJ10022	Mechanical Workshop Practice 1	0	4	0	0	2	
	DJJ10033	Workshop Technology	3	0	0	0	3	
		TOTAL	**25**				**18**	
SEMESTER 2								
Compulsory	MPU23052	Sains, Teknologi dan Kejuruteraan Dalam Islam*	1	0	2	0	2	
	MPU23042	Nilai Masyarakat Malaysia**						
	MPU24XX1	Kelab/Persatuan	0	2	0	0	1	MPU24XX1
	MPU24XX1	Unit Beruniform 2						MPU24XX1
Common Core	DBM20023	Engineering Mathematics 2	2	0	2	0	3	DBM10013
Discipline Core	DJJ20042	Mechanical Workshop Practice 2	0	4	0	0	2	DJJ10022
	DJJ20053	Electrical Technology	2	2	0	0	3	
	DJJ20063	Thermodynamics	2	2	0	0	3	
	DJJ20073	Fluid Mechanics	2	2	0	0	3	
		TOTAL	**25**				**17**	

DIPLOMA IN MECHANICAL ENGINEERING
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHANICAL ENGINEERING

COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS	PREREQUISITE/ CO-REQUISITE
			L	P	T	O		
SEMESTER 3								
Compulsory	DUE30022	Communicative English 2	1	0	2	0	2	DUE10012
Common Core	DBM30033	Engineering Mathematics 3	2	0	2	0	3	DBM20023
Discipline Core	DJJ30082	Mechanical Workshop Practice 3	0	4	0	0	2	DJJ20042
	DJJ30093	Engineering Mechanics	2	2	0	0	3	
	DJJ30103	Strength of Materials	2	2	0	0	3	
	DJJ30113	Material Science and Engineering	2	2	0	0	3	
	DJJ30122	Computer Aided Design	1	2	0	0	2	DJJ10013
TOTAL			**26**				**18**	
SEMESTER 4								
Common Core	DJJ40132	Engineering and Society	2	0	0	0	2	
Discipline Core	DJJ40142	Engineering Workshop Practice 4	0	4	0	0	2	DJJ30082
	DJJ40153	Pneumatic & Hydraulics	2	2	0	0	3	
	DJJ40163	Mechanics of Machines	2	2	0	0	3	DJJ30093
	DJJ40173	Engineering Design	2	2	0	0	3	DJJ30122
	DJJ40182	Project 1	2	0	0	0	2	
Elective		Elective ***						
TOTAL			**20**				**15**	
SEMESTER 5								
Compulsory	MPU21032	Penghayatan etika dan Peradaban	1	0	2	0	2	
	DUE50032	Communicative English 3	1	0	2	0	2	DUE30022
	MPU22012	Entrepreneurship	1	0	2	0	2	
Discipline Core	DJJ50193	Project 2	0	4	0	0	3	DJJ40182
	DJJ50203	Troubleshooting and Maintenance for Mechanical Components	2	2	0	0	3	
	DJJ50212	Maintenance Engineering and Management	2	0	0	0	2	
Elective		Elective***						
TOTAL			**19**				**14**	
SEMESTER 6								
Industrial Training	DUT600610	Engineering Industrial Training	0	0	0	0	10	
TOTAL			**0**				**10**	
TOTAL CREDIT VALUES							**94**	

DIPLOMA IN MECHANICAL ENGINEERING
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHANICAL ENGINEERING							
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS
			L	P	T	O	
ELECTIVE COURSE							
1	DJJ42022	Industrial Management	2	0	0	0	2
2	DJJ42032	Instrumentation and Control	2	0	0	0	
3	DJJ52012	Engineering Plant Technology	2	0	0	0	
4	DJJ52052	Railway Track System	2	0	0	0	
5	DJM20032	C Programming	2	0	0	0	
6	DJM40082	Programmable Logic Control	1	2	0	0	
7	DJM40092	Control System	1	2	0	0	
8	DJM40092	Control System	1	2	0	0	
FREE ELECTIVES							
1	DUD10012	Design Thinking	1	0	0	1	2

COURSE CLASSIFICATION	TOTAL CREDIT	%
i. a) Compulsory	14	14.9
b) Compulsory (Bahasa Kebangsaan A)[b]	2[b]	0.0
ii. Common Core	15	16.0
iii. Discipline Core	53	56.4
Total Credit	**82**	**87**
v. (a) Electives	2	2.1
(b) Free Electives[a]	2[a]	0.0
vi. Industrial Training	10	10.6
Grand Total Credit	**94**	**100**

	Total Hours	%
i. Lecture	49	41.9
ii. Practical	50	42.7
iii. Tutorial	18	15.4
Total Contact Hours	117	100.0

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DUE10012 Communicative English 1	2	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.	CLO1 : Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3 , CLS 3b) CLO2 : Demonstrate awareness of values and opinions embedded in texts on current issues. (A3 , CLS 3b) CLO3 : Present a topic of interest that carries identifiable values coherently using effective verbal and nonverbal communication skills.(A2 , CLS 4)
	MPU24XX1 Sukan / Unit Beruniform 1	1	UNIT BERUNIFORM 1 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. 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	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)
	DJJ10033 Workshop Technology	3	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).	CLO1 : Apply the knowledge of basic mechanical components and equipment, hand tools and measuring equipment in workshop technology (C3, PLO1) CLO2 : Apply standard practice in operating mechanical tools and component (C3, PLO8) CLO3 : Demonstrate continuous learning and information management skills to complete assigned task (A3, PLO12)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DBS10012 Engineering Science	2	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.	CLO1 : Use basic physics concept to solve engineering physics problem. (C3, CLS 1) CLO2 : Apply Knowledge of fundamental physics in activities to mastery physics concept. (C3, CLS 1) CLO3 : Perform appropriate activities related to physics concept. (P3, CLS 3a)
	DBM10013 Engineering Mathematics 1	3	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.	CLO1 : Use mathematical statement to describe relationship between various physical phenomenon. (C3, CLS 1) CLO2 : Show mathematical solutions using the appropriate techniques in mathematics. (C3, CLS 3c) CLO3; Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)
	DJJ10013 Engineering Drawing	2	ENGINEERING DRAWING course 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 CAD the 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.	CLO1: Apply the fundamentals of technical drawing and features of CAD software in producing engineering drawing. (C3, PLO1) CLO2: Construct the technical drawing and 2D CAD drawing according to the engineering drawing standards. (P3, PLO5) CLO3: Propose a project report with following engineering norms and practices in engineering drawing. (A3, PLO8)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DJJ10022 Mechanical workshop Practice 1	2	MECHANICAL WORKSHOP PRACTICE 1 exposes the students to welding, machining and fitting which involve the use of arc and and gas welding machine, lathe machine, drilling machine, grinding, hand tools, marking out tools, measuring and testing tools. Students are also taught to emphasize on safety procedures and cleanliness in the workshop.	CLO1 : Measure finished product using appropriate measurement instruments. (P3, PLO5) CLO2 : Perform fitting, welding and machining works according to Standard Operational Procedure (SOP). (P4, PLO5) CLO3 : Demonstrate an understanding of professional ethics , responsibilities and norms of engineering practices according to the workshop safety regulation. (A3, PLO6)
	DUW10022 Occopational, Safety and Health for Engineering	2	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.	CLO1 : Explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia. (C2,PLO1) CLO2 : Initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment.(A3, PLO8) CLO3 : Demonstrate communication skill in group to explain the factor that can lead to accident in workplace.(A3,PLO10)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	MPU23052 Sains, Teknolgi dan Kejuruteraan Dalam Islam	2	SAINS, TEKNOLOGI DAN KEJURUTERAAN DALAM ISLAM memberi pengetahuan tentang konsep Islam sebagai al-Din dan seterusnya membincangkan konsep sains, teknologi dan kejuruteraan dalam Islam serta impaknya, pencapaiannya dalam tamadun Islam, prinsip serta peranan syariah dan etika Islam, peranan kaedah fiqh serta aplikasinya.	CLO1 : Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian (A2 , CLS 4) CLO2 : Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam (A3 , CLS 5) CLO3 : Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam (A4 , CLS 4)
	MPU23042 Nilai Masyarakat Malaysia	2	NILAI MASYARAKAT MALAYSIA membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran- cabaran dalam membentuk masyarakat Malaysia	CLO1 : Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia (A2 , CLS 4) CLO2 : Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotisme masyarakat Malaysia (A3 , CLS 5) CLO3 : Menghubungkait minda ingin tahu dengan cabaran-cabaran dalam membentuk masyarakat Malaysia (A4 , CLS 4)
	MPU24XX1 Kelab / Persatuan / Unit Beruniform 2	1	KELAB memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif UNIT BERUNIFORM 2 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	DBM20023 Engineering Mathematics 2	3	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.	CLO1 : Use algebra and calculus knowledge to describe relationship between various physical phenomena. (C3, CLS 1) CLO2 : Solve the mathematical problems by using appropriate and relevant fundamental calculus techniques. (C3, CLS 3c) CLO3 : Use mathematical language to express mathematical ideas and arguments precisely, concisely, and logically in calculus. (A3, CLS 3b)
	DJJ20053 Electrical Technology	3	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.	CLO1 :Explain the principles and fundamental of electrical circuits, electromagnetism, transformers and electrical machine (C2, PLO1) CLO2 :Solve the problem related to electrical circuits, electromagnetism, transformers and electrical machine (C3, PLO1) CLO3 :Organize appropriately experiments in groups according to the Standard Operating Procedures. (P4, PLO5)
	DJJ20042 Mechanical Workshop Practices 2	2	MECHANICAL WORKSHOP PRACTICE 2 exposes the students to arc and gas welding, foundry and machining works. Safety procedure practice is heavily emphasized in the workshop.	CLO 1: Follow the appropriate procedure for welding, foundry and lathe machining. (P3, PLO5) CLO 2: Perform welding, foundry and lathe machining according to Standard Operating Procedure (SOP). (P4, PLO5) CLO 3: Demonstrate the ability to work as individual and as a team to complete assigned tasks. (A3, PLO9)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	DJJ20063 Thermodynamics	3	THERMODYNAMICS provides knowledge of theory, concept and application of principles to solve problems related to thermodynamics. It emphasizes on concept of non-flow process and flow process, properties of steam, Carnot cycle and Rankine cycle. This course also exposes the students to the demonstration of experiments in Thermo-dynamics by using the real equipment	CLO1 : Explain fundamentals concept and properties of pure substances in thermodynamics (C2, PLO1) CLO2 : Apply Laws of thermodynamics and it processes (C3, PLO1) CLO3 : Organize appropriately experiments according to the Standard Operating Procedures (P4, PLO5)
	DJJ20073 Fluid Mechanics	3	FLUID MECHANICS provides students with a strong understanding of the fundamentals of fluid mechanics principles related to the fluid properties and behavior in static and dynamic situations. This course also exposes the students to the demonstration at the real equipment of fluid mechanics.	CLO1 : Explain the fundamentals of fluid (C2, PLO1) CLO2 : Solve problems related to fluid properties , fluid statics and fluid dynamics (C3, PLO1) CLO3 : Organize appropriate experiments in groups according to the standard operating procedures (P4, PLO5)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DUE30022 Communicative English 2	2	COMMUNICATIVE ENGLISH 2 emphasizes the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints.	CLO1 : Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience (A3 , CLS 3b) CLO2 : Describe processes, procedures and instructions clearly by highlighting information of concern (A3 , CLS 4) CLO3 : Demonstrate effective communication and social skills in handling enquiries and complaints amicably and professionally (A3 , CLS 3b)
	DBM30033 Engineering Mathematics 3	3	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.	CLO1 : Demonstrate an understanding of the common body of knowledge in mathematics. (C3 , CLS 1) CLO2 : Demonstrate problems solving skills in engineering problems. C3, CLS 3c) CLO3 : Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)
	DJJ.30082 Mechanical Workshop Practice 3	2	MECHANICAL WORKSHOP PRACTICE 3 exposes the students to the use of Tungsten Inert Gas (TIG) and Metal Inert Gas (MIG) welding machines. Students also will perform a task by using lathe and milling machine. In addition students will be exposed in safety procedures practice will be emphasized in workshop	CLO1 : Follow welding tasks according to workshop Standard Operating Procedure (SOP). (P3, PLO5) CLO2 : Perform machining tasks according to workshop Standard Operating Procedure (SOP). (P4, PLO5) CLO3 : Demonstrate awareness of social responsibility and safety procedures in the workshop according to the workshop safety regulations and create a secured environment in an organization while doing practical work. (A3, PLO6)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DJJ30093 Engineering Mechanics	3	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.	CLO 1: solve problems related to static and dynamics based on the concepts and principle of engineering mechanics (C3, PLO 1) CLO 2: analyze engineering related problems based on fundamentals of static and dynamics (C4, PLO 2) CLO 3: organize appropriately experiment in groups according to Standard Operation Procedures (P4, PLO 5)
	DJJ30103 Strength Of Materials	3	STRENGTH OF MATERIALS provides knowledge on concepts and calculation of forces on materials, thermal stress, shear force and bending moment, bending stress, shear stress and torsion in shafts. It also deals with the experiments conducted on tensile test, bending moment, shearing force and torsion and deflection.	CLO1 : apply the concepts of strength of materials to solve related problems. (C3, PLO1) CLO2 : analyze problems correctly related to strength of materials (C4, PLO2) CLO3 : organize appropriately experiment in groups according to Standard Operation Procedures (SOP). (P4, PLO5)
	DJJ30113 Material Science and Engineering	3	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.	CLO1 : Apply the fundamental of material science to identify the materials, properties, behavior, processes and treatment. (C3 ,PLO1) CLO2 : Performed appropriate material testing according to the Standard Operating Procedures. (P4 , PLO5) CLO3 : Demonstrate the ability to work individually and in groups to complete assigned tasks during the practical work session. (A3 ,PLO9)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DJJ30122 Computer Aided Design	2	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.	CLO1: Apply CAD commands in order to produce engineering drawing. (C3, PLO1) CLO2: Construct 3D drawing of Mechanical Components according Drawing Standards. (P4, PLO5) CLO3: Demonstrate a presentation with following technical standard Communication. (A3, PLO10)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJJ41032 Engineering Society	2	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.	CLO1 : Determine the important of work ethics, bylaws and professionalism in engineering profession. (C4,PLO8) CLO2 : Determine the needs for sustainable and gree n engineering towards providing the solutions in engineering field. (C4,PLO7) CLO3 : Implement the roles of engineering profession towards the developing of society and its challenges in globalization (C3,PLO6)
	DJJ40142 Mechanical Workshop Practice 4	2	MECHANICAL WORKSHOP PRACTICES 4 course allows the students to operate machine tools, precision grinding, CNC machine and able to work in a clean and safe workshop environment	CLO1 : perform high precision machining processes for the surface or cylindrical grinding machine. (P4, PLO5) CLO2 : construct programs for EDM and CNC machining process using ISO codes or any related machining software. (P5, PLO3) CLO3 : demonstrate safety procedures in the workshop according to the workshop safety regulation correctly to create a secured environment in an organization while doing practical work and ability to work in team to complete assigned tasks during practical work sessions (A3, PLO7)
	DJJ41053 Pneumatic and Hydraulics	3	PNEUMATIC and HYDRAULICS provides knowledge and understanding to the importance of pneumatics and hydraulics circuits, equipment and design along with its usage in the industry.	CLO1 : Apply the basic concept and function of pneumatics and hydraulics system. (C3 , PLO1) CLO2 : Design pneumatic, electro-pneumatic and hydraulic circuit according to assigned tasks. (C5 , PLO3) CLO3 : Perform experiment on pneumatic, electro-pneumatic and hydraulic circuit during practical session. (P4 , PLO5)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJJ40163 Mechanics of Machines	3	**MECHANICS OF MACHINES** exposes the students with knowledge on techniques and concepts of mechanics of machines and analyzing problems related to hoists, simple harmonic motion, velocity and acceleration diagram, and belt drives. This course also exposes the students to the demonstration of experiments in Mechanics of Machines by using the real equipment.	**CLO1 :** Apply the fundamentals of mechanics of machines to solve related problems in the theoretical and graphical aspects. (C3, PLO1) **CLO2 :** Analyze problems related to the mechanics of machines in relation to the theoretical aspects. (C4, PLO2) **CLO3 :** Perform experiments in groups according to the Standard Operating Procedures
	DJJ40173 Engineering Design	3	**ENGINEERING DESIGN** course offers a comprehensive coverage of basic concept engineering design. Student will learn the fundamental concepts for designing process, designing consideration, ergonomic, materials selection and emphasizes on mathematical analysis for simple components designs in engineering. It also provides knowledge on reverse engineering and practical on 3D printing.	**CLO1:** Apply the concept of design process, stress analysis and mechanical joint in an engineering product. (C3 , PO1) **CLO2:** Implement engineering design process on project design taking into design consideration, ergonomic factors and material selection. (C3 , PO3) **CLO3:** Builds a part or product in 3D modelling based on project design. (P4 , PO5) **CLO4:** Adopt design regarding to the environment and sustainability. (A3 , PO7)
	DJJ40182 Project 1	2	PROJECT 1 provides students with solid foundation on knowledge and skills in formulating project proposal preparation, writing and presetation	CLO1 : Identify the engineering problems to be solved (C4, PLO2) CLO2 : Analyze methods to solve problems (C4, PLO7) CLO3 : Propose a solution to problems (A3, PLO11)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
5	MPU21032 Penghayatan Etika dan Peradaban	2	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.	CLO1 : Membentangkan konsep etika dan peradaban dalam kepelbagaian pelbagaian tamadun. (A2, CLS 5) CLO2 : Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia . (A2, CLS 5) CLO3 : Mecadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban. (A3, CLS 4)
	DUE50032 Communicative English 3	2	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.	CLO1 : Present gathered data in graphs and charts effectively using appropriate language forms and functions (A2 , CLS 3b) CLO2 : Prepare a high impact resume and a cover letter, highlighting competencies and strengths that meet employer's expectations (A4 , CLS 4) CLO3 : Demonstrate effective communication and social skills in handling job interviews confidently (A3 , CLS 3b)
	MPU22012 Entrepreneurship	2	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.	CLO1:Propose the value proposition of entrepreneurial idea using Business model Canvas(A3, CLS3b) CLO2:Develop a viable business plan by organizing business objectives according to priorities(A4, CLS4) CLO3:Organise the online presence business in social media marketing platform (A3, CLS4)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
5	DJJ50193 Project 2	3	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.	CLO1 : Demonstrate appropriate and creative solution in solving project problems (P5, PLO3) CLO2 : Perform project plan to achieve objectives with valid and reliable results (P4, PLO4) CLO3 : Explain the project work and defend project outcomes effectively with good communication skills (A4, PLO10) CLO4 : Organize project activities and outcomes in report accordance to the specified standard format that applies engineering management principles (P4, PLO11)
	DJJ50203 Troubleshooting and Maintenance for Mechanical Components	3	**TROUBLESHOOTING AND MAINTENANCE FOR MECHANICAL COMPONENTS** course covers necessary mechanical components needed in Industries. The topics include maintenance and troubleshooting principles and procedures, power transmission, bearing and pump. This course provides knowledge and skills on maintenance and troubleshooting lubrication, bearing, power transmission and pump.	**CLO1:** Analyze the concept of mechanical components to solve related problems. (C3, PLO1) **CLO2:** Assemble selected mechanical components based on service manual maintenance in groups. (P4, PLO4) **CLO3:** Demonstrate understanding of engineering norm and practices in mechanical components and maintenance during practical work sessions. (C4, PLO5)
	DJJ50212 Maintenance Engineering and Management	2	**MAINTENANCE ENGINEERING AND MANAGEMENT** covers topic such asmaintenance organization, maintenance strategies system, system approach to maintenance, maintenance planning and scheduling and computerized maintenance management system (CMMS).	**CLO1 :** Apply the concepts of maintenance organization and strategies to solve related problems. (C3, PLO1) **CLO2 :** Analyze the principles of maintenance strategies and elaborate on the significance of a system approach to maintenance. (C4, PLO7) **CLO3 :** Organize project management and finance by group in actual workplace related to maintenance management. (A3, PLO11)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
6	DUT 600610 Engineering Industrial Training	10	ENGINEERING INDUSTRIAL TRAINING course will provide student with first-hand experience in an engineering-practice environment outside the polytechnic. Student 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 ethic, communication, teamwork and inter-personal and life-long learning skills at the workplace.	CLO1: perform the assigned task accordingly based on job scope requirement (P4 , PLO 5) CLO2 : demonstrate responsibilities as an engineering technician while dealing with people of various background (A5 , PLO 6) CLO3: practice good working ethics while undergoing industrial training (A5 , PLO 8) CLO4: display ability to work in a team or independently base on the given task (P4 , PLO 9) CLO5: demonstrate oral communication skill in performing job requirement (A3 , PLO 10) CLO6: write a report based on given task accordingly to technical practice (C3 , PLO 10) CLO7: display life long learning skill in completing the given task (P4 , PLO 12)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJJ42022 Industrial Management	2	INDUSTRIAL MANAGEMENT provides students with a strong fundamental understanding of industrial management prospect and production system planning such as inventory, scheduling, production system operation, facilities, plan location, layout and line balancing. This course also provides knowledge in quality control, and human resource management.	CLO1: Apply the basic concept of industrial management system to solve related problems. (C3, PLO2) CLO2: Analyze problems related to industrial management. (C4, PLO8) CLO3: demonstrate good communication skills. (A3, PLO10)
	DJJ42032 Instrument and Control	2	INSTRUMENTATION & CONTROL exposes the students to the basic principles in control system and its usage in industrial sector is the main focus in this course. Instrumentation and control also provide knowledge to the students in components measurement in control systems that are normally used in industries.	CLO1 : Apply the fundamental of control system and instrumentation used in engineering (C4, PLO2) CLO2 : Explore the measurement and process control system in engineering (C3, PLO4) CLO3 : Demonstrate good communication skill in presentation on assigned topics (A3, PLO10)
	DJJ52012 Engineering Plant Technology	2	ENGINEERING PLANT TECHNOLOGY provides an introduction to power plant technology industry such as steam power plant, gas turbine power plant, diesel power plant, compressed air plant and water pump.	CLO1 : Classify the concepts and technology of power plant system and components to solve related problem based on its application and functions. (C4,PLO2) CLO2 : Implement the professional ethics and responsibility and norms of technician practice in power plant system and components. (C3,PLO8) CLO3 : Demonstrate skill of communications effectively on well-defined engineering activities with the engineering community and with society of large and information management skills based on related engineering plant technology. (A3,PLO10)

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJJ52052 Railway Track system	2	RAILWAY TRACK SYSTEM provides knowledge regarding to railway track engineering concepts including track component and system design, construction, evaluation, maintenance, load distribution, and wheel/rail interaction. Topics covered include: Track layout and geometry; ballast and subgrade; ties; rail and fastenings; track analysis and design; special trackwork; grade crossings; track standards; and inspection, condition assessment, and asset management.	CLO1 :Explain the concept of Railway Track System. (C2, PLO 1) CLO2 :Apply the railway engineering and give respond in work application. (C3, PLO 5) CLO3 :Analyze the effectiveness of Railway Track System through engineering issue in group.(C4, PLO 9)
	DJM20032 C Programming	2	C Programming course provides an introduction to programme design and development. Student will learn to design, code, debug, test and document well-structured 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.	CLO1 : Explain knowledge of basic concepts of C Programming to solve given problem using an appropriate data type (C2 , PLO1) CLO2 : Constructs a high level programming language in solving variety engineering and scientific problems (P3 , PLO3) CLO3 : Present a solution for assigned project based on programming which relates to current or upcoming technologies and peripherals (A2 , PLO12)
	DJM40082 Programmable Logic Control	2	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.	CLO1 : Differentiate the types of automation systems and terminologies used in PLC hardware and programmes. (C2, PLO1) CLO2 : Write a PLC program related to an industrial automation system. (C5, PLO2) CLO3 : (P6, PLO3) Program a PLC for an automated application.

DIPLOMA IN MECHANICAL ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJM40092 Control System	2	CONTROL SYSTEMS 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.	CLO1 :Explain the basic concept of control system including controller principle, transfer function and stability (C2, PLO2) CLO2 :Construct experiment on different types of controller mode in order to analyse and interpretation of data (P4, PLO3) CLO3 : (A3, PLO9) Demonstrate the ability to work in team for completing assigned task during practical work session
	DJJ51082 Quality Control	2	QUALITY CONTROL provides knowledge on basic principle and concept of quality including statistical method in controlling products quality or services. This course also emphasizes on the application of Control Chart and Quality Control tools and also explains the quality improvement technique.	CLO1 : Apply the relation of statistics and quality management system in understanding of quality control and their application tools. (C3, PLO1) CLO2 : Determine the related quality tools and techniques to control the quality of products or services based on case study. (C4, PLO2) CLO3 : Demonstrate ability to work in team to complete the assigned tasks (A3, PLO9)
FREE ELECTIVE	DUD10012 Design Thinking	2	This course offers the basic concept of Design Thinking through experiential learning. Students learn the five iterative phases of Design Thinking, which are Empathy, Define, Ideate, Prototype and Testing. Students will apply these design thinking principles, process and techniques to solve a real-world problem and come up with an innovative solution in the form of a product, system or service prototype.	CLO1: Apply design thinking principles, process and techniques to solve a real-world problem innovatively (C3 , CLS 2) CLO2: Demonstrate the ability to communicate ideas in solving a real-world problem (A3 , CLS 3b)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

DIPLOMA IN
MECHANICAL ENGINEERING (AUTOMOTIVE)

INTRODUCTION

In line with the 3rd Industrial Malaysia Plan (IMP3) aiming for the innovative and creative human capital development, via matching talent to expertise with market demand, Diploma in Mechanical Engineering for polytechnic is developed to give balance emphasis on theoretical and practical aspects. The Eleventh Malaysia Plan was drawn to produced 60% out of 1.5 million workers was in TVET sector. Until now a total of 69,475 (51%) of the 136,062 technical education and vocational training (TVET) graduates in Malaysia are working as professionals and skilled workers. Thus, to keep abreast with rapid demand in TVET sector, Department of Polytechnic and Community College Education (DPCCE) progressively collaborates with major industry players in the country in developing the curriculum. The programme will take six semesters to complete, five academic semesters at their respective polytechnics and one semester of industrial training at relevant industries during the final semester. This programme complies with the Board of Engineer (BEM) requirement.

SYNOPSIS

The Diploma in Mechanical Engineering (Automotive) programme is designed to produced holistic graduates that have knowledge and competent skills in the field of mechanical engineering with added specialization subjects in the automotive engineering to fulfil the demand of workers in engineering sector. The programme structure focusses on the area of Solid Mechanics, Statics & Dynamics, Thermodynamics & Heat Transfer, Fluid Mechanics, Materials, Mechanical Design, Workshop Practices, Manufacturing, Instrumentation & Control, Mechanical Maintenance, Electrical & Electronic Technology, Vehicle system, Vehicle Technology and Workshop Practice & Management

JOB PROSPECT

This programme provides the knowledge and skills in Mechanical Engineering (Automotive) field that can be applied to a broad range of careers in Mechanical Engineering and Automotive 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. Service Advisor
c. Technical Assistant
d. Quality Officer
e. After Sales Service Officer
f. Sales Executive
g. Technical Instructor or Lecturer
h. Technical Specialist
i. Workshop supervisor
j. Factory Supervisor
k. Team Leader Service Advisor
l. Service Assistant Manager
m. Service Manager
n. Entrepreneur

DIPLOMA IN
MECHANICAL ENGINEERING (AUTOMOTIVE)

VISION

To be the Leading-Edge TVET Institution.

MISSION

a. To provide wide access to quality and recognized TVET programmes.

b. To empower communities through lifelong learning.

c. To develop holistic, entrepreneurial and balanced graduates.

d. To capitalise on smart partnership with stakeholders.

EDUCATIONAL GOAL

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

PROGRAMME AIMS

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

Diploma in Mechanical Engineering (Automotive) programme should produce balanced and competent TVET workers who are :

PEO1: Equipped with industry-relevant knowledge and skills in mechanical engineering field

PEO2: Engaging on lifelong and continuous learning to enhance knowledge and skills

PEO3: Instilled with entrepreneurial skills and mind set in the real working environment

PEO4: Established strong linkage with society and players in the industry

DIPLOMA IN
MECHANICAL ENGINEERING (AUTOMOTIVE)

PROGRAMME LEARNING OUTCOMES (PLO)

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

PLO1: Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices

PLO2: Identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)

PLO3: Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DK5)

PLO4: Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements

PLO5: Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)

PLO6: Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (DK7)

PLO7: Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)

PLO8: Understand and commit to professional ethics and responsibilities and norms of technician practice

PLO9: Function effectively as an individual, and as a member in diverse technical teams

PLO10: Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions

PLO11: Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments

PLO12: Recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

Notes:

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

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

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

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

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

DK 6: Codified practical engineering knowledge in recognised practice area.

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

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)									
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS	PREREQUISITE/ CO-REQUSITE
			L	P	T	O		
SEMESTER 1								
Compulsory	DUE10012	Communicative English 1	1	0	2	0	2	
	MPU24XX1	Sukan / Unit Beruniform 1	0	2	0	0	1	
Common Core	DUW10022	Occupational, Safety & Health Engineering	2	0	0	0	2	
	DBS10012	Engineering Science	2	1	2	0	2	
	DBM10013	Engineering Mathematics 1	2	0	2	0	3	
Discipline Core	DJJ10013	Engineering Drawing	1	3	0	0	3	
	DJJ10022	Mechanical Workshop Practice 1	0	4	0	0	2	
	DJJ10033	Workshop Technology	3	0	0	0	3	
		TOTAL	**25**				**18**	
SEMESTER 2								
Compulsory	MPU23052	Sains, Teknologi dan Kejuruteraan Dalam Islam*	1	0	2	0	2	
	MPU23042	Nilai Masyarakat Malaysia**						
	MPU24XX1	Kelab/Persatuan	0	2	0	0	1	MPU24XX1
	MPU24XX1	Unit Beruniform 2						MPU24XX1
Common Core	DBM20023	Engineering Mathematics 2	2	0	2	0	3	DBM10013
Discipline Core	DJJ20063	Thermodynamics	2	2	0	0	3	
Specialization	DJA20063	Automotive Electrical and Electronics	2	2	0	0	3	
	DJA20013	Automotive Technology 1	3	0	0	0	3	
	DJA20032	Automotive Workshop Practice 1	0	4	0	0	2	
		TOTAL	**24**				**17**	

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)									
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS	PREREQUISITE/ CO-REQUISITE
			L	P	T	O		
SEMESTER 3								
Compulsory	DUE30022	Communicative English 2	1	0	2	0	2	DUE10012
Common Core	DBM30033	Engineering Mathematics 3	2	0	2	0	3	DBM20023
Discipline Core	DJJ30093	Engineering Mechanics	2	2	0	0	3	
	DJJ20073	Fluid Mechanics	2	2	0	0	3	
	DJJ30122	Computer Aided Design	1	2	0	0	2	DJJ10013
Specialization	DJA30023	Automotive Technology 2	3	0	0	0	3	DJA20013
	DJA30042	Automotive Workshop Practice 3	0	4	0	0	2	DJA20032
TOTAL			**26**				**18**	
SEMESTER 4								
Common Core	DJJ40132	Engineering and Society	2	0	0	0	2	
Discipline Core	DJJ30103	Strength of Materials	2	2	0	0	3	
	DJJ30113	Material Science and Engineering	2	2	0	0	3	
	DJJ40182	Project 1	2	0	0	0	2	
Specialization	DJA40052	Automotive Workshop Practice 3	4	0	0	0	2	DJA30042
	DJA40072	Internal Combustion Engine	2	0	0	0	2	DJA20063
	DJA40092	Workshop Service Management	1	2	0	0	2	
Elective		Elective ***					2*	
TOTAL			**20**				**16**	
SEMESTER 5								
Compulsory	MPU21032	Penghayatan etika dan Peradaban	1	0	2	0	2	
	DUE50032	Communicative English 3	1	0	2	0	2	DUE30022
	MPU22012	Entrepreneurship	1	0	2	0	2	
Discipline Core	DJJ50193	Project 2	0	4	0	0	3	DJJ40182
	DJJ40153	Pneumatic & Hydraulics	2	2	0	0	3	
	DJA50082	Vehicle Dynamic	2	0	1	0	2	
Elective		Elective***					2*	
TOTAL			**20**				**14**	
SEMESTER 6								
Industrial Training	DUT600610	Engineering Industrial Training	0	0	0	0	10	
TOTAL			**0**				**10**	
TOTAL CREDIT VALUES							**95**	

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)							
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS
			L	P	T	O	
ELECTIVE COURSE							
1	DJA42012	Mobile Hydraulic	1	2	0	0	2
2	DJF42012	Advanced Manufacturing Technology	2	0	2	0	
3	DJJ52012	Engineering Plant Technology	2	0	0	0	
4	DJF51082	Quality Control	2	0	0	0	
5	DJJ42032	Instrumentation and Control	2	0	0	0	
6	DJF51072	Jig and Fixtures Design	1	2	0	0	
7	DJF41042	CAD/CAM	0	4	0	0	

FREE ELECTIVES							
1	DUD10012	Design Thinking	1	0	0	1	2

COURSE CLASSIFICATION	TOTAL CREDIT	%
i. a) Compulsory	14	15
b) Compulsory (Bahasa Kebangsaan A)[b]	2[b]	0
ii. Common Core	15	16
iii. Discipline Core	33	35
Total Credit	**83**	**88**
v. (a) Electives	2	2
(b) Free Electives[a]	2[a]	0
vi. Industrial Training	10	10
Grand Total Credit	**95**	**100**

	Total Hours	%
i. Lecture	51	43
ii. Practical	48	41
iii. Tutorial	19	16
Total Contact Hours	118	100

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DUE10012 Communicative English 1	2	**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.	CLO1 : Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3 , CLS 3b) CLO2 : Demonstrate awareness of values and opinions embedded in texts on current issues. (A3 , CLS 3b) CLO3 : Present a topic of interest that carries identifiable values coherently using effective verbal and nonverbal communication skills.(A2 , CLS 4)
	MPU24XX1 Sukan / Unit Beruniform 1	1	**UNIT BERUNIFORM 1** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. 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	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)
	DJJ10033 Workshop Technology	3	**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).	CLO1 : Apply the knowledge of basic mechanical components and equipment, hand tools and measuring equipment in workshop technology (C3, PLO1) CLO2 : Apply standard practice in operating mechanical tools and component (C3, PLO8) CLO3 : Demonstrate continuous learning and information management skills to complete assigned task (A3, PLO12)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DUE10012 Communicative English 1	2	**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.	CLO1 : Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3 , CLS 3b) CLO2 : Demonstrate awareness of values and opinions embedded in texts on current issues. (A3 , CLS 3b) CLO3 : Present a topic of interest that carries identifiable values coherently using effective verbal and nonverbal communication skills.(A2 , CLS 4)
	MPU24XX1 Sukan / Unit Beruniform 1	1	**UNIT BERUNIFORM 1** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. 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	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)
	DJJ10033 Workshop Technology	3	**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).	CLO1 : Apply the knowledge of basic mechanical components and equipment, hand tools and measuring equipment in workshop technology (C3, PLO1) CLO2 : Apply standard practice in operating mechanical tools and component (C3, PLO8) CLO3 : Demonstrate continuous learning and information management skills to complete assigned task (A3, PLO12)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DUE10012 Communicative English 1	2	**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.	CLO1 : Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3 , CLS 3b) CLO2 : Demonstrate awareness of values and opinions embedded in texts on current issues. (A3 , CLS 3b) CLO3 : Present a topic of interest that carries identifiable values coherently using effective verbal and nonverbal communication skills.(A2 , CLS 4)
	MPU24XX1 Sukan / Unit Beruniform 1	1	**UNIT BERUNIFORM 1** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. 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	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)
	DJJ10033 Workshop Technology	3	**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).	CLO1 : Apply the knowledge of basic mechanical components and equipment, hand tools and measuring equipment in workshop technology (C3, PLO1) CLO2 : Apply standard practice in operating mechanical tools and component (C3, PLO8) CLO3 : Demonstrate continuous learning and information management skills to complete assigned task (A3, PLO12)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DBS10012 Engineering Science	2	**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.	CLO1 : Use basic physics concept to solve engineering physics problem. (C3, CLS 1) CLO2 : Apply Knowledge of fundamental physics in activities to mastery physics concept. (C3, CLS 1) CLO3 : Perform appropriate activities related to physics concept. (P3, CLS 3a)
	DBM10013 Engineering Mathematics 1	3	**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.	CLO1 : Use mathematical statement to describe relationship between various physical phenomenon. (C3, CLS 1) CLO2 : Show mathematical solutions using the appropriate techniques in mathematics. (C3, CLS 3c) CLO3; Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)
	DJJ10013 Engineering Drawing	2	**ENGINEERING DRAWING** course 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 CAD the 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.	CLO1: Apply the fundamentals of technical drawing and features of CAD software in producing engineering drawing. (C3, PLO1) CLO2: Construct the technical drawing and 2D CAD drawing according to the engineering drawing standards. (P3, PLO5) CLO3: Propose a project report with following engineering norms and practices in engineering drawing. (A3, PLO8)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DJJ10022 Mechanical workshop Practice 1	2	**MECHANICAL WORKSHOP PRACTICE 1** exposes the students to welding, machining and fitting which involve the use of arc and and gas welding machine, lathe machine, drilling machine, grinding, hand tools, marking out tools, measuring and testing tools. Students are also taught to emphasize on safety procedures and cleanliness in the workshop.	CLO1 : Measure finished product using appropriate measurement instruments. (P3, PLO5) CLO2 : Perform fitting, welding and machining works according to Standard Operational Procedure (SOP). (P4, PLO5) CLO3 : Demonstrate an understanding of professional ethics , responsibilities and norms of engineering practices according to the workshop safety regulation. (A3, PLO6)
	DUW10022 Occopational, Safety and Health for Engineering	2	**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.	CLO1 : Explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia. (C2,PLO1) CLO2 : Initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment.(A3, PLO8) CLO3 : Demonstrate communication skill in group to explain the factor that can lead to accident in workplace.(A3,PLO10)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	MPU23052 Sains, Teknolgi dan Kejuruteraan Dalam Islam	2	**SAINS, TEKNOLOGI DAN KEJURUTERAAN DALAM ISLAM** memberi pengetahuan tentang konsep Islam sebagai al-Din dan seterusnya membincangkan konsep sains, teknologi dan kejuruteraan dalam Islam serta impaknya, pencapaiannya dalam tamadun Islam, prinsip serta peranan syariah dan etika Islam, peranan kaedah fiqh serta aplikasinya.	CLO1 : Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian (A2 , CLS 4 CLO2 : Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam (A3 , CLS 5) CLO3 : Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam (A4 , CLS 4)
	MPU23042 Nilai Masyarakat Malaysia	2	**NILAI MASYARAKAT MALAYSIA** membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran- cabaran dalam membentuk masyarakat Malaysia	CLO1 : Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia (A2 , CLS 4) CLO2 : Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotisme masyarakat Malaysia (A3 , CLS 5) CLO3 : Menghubungkait minda ingin tahu dengan cabaran-cabaran dalam membentuk masyarakat Malaysia (A4 , CLS 4)
	MPU24XX1 Kelab / Persatuan / Unit Beruniform 2	1	**KELAB** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif **UNIT BERUNIFORM 2** memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	DBM20023 Engineering Mathematics 2	3	**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.	CLO1 : Use algebra and calculus knowledge to describe relationship between various physical phenomena. (C3, CLS 1) CLO2 : Solve the mathematical problems by using appropriate and relevant fundamental calculus techniques. (C3, CLS 3c) CLO3 : Use mathematical language to express mathematical ideas and arguments precisely, concisely, and logically in calculus. (A3, CLS 3b)
	DJJ2063 Thermodynamics	3	T**HERMODYNAMICS** provides knowledge of theory, concept and application of principles to solve problems related to thermodynamics. It emphasizes on concept of non-flow process and flow process, properties of steam, Carnot cycle and Rankine cycle. This course also exposes the students to the demonstration of experiments in Thermodynamics by using the real equipment	CLO1 : Explain fundamentals concept and properties of pure substances in thermodynamics (C2, PLO1) CLO2 : Apply Laws of thermodynamics and it processes (C3, PLO1) CLO3 : Organize appropriately experiments according to the Standard Operating Procedures (P4, PLO5)
	DJA20063 Automotive Electrical	3	**AUTOMOTIVE ELECTRICAL** covers the basic concepts and application of automotive electrical and electronic systems. Students will learn the fundamental concepts of electricity, electrical circuits, principles of magnetism, tools and test equipment, automotive electrical systems and circuits as well as comfort and safety.	CLO1: Explain the principles of electrical circuits, electromagnetism, electronic and automotive electrical circuit to solve related problems. (C2, PLO1) CLO2: Organize appropriately experiments in groups according to Standard Operating Procedure. (P3, PLO5) CLO 3: Demonstrate continuous learning and information management skills while engaging in independent acquisition of new knowledge and skills in laboratory report.

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	DJA20013 Automotive Technology 1	3	**AUTOMOTIVE TECHNOLOGY 1** covers automotive configurations, basic operation of automotive system such as engine component and vehicle classification, cooling and lubrication system, steering and suspension system, clutch and manual transmission systems and tyre, wheel alignment and brake system. It provides a foundation for students in engine construction, categories and working principles of those systems.	CLO1 : Identify the evolving technology trends in automotive systems. (C1, PLO1) CLO2 :Explain the working principles of automotive system. (C2, PLO1) CLO3 : Demonstrate continuous learning while engaging in the new knowledge and skill. (A3, PLO12
	DJA20032 Automotive Workshop Practice 1	3	**AUTOMOTIVE WORKSHOP PRACTICE 1** provides automotive troubleshooting and servicing skill of automotive systems. The course covers the topics of complete overhauling of petrol engine, tyre and suspension systems, brake system, automobile electrical wiring system, starting system and charging system.	CLO1 : Proceed troubleshooting method of automotive systems. (P2, PLO5) CLO2 : Follow skill for servicing automotive systems. (P3, PLO5) CLO3 : Demonstrate the ability to work as individual and as a team to complete assigned task. (A3, PLO9)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DUE30022 Communicative English 2	2	**COMMUNICATIVE ENGLISH 2** emphasizes the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints.	CLO1 : Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience (A3 , CLS 3b) CLO2 : Describe processes, procedures and instructions clearly by highlighting information of concern (A3 , CLS 4) CLO3 : Demonstrate effective communication and social skills in handling enquiries and complaints amicably and professionally (A3 , CLS 3b)
	DBM30033 Engineering Mathematics 3	3	**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.	CLO1 : Demonstrate an understanding of the common body of knowledge in mathematics. (C3 , CLS 1) CLO2 : Demonstrate problems solving skills in engineering problems. (C3, CLS 3c) CLO3 : Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)
	DJJ30093 Engineering Mechanics	3	**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.	CLO 1: solve problems related to static and dynamics based on the concepts and principle of engineering mechanics (C3, PLO 1) CLO 2: analyze engineering related problems based on fundamentals of static and dynamics (C4, PLO 2) CLO 3: organize appropriately experiment in groups according to Standard Operation Procedures (P4, PLO 5)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DJJ20073 Fluid Mechanics	3	**FLUID MECHANICS** provides students with a strong understanding of the fundamentals of fluid mechanics principles related to the fluid properties and behavior in static and dynamic situations. This course also exposes the students to the demonstration at the real equipment of fluid mechanics.	CLO1 : Explain the fundamentals of fluid (C2, PLO1) CLO2 : Solve problems related to fluid properties , fluid statics and fluid dynamics (C3, PLO1) CLO3 : Organize appropriate experiments in groups according to the standard operating procedures (P4, PLO5)
	DJJ30122 Computer Aided Design	2	**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.	CLO1: Apply CAD commands in order to produce engineering drawing. C3, PLO1) CLO2: Construct 3D drawing of Mechanical Components according Drawing Standards. (P4, PLO5) CLO3: Demonstrate a presentation with following technical standard Communication. (A3, PLO10)
	DJA30023 AUTOMOTIVE TECHNOLOGY 2	3	**AUTOMOTIVE TECHNOLOGY 2** provides knowledge on the concept and basic principles of Engine Management System, Air Induction System, Forced Induction System, Emissions Control System, Automatic Transmission, Power Train Units and Modern Technology in Automotive.	CLO1 : Explain the evolving technology trends in automotive systems. (C2, PLO1) CLO2 :Illustrate the working principles of automotive system. (C3, PLO1) CLO3 : Demonstrate the analytical skills that are related to the automotive system.

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DJA30042 Automotive Workshop Practice 2	2	**AUTOMOTIVE WORKSHOP PRACTICE 2** provides automotive troubleshooting and servicing skill of automotive systems. The course covers fuel delivery system for EFI petrol engine, throttle body servicing, turbocharger servicing, manual and automatic transmission service, clutch servicing differential unit service, basic engine diagnosis, EFI system diagnosis and troubleshooting, power window system, windshield washer and wiper system.	CLO1 : Proceed troubleshooting method of automotive systems. (P2, PLO5) CLO2 : Follow skill for servicing automotive systems. (P3, PLO5) CLO3 : Demonstrate awareness of social responsibility and safety procedures in the workshop according to the workshop safety regulations to create a secured environment in an organization while doing practical work.

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJJ41032 Engineering Society	2	**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.	CLO1 : Determine the important of work ethics, bylaws and professionalism in engineering profession. (C4,PLO8) CLO2 : Determine the needs for sustainable and gree n engineering towards providing the solutions in engineering field. (C4,PLO7) CLO3 : Implement the roles of engineering profession towards the developing of society and its challenges in globalization (C3,PLO6)
	DJJ30103 Strength of Materials	3	**STRENGTH OF MATERIALS** provides knowledge on concepts and calculation of forces on materials, thermal stress, shear force and bending moment, bending stress, shear stress and torsion in shafts. It also deals with the experiments conducted on tensile test, bending moment, shearing force and torsion and deflection.	CLO1 : apply the concepts of strength of materials to solve related problems. (C3, PLO1) CLO2 : analyze problems correctly related to strength of materials (C4, PLO2) CLO3 : organize appropriately experiment in groups according to Standard Operation Procedures (SOP). (P4, PLO5)
	DJJ30113 Material Science and Engineering	3	**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.	CLO1 : Apply the fundamental of material science to identify the materials, properties, behavior, processes and treatment. (C3 ,PLO1) CLO2 : Performed appropriate material testing according to the Standard Operating Procedures. (P4 , PLO5) CLO3 : Demonstrate the ability to work individually and in groups to complete assigned tasks during the practical work session. (A3 ,PLO9)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJJ40182 Project 1	2	**PROJECT 1** provides students with solid foundation on knowledge and skills in formulating project proposal preparation, writing and presetation	CLO1 : Identify the engineering problems to be solved (C4, PLO2) CLO2 : Analyze methods to solve problems (C4, PLO7) CLO3 : Propose a solution to problems (A3, PLO11)
	DJA40052: Automotive Workshop Practice 3	2	**AUTOMOTIVE WORKSHOP PRACTICE 3** provides basic automotive related skills which focus on follow troubleshooting and servicing of Natural Gas Vehicle (NGV), Diesel Common Rail System, Hybrid Car System, Antilock Brake System (ABS), Electronic Stability Program (ESP), air conditioning system, Continuously Variable Transmission (CVT), and Supplemental Restraint System (SRS) by using OBD II and inspection and testing of actuators.	CLO1 :Proceed troubleshooting method of automotive systems (P2, PLO5) CLO2 :Follow skill for servicing automotive systems (P3, PLO5) CLO3 : Demonstrate awareness of social responsibility and safety procedures in the workshop according to the workshop safety regulations to create a secured environment in an organization while doing practical work. (A3, PLO6)
	DJA40072 Internal Combustion Engine	2	**INTERNAL COMBUSTION ENGINE** covers various types of engines, piston engine process analysis, combustion process and fuel characteristics, engines criterions and comparison, as well as various engine parts and their functions.	CLO1 : Show the classification and terms in Internal Combustion Engine. (C3, PLO2) CLO2 :Analyze the problem in Internal Combustion Engine. (C4, PLO4) CLO3 : Demonstrate continuous learning while engaging in the new knowledge and skill. (A3, PLO12)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJA40092 Workshop Service Managment	2	**WORKSHOP SERVICE MANAGEMENT** discusses the principles and practices related to Workshop/Service Centre Management covering the topics on Introduction to Workshop Management, Building and Facilities, Personnel Management, Management Control, Marketing and Service Selling, Customer Relations and Advertising.	CLO1: Analyze market potential and related service operation and procedure. (C4, PLO2) CLO2: Demonstrate skills for resource management and management control of automotive workshop/service center. (P3, PLO5) CLO 3: Demonstrate management and entrepreneurial Skills of Automotive Workshop Marketing and Service Selling. (A3, PLO11)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
5	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.	CLO1 : Membentangkan konsep etika dan peradaban dalam kepelbagaian pelbagaian tamadun. (A2, CLS 5) CLO2 : Menerangkan sistem, tahap perkembangan, kesepaduan sosial dan kebudayaan merentas bangsa di Malaysia . (A2, CLS 5) CLO3 : Mecadangkan sikap yang positif terhadap isu dan cabaran kontemporari dari perspektif etika dan peradaban. (A3, CLS 4)
	DUE50032 Communicative English 3	2	**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.	CLO1 : Present gathered data in graphs and charts effectively using appropriate language forms and functions (A2 , CLS 3b) CLO2 : Prepare a high impact resume and a cover letter, highlighting competencies and strengths that meet employer's expectations (A4 , CLS 4) CLO3 : Demonstrate effective communication and social skills in handling job interviews confidently (A3 , CLS 3b)
	MPU22012 Entrepreneurship	2	**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.	CLO1:Propose the value proposition of entrepreneurial idea using Business model Canvas(A3, CLS3b) CLO2:Develop a viable business plan by organizing business objectives according to priorities(A4, CLS4) CLO3:Organise the online presence business in social media marketing platform (A3, CLS4)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
5	DJJ50193 Project 2	3	**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.	CLO1 : Demonstrate appropriate and creative solution in solving project problems (P5, PLO3) CLO2 : Perform project plan to achieve objectives with valid and reliable results (P4, PLO4) CLO3 : Explain the project work and defend project outcomes effectively with good communication skills (A4, PLO10) CLO4 : Organize project activities and outcomes in report accordance to the specified standard format that applies engineering management principles (P4, PLO11)
	DJJ41053 Pneumatic and Hydraulics	3	**PNEUMATIC and HYDRAULICS** provides knowledge and understanding to the importance of pneumatics and hydraulics circuits, equipment and design along with its usage in the industry.	CLO1 : Apply the basic concept and function of pneumatics and hydraulics system. (C3 , PLO1) CLO2 : Design pneumatic, electro-pneumatic and hydraulic circuit according to assigned tasks. (C5 , PLO3) CLO3 : Perform experiment on pneumatic, electro-pneumatic and hydraulic circuit during practical session. (P4 , PLO5)
	DJA50082 Vehicle Dynamic		**VEHICLE DYNAMICS** enables the students to embark on the study regarding forces acting on vehicles propelled by engines. Forces and moments acting on pneumatic tires are also studied. It is important to understand the dynamics of road vehicles. The principals involved dynamics for various types of vehicles, etc. Therefore, this course focuses on the dynamics and the basic operations of the vehicle related to dynamics. Most of the discussion and examples will focus on passenger cars, although these principles are equally applicable to large and small trucks and buses.	CLO1 : Apply the knowledge of vehicle dynamics to solve related problems. (C3, PLO2) CLO2 :Analyze the forces acting on vehicles. (C4, PLO4) CLO3 : Display phenomenon involving vehicle dynamics as individual and as a team to complete assigned tasks. (A3, PLO9)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
6	DUT 600610 Engineering Industrial Training	10	**ENGINEERING INDUSTRIAL TRAINING** course will provide student with first-hand experience in an engineering-practice environment outside the polytechnic. Student 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 ethic, communication, teamwork and inter-personal and life-long learning skills at the workplace.	CLO1: perform the assigned task accordingly based on job scope requirement (P4 , PLO 5) CLO2 : demonstrate responsibilities as an engineering technician while dealing with people of various background (A5 , PLO 6) CLO3: practice good working ethics while undergoing industrial training (A5 , PLO 8) CLO4: display ability to work in a team or independently base on the given task (P4 , PLO 9) CLO5: demonstrate oral communication skill in performing job requirement (A3 , PLO 10) CLO6: write a report based on given task accordingly to technical practice (C3 , PLO 10) CLO7: display life long learning skill in completing the given task (P4 , PLO 12)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJA42012 Mobile Hydraulic	2	**MOBILE HYDRAULIC** provides knowledge and understanding on the concept and basic principles of hydraulic system. The course also identifies the main components and build circuit of hydraulic system.	CLO1: Explain the basic concept and functions of Hydraulic System. (C2, PLO1) CLO2: Construct the main components and build a circuit of Hydraulic System for a particular purpose. (P3, PLO5) CLO 3: Demonstrate team work skill in Hydraulic System experiments. (A3, PLO9)
	DJJ42032 Instrument and Control	2	**INSTRUMENTATION & CONTROL** exposes the students to the basic principles in control system and its usage in industrial sector is the main focus in this course. Instrumentation and control also provide knowledge to the students in components measurement in control systems that are normally used in industries.	CLO1 : Apply the fundamental of control system and instrumentation used in engineering (C4, PLO2) CLO2 : Explore the measurement and process control system in engineering (C3, PLO4) CLO3 : Demonstrate good communication skill in presentation on assigned topics (A3, PLO10)
	DJJ52012 Engineering Plant Technology	2	**ENGINEERING PLANT TECHNOLOGY** provides an introduction to power plant technology industry such as steam power plant, gas turbine power plant, diesel power plant, compressed air plant and water pump.	CLO1 : Classify the concepts and technology of power plant system and components to solve related problem based on its application and functions. (C4,PLO2) CLO2 : Implement the professional ethics and responsibility and norms of technician practice in power plant system and components. (C3,PLO8) CLO3 : Demonstrate skill of communications effectively on well-defined engineering activities with the engineering community and with society of large and information management skills based on related engineering plant technology. (A3,PLO10)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJF42012 Advanced Manufacturing Process	2	**ADVANCED MANUFACTURING PROCESS** provides students with an understanding and appreciation of the width and depth of the manufacturing processes and interrelationship between manufacturing processes, product design, material properties and other aspects such as humanity, economy and environment. It will introduce advanced machining process such as electrical discharge machining, laser beam, water jet and abrasive machining.	CLO1 : Expose the various method and operation for manufacturing process by consideration of material, design and economic aspect. (C3, PLO2) CLO2 : Select the appropriate manufacturing processes in making a plastic or composite component based on their characteristics. (C4, PLO4) CLO3 : Demonstrate ability to work in team to complete the assigned tasks. (A3, PLO9)
	DJJ51082 Quality Control	2	**QUALITY CONTROL** provides knowledge on basic principle and concept of quality including statistical method in controlling products quality or services. This course also emphasizes on the application of Control Chart and Quality Control tools and also explains the quality improvement technique.	CLO1 : Apply the relation of statistics and quality management system in understanding of quality control and their application tools. (C3, PLO1) CLO2 : Determine the related quality tools and techniques to control the quality of products or services based on case study. (C4, PLO2) CLO3 : Demonstrate ability to work in team to complete the assigned tasks (A3, PLO9)
	DJF41042 CADCAM	2	**CAD/CAM** explains the theory and basic of coding languages, structures and the use of CAD/CAM systems for generating and verifying tool path. The students will be use CAD/CAM software to demonstrate the integration between CAD and CAM operation that includes design an object, produce a code and simulate the tool path for machining operation prior to the machining process and also generate NC part programming. Students also enables to build a project from NC part programming using CNC milling or lathe machine.	CLO1 : Calibrates machining code (G and M code) from CAD/CAM software to plan and devise holes process and milling/lathe project. (P3, PLO3) CLO2 : Build a project using CNC milling or lathe machine by utilizing related CAD/CAM simulation software. (P4, PLO5) CLO3 : Demonstrate continuous learning and information management skill while engaging in independent acquisition of new knowledge and skill to develop a project.(A3, PLO12)

DIPLOMA IN MECHANICAL ENGINEERING (AUTOMOTIVE)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJJ52012 Engineering Plant Technology	2	**ENGINEERING PLANT TECHNOLOGY** provides an introduction to power plant technology industry such as steam power plant, gas turbine power plant, diesel power plant, compressed air plant and water pump.	CLO1 : Classify the concepts and technology of power plant system and components to solve related problem based on its application and functions. (C4,PLO2) CLO2 : Implement the professional ethics and responsibility and norms of technician practice in power plant system and components. (C3,PLO8) CLO3 : Demonstrate skill of communications effectively on well-defined engineering activities with the engineering community and with society of large and information management skills based on related engineering plant technology. (A3,PLO10)
	DJF51072 Jig And Fixture Design	2	**JIG AND FIXTURE DESIGN** covers basic production needs in industry. The topics taught includes types and functions of jigs and fixtures, supporting and locating, clamping and work holding principles, design economics, designing and constructing plate jig and plate fixtures. This course also provides knowledge in management, sustainability and manufacturing systems.	CLO1 : Apply the concepts and principles of jigs and fixtures in design. CLO2 : Calibrate the 3D design by using CAD/CAM software to plan and devise mini project. CLO3 : Demonstrate convictions towards environment and sustainability to complete assigned tasks during mini project sessions.
FREE ELECTIVE	DUD10012 Design Thinking	2	**DESIGN THINKING** offers the basic concept of Design Thinking through experiential learning. Students learn the five iterative phases of Design Thinking, which are Empathy, Define, Ideate, Prototype and Testing. Students will apply these design thinking principles, process and techniques to solve a real-world problem and come up with an innovative solution in the form of a product, system or service prototype.	CLO1: Apply design thinking principles, process and techniques to solve a real-world problem innovatively (C3 , CLS 2) CLO2: Demonstrate the ability to communicate ideas in solving a real-world problem (A3 , CLS 3b)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

DIPLOMA IN
MECHANICAL ENGINEERING(MANUFACTURING)

INTRODUCTION

In line with the 3rd Industrial Malaysia Plan (IMP3) aiming for the innovative and creative human capital development, via matching talent to expertise with market demand, Diploma in Mechanical Engineering (Manufacturing) for polytechnic is developed to give balance emphasis on theoretical and practical aspects. The Eleventh Malaysia Plan was drawn to produced 60% out of 1.5 million workers was in TVET sector. Until now a total of 69,475 (51%) of the 136,062 technical education and vocational training (TVET) graduates in Malaysia are working as professionals and skilled workers. Thus, to keep abreast with rapid demand in TVET sector, Department of Polytechnic and Community College Education (DPCCE) progressively collaborates with major industry players in the country in developing the curriculum. The programme will take six semesters to complete, five academic semesters at their respective polytechnics and one semester of industrial training at relevant industries during the final semester. This programme complies with the Board of Engineer (BEM) requirement.

SYNOPSIS

The Diploma in Mechanical Engineering (Manufacturing) programme is designed to produce holistic graduates that have knowledge and competent skills in the field of mechanical engineering to fulfil the demand of workers in engineering sector. The programme structure focusses on the area of Solid Mechanics, Statics & Dynamics, Thermodynamics & Heat Transfer, Fluid Mechanics, Materials, Mechanical Design, Electrical, Manufacturing, Instrumentation & Control and Mechanical Maintenance.

JOB PROSPECT

This programme provides the knowledge and skills in Manufacturing field that can be applied to a broad range of careers in Mechanical 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. Production/ Process Supervisor
c. Technical Assistant
d. Technician
e. Product Designer
f. Quality Officer
g. CNC Programmer Technical Assistant
g. h. Precision Machinist
i. Production / Process Executive
j. Procurement Executive
k. Technical Specialist
l. Technical Instructor or Lecturer
m. Entrepreneur

DIPLOMA IN
MECHANICAL ENGINEERING(MANUFACTURING)

POLYTECHNIC VISION

To be the Leading-Edge TVET Institution.

POLYTECHNIC MISSION

a. To provide wide access to quality and recognized TVET programmes.

b. To empower communities through lifelong learning.

c. To develop holistic, entrepreneurial and balanced graduates.

d. To capitalise on smart partnership with stakeholders.

EDUCATIONAL GOAL

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

PROGRAMME AIMS

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

PROGRAMME EDUCATIONAL OBJECTIVE (PEO)

The Diploma in Mechanical Engineering (Manufacturing) programme should produce Assistant Mechanical Engineers who are:

PEO1: equipped with industry-relevant knowledge and skills in Mechanical Engineering field.

PEO2: engaging on lifelong and continuous learning to enhance knowledge and skills.

PEO3: instilled with entrepreneurial skills and mind set in the real working environment.

PEO4: established with strong linkage with society and players in the industry.

DIPLOMA IN
MECHANICAL ENGINEERING(MANUFACTURING)

PROGRAMME LEARNING OUTCOMES (PLO)

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

PLO1: apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively for practical procedures and practices

PLO2: identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)

PLO3: design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DK5)

PLO4: conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements

PLO5: apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)

PLO6: demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (DK7)

PLO7: understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)

PLO8: understand and commit to professional ethics and responsibilities and norms of technician practice

PLO9: function effectively as an individual, and as a member in diverse technical teams

PLO10: communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions

PLO11: demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments

PLO12: recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)								
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS	PRE REQUISITE
			L	P	T	O		
SEMESTER 1								
Compulsory	DUE10012	Communicative English 1	1	0	2	0	2	
	MPU24XX1	Sukan / Unit Beruniform 1	0	2	0	0	1	
Common Core	DUW10022	Occupational, Safety & Health Engineering	2	0	0	0	2	
	DBS10012	Engineering Science	2	1	2	0	2	
	DBM10013	Engineering Mathematics 1	2	0	2	0	3	
Discipline Core	DJJ10013	Engineering Drawing	1	3	0	0	3	
	DJJ10022	Mechanical Workshop Practice 1	0	4	0	0	2	
	DJJ10033	Workshop Technology	3	0	0	0	3	
		TOTAL	**25**				**18**	
SEMESTER 2								
Compulsory	MPU23052	Sains, Teknologi dan Kejuruteraan Dalam Islam*	1	0	2	0	2	
	MPU23042	Nilai Masyarakat Malaysia**						
	MPU24XX1	Kelab/Persatuan / Unit Beruniform 2	0	2	0	0	1	MPU24XX1
Common Core	DBM20023	Engineering Mathematics 2	2	0	2	0	3	DBM10013
Discipline Core	DJJ20053	Electrical Technology	2	2	0	0	3	
	DJJ20063	Thermodynamics	2	2	0	0	3	
	DJJ20073	Fluid Mechanics	2	2	0	0	3	
Specialization	DJF21012	Manufacturing Workshop Practice 1	0	4	0	0	2	DJJ10022
		TOTAL	**25**				**17**	
SEMESTER 3								
Compulsory	DUE30022	Communicative English 2	1	0	2	0	2	DUE10012
	MPU21012	Pengajian Malaysia	1	0	2	0	2	
Common Core	DBM30033	Engineering Mathematics 3	2	0	2	0	3	DBM20023
Discipline Core	DJJ30113	Material Science and Engineering	2	2	0	0	3	
	DJJ30093	Engineering Mechanics	2	2	0	0	3	
	DJJ30122	Computer Aided Design	1	2	0	0	2	DJJ10013
Specialization	DJF31022	Manufacturing Workshop Practice 2	0	4	0	0	2	DJF21012
		TOTAL	**25**				**17**	

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)									
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS	PRE REQUISITE
			L	P	T	O		
SEMESTER 4									
Common Core	DJJ40132	Engineering Society	2	0	0	0	2	
Discipline Core	DJJ40153	Pneumatic & Hydraulics	2	2	0	0	3	
	DJJ10022	Strength of Materials	2	2	0	0	2	
	DJJ40182	Project 1	2	0	0	0	2	
Specialization	DJF41032	Manufacturing Workshop Practice 3	0	4	0	0	2	DJF31022
	DJF40142	CADCAM	0	4	0	0	2	
	DJF41052	Manufacturing System	2	0	0	0	0	
Elective		Elective**						
		TOTAL	**22**				**16**	
SEMESTER 5									
Common Core	DUE50032	Communicative English 2	1	0	2	0	2	DUE30012
	MPU22012	Entrepreneurship	1	0	2	0	2	
Discipline Core	DJJ50193	Project 2	0	4	0	0	3	DJJ40182
Specialization	DJF51062	Manufacturing Control	2	0	0	0	2	
	DJF51072	Jig and Fixtures Design	1	2	0	0	2	
	DJF51082	Quality Control	2	0	0	0	2	
	DJF51092	Tool Design	1	2	0	0	2	
Elective		Elective**						
		TOTAL	**20**				**15**	
SEMESTER 6									
Industrial Training	DUT600610	Engineering Industrial Training	0	0	0	0	10	
		TOTAL	**0**				**10**	
TOTAL CREDIT VALUES							**95**	

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)							
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS
			L	P	T	O	
ELECTIVE COURSE							
1	DJF42012	Manufacturing Process	2	0	0	0	2
2	DJF52032	Manufacturing Economy	2	0	0	0	
3	DJJ42032	Instrumentation and Control	2	0	0	0	
4	DJJ42022	Industrial Management	2	0	0	0	
5	DJJ52052	Railway Track System	2	0	0	0	
6	DJM20032	C Programming	1	2	0	0	
7	DJM40082	Programmable Logic Control	1	2	0	0	
8	DJM40092	Control System	1	2	0	0	

FREE ELECTIVES							
1	DUD10012	Design Thinking	1	0	0	1	2

COURSE CLASSIFICATION	TOTAL CREDIT	%
i. a) Compulsory	14	15
b) Compulsory (Bahasa Kebangsaan A)[b]	2[b]	0
ii. Common Core	15	16
iii. Discipline Core	36	38
iv. Specialization	18	19
Total Credit	**83**	**88**
v. (a) Elective	2	2
(b) Free Electives[a]	2[a]	0
vi. Industrial Training	10	10
Grand Total Credit	**95**	**100**

	Total Hours	%
i. Lecture	49	41
ii. Practical	52	44
iii. Tutorial	18	15
Total Contact Hours	119	100

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DUE10012 Communicative English 1	2	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.	CLO1 : Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3 , CLS 3b) CLO2 : Demonstrate awareness of values and opinions embedded in texts on current issues. (A3 , CLS 3b) CLO3 : Present a topic of interest that carries identifiable values coherently using effective verbal and nonverbal communication skills.(A2 , CLS 4)
	MPU24XX1 Sukan / Unit Beruniform 1	1	UNIT BERUNIFORM 1 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. 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	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)
	DUW10022 Occopational, Safety and Health for Engineering	2	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.	CLO1 : Explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia. (C2,PLO1) CLO2 : Initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment.(A3, PLO8) CLO3 : Demonstrate communication skill in group to explain the factor that can lead to accident in workplace.(A3,PLO10)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DBS10012 Engineering Science	2	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.	CLO1 : Use basic physics concept to solve engineering physics problem. (C3, CLS 1) CLO2 : Apply Knowledge of fundamental physics in activities to mastery physics concept. (C3, CLS 1) CLO3 : Perform appropriate activities related to physics concept. (P3, CLS 3a)
	DBM10013 Engineering Mathematics 1	3	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.	CLO1 : Use mathematical statement to describe relationship between various physical phenomenon. (C3, CLS 1) CLO2 : Show mathematical solutions using the appropriate techniques in mathematics. (C3, CLS 3c) CLO3; Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)
	DJJ10013 Engineering Drawing	2	ENGINEERING DRAWING course 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 CAD the 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.	CLO1: Apply the fundamentals of technical drawing and features of CAD software in producing engineering drawing. (C3, PLO1) CLO2: Construct the technical drawing and 2D CAD drawing according to the engineering drawing standards. (P3, PLO5) CLO3: Propose a project report with following engineering norms and practices in engineering drawing. (A3, PLO8)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DJJ10033 Mechanical workshop Practice 1	2	MECHANICAL WORKSHOP PRACTICE 1 exposes the students to welding, machining and fitting which involve the use of arc and and gas welding machine, lathe machine, drilling machine, grinding, hand tools, marking out tools, measuring and testing tools. Students are also taught to emphasize on safety procedures and cleanliness in the workshop.	CLO1 : Measure finished product using appropriate measurement instruments. (P3, PLO5) CLO2 : Perform fitting, welding and machining works according to Standard Operational Procedure (SOP). (P4, PLO5) CLO3 : Demonstrate an understanding of professional ethics , responsibilities and norms of engineering practices according to the workshop safety regulation. (A3, PLO6)
	DJJ10033 Workshop Technology	3	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).	CLO1 : Apply the knowledge of basic mechanical components and equipment, hand tools and measuring equipment in workshop technology (C3, PLO1) CLO2 : Apply standard practice in operating mechanical tools and component (C3, PLO8) CLO3 : Demonstrate continuous learning and information management skills to complete assigned task (A3, PLO12)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	MPU23052 Sains, Teknolgi dan Kejuruteraan Dalam Islam	2	SAINS, TEKNOLOGI DAN KEJURUTERAAN DALAM ISLAM memberi pengetahuan tentang konsep Islam sebagai al-Din dan seterusnya membincangkan konsep sains, teknologi dan kejuruteraan dalam Islam serta impaknya, pencapaiannya dalam tamadun Islam, prinsip serta peranan syariah dan etika Islam, peranan kaedah fiqh serta aplikasinya.	CLO1 : Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian (A2 , CLS 4) CLO2 : Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam (A3 , CLS 5) CLO3 : Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam (A4 , CLS 4)
	MPU23042 Nilai Masyarakat Malaysia	2	NILAI MASYARAKAT MALAYSIA membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran- cabaran dalam membentuk masyarakat Malaysia	CLO1 : Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia (A2 , CLS 4) CLO2 : Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotisme masyarakat Malaysia (A3 , CLS 5) CLO3 : Menghubungkait minda ingin tahu dengan cabaran-cabaran dalam membentuk masyarakat Malaysia (A4 , CLS 4)
	MPU24XX1 Kelab / Persatuan / Unit Beruniform 2	1	KELAB memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif UNIT BERUNIFORM 2 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	DBM20023 Engineering Mathematics 2	3	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.	CLO1 :Use algebra and calculus knowledge to describe relationship between various physical phenomena. (C3, CLS 1) CLO2 : Solve the mathematical problems by using appropriate and relevant fundamental calculus techniques. (C3 , CLS 3c) CLO3 :Use mathematical language to express mathematical ideas and arguments precisely, concisely and logically in calculus. (A3 , CLS 3b)
	DJJ20053 Electrical Technology	3	ELECTRICAL TECHNOLOGY exposes students to the basic electrical circuit concepts, the application of electro-magnetism 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.	CLO1 :Explain the principles and fundamental of electrical circuits, electro-magnetism, transformers and electrical machine (C2, PLO1) CLO2 :Solve the problem related to electrical circuits, electromagnetism, transformers and electrical machine (C3, PLO1) CLO3 :Organize appropriately experiments in groups according to the Standard Operating Procedures. (P4, PLO5)
	DJJ20063 Thermodynamics	3	THERMODYNAMICS provides knowledge of theory, concept and application of principles to solve problems related to thermodynamics. It emphasizes on concept of non-flow process and flow process, properties of steam, Carnot cycle and Rankine cycle. This course also exposes the students to the demonstration of experiments in Thermo-dynamics by using the real equipment	CLO1 : Explain fundamentals concept and properties of pure substances in thermodynamics (C2, PLO1) CLO2 : Apply Laws of thermodynamics and it processes (C3, PLO1) CLO3 : Organize appropriately experiments according to the Standard Operating Procedures (P4, PLO5)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
	DJJ20073 Fluid Mechanics	3	FLUID MECHANICS provides students with a strong understanding of the fundamentals of fluid mechanics principles related to the fluid properties and behavior in static and dynamic situations. This course also exposes the students to the demonstration at the real equipment of fluid mechanics.	CLO1 : Explain the fundamentals of fluid (C2, PLO1) CLO2 : Solve problems related to fluid properties , fluid statics and fluid dynamics (C3, PLO1) CLO3 : Organize appropriate experiments in groups according to the standard operating procedures (P4, PLO5)
2	DJF21012 Manufacturing Workshop Practices 1	2	MANUFACTURING WORKSHOP PRACTICE 1 exposes the students to the fundamental of manufacturing processes, industrial environment, cultural issues and hands on experiences. This course enables students to apply knowledge and develop required technical skills on sand casting, conventional machining and TIG/MIG welding. The workshop practice helps the students to practice appropriate safety procedures and standard operation on completing mini project and practical task. The practical skills also cover the organizational and housekeeping activity, schedule maintenance, planning skills, supervising design, inspecting and testing welding task in order to meet the quality requirement.	CLO1 : Build a project using casting, TIG and MIG welding process based on standard operational procedures and safety. (P3, PLO5) CLO2 : Perform direct indexing operation using indexing head attachment in milling machine processes. (P4, PLO5) CLO3 : Demonstrate an understanding of the responsibilities, societal, health, safety, legal and cultural issues during practical work session. (A3, PLO6)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DUE30022 Communicative English 2	2	COMMUNICATIVE ENGLISH 2 emphasizes the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints.	CLO1 : Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience (A3 , CLS 3b) CLO2 : Describe processes, procedures and instructions clearly by highlighting information of concern (A3 , CLS 4) CLO3 : Demonstrate effective communication and social skills in handling enquiries and complaints amicably and professionally (A3 , CLS 3b)
	MPU21012 Pengajian Malaysia	2	PENGAJIAN MALAYSIA membincangkan sejarah dan politik, perlembagaan Malaysia dan sistem pemerintahan negara, kemasyarakatan dan perpaduan, pembangunan negara dan isu-isu keperihatinan negara. Kursus ini adalah bertujuan untuk melahirkan graduan yang mempunyai identiti kebangsaan dan semangat patriotisme yang unggul	CLO1 : Menerangkan nilai sejarah bangsa dan negara di Malaysia (A3 , CLS 5) CLO2 : Menghubungkait sikap dan tanggungjawab yang signifikan dengan sistem pemerintahan negara (A4 , CLS 5) CLO3 : Membentuk minda ingin tahu menerusi aktiviti kemasyarakatan atau patriotisme dalam kalangan pelajar (A3 , CLS 4)
	DBM30033 Engineering Mathematics 3	3	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'	CLO1 : Demonstrate an understanding of the common body of knowledge in mathematics. (C3 , CLS 1) CLO2 : Demonstrate problems solving skills in engineering problems. (C3, CLS 3c) CLO3 : Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DJJ30113 Material Science and Engineering	3	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.	CLO1 : Apply the fundamental of material science to identify the materials, properties, behavior, processes and treatment. (C3 ,PLO1) CLO2 : Performed appropriate material testing according to the Standard Operating Procedures. (P4 , PLO5) CLO3 : Demonstrate the ability to work individually and in groups to complete assigned tasks during the practical work session. (A3 ,PLO9)
	DJJ30093 Engineering Mechanics	3	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.	CLO 1: solve problems related to static and dynamics based on the concepts and principle of engineering mechanics (C3, PLO 1) CLO 2: analyze engineering related problems based on fundamentals of static and dynamics (C4, PLO 2) CLO 3: organize appropriately experiment in groups according to Standard Operation Procedures (P4, PLO 5)
	DJJ30122 Computer Aided Design	2	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.	CLO1: Apply CAD commands in order to produce engineering drawing. (C3, PLO1) CLO2: Construct 3D drawing of Mechanical Components according Drawing Standards. (P4, PLO5) CLO3: Demonstrate a presentation with following technical standard Communication. (A3, PLO10)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DJF31022 Manufacturing Workshop Practices 1	2	MANUFACTURING WORKSHOP PRACTICE 2 exposes the students to the fundamental of manufacturing process-es, industrial environment, cultural issues and hands-on experiences. This course enables students to apply knowledge and develop required technical skills on CNC machine, conventional machining, surface grinding machine and TIG and MIG welding. The workshop practice helps the students to practice appropriate safety procedures and standard operation on completing mini project and practical task. The practical skills also cover the organizational and housekeeping activity, schedule maintenance, planning skills, supervising design, inspecting and testing welding task in order to meet the quality requirements.	CLO1 : Build a project using CNC machine, TIG and MIG welding process based on standard operational procedures and safety. (P3, PLO5) CLO2 : Perform contouring cutting operation using rotary table attachment in milling machine processes. (P4, PLO5) CLO3 : Demonstrate an understanding of the responsibilities, societal, health, safety, legal and cultural issues during practical work session. (A3, PLO6)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJJ41032 Engineering Society	2	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.	CLO1 : Determine the important of work ethics, bylaws and professionalism in engineering profession. (C4,PLO8) CLO2 : Determine the needs for sustainable and gree n engineering towards providing the solutions in engineering field. (C4,PLO7) CLO3 : Implement the roles of engineering profession towards the developing of society and its challenges in globalization (C3,PLO6)
	DJJ41053 Pneumatic & Hydraulics	3	PNEUMATIC & HYDRAULICS provides knowledge and understanding to the importance of pneumatics and hydraulics circuits, equipment and design along with its usage in the industry.	CLO1 : Apply the basic concept and function of pneumatics and hydraulics system. (C3 , PLO1) CLO2 : Design pneumatic, electro-pneumatic and hydraulic circuit according to assigned tasks. (C5 , PLO3) CLO3 : Perform experiment on pneumatic, electro-pneumatic and hydraulic circuit during practical session. (P4 , PLO5)
	DJJ30103 Strength Of Materials	3	STRENGTH OF MATERIALS provides knowledge on concepts and calculation of forces on materials, thermal stress, shear force and bending moment, bending stress, shear stress and torsion in shafts. It also deals with the experiments conducted on tensile test, bending moment, shearing force and torsion and deflection.	CLO1 : apply the concepts of strength of materials to solve related problems. (C3, PLO1) CLO2 : analyze problems correctly related to strength of materials (C4, PLO2) CLO3 : organize appropriately experiment in groups according to Standard Operation Procedures (SOP). (P4, PLO5)

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COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJJ40182 Project 1	2	PROJECT 1 provides students with solid foundation on knowledge and skills in formulating project proposal preparation, writing and presetation	CLO1 : Identify the engineering problems to be solved (C4, PLO2) CLO2 : Analyze methods to solve problems (C4, PLO7) CLO3 : Propose a solution to problems (A3, PLO11)
	DJF31022 Manufacturing Workshop Practices 1	2	MANUFACTURING WORKSHOP PRACTICE 3 exposes the students to develop knowledge and skills in Robot Programming and Application, Programmable Logic Control, Additive Manufacturing and Plastic Processing. Robot Application helps the students to learn about programming, hands-on training and robot application. Students will also learn about creating a simple program using PLC which is widely used in manufacturing and mechanical processes. The Additive Manufacturing will focus on designing complex design shapes which involves in modifying and completing design of a prototype. Plastic processing process helps the students to understand the basic principle of the plastic manufacturing processes.	CLO1 : Manipulates robot programming and PLC programming process. (P3, PLO5) CLO2 : Perform mini project using additive manufacturing and plastic processing process. (P4, PLO5) CLO3 : Demonstrate an understanding of professional ethics, responsibilities, norms and practices during practical work session. (A3, PLO8)

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COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJF41042 CADCAM	2	CAD/CAM explains the theory and basic of coding languages, structures and the use of CAD/CAM systems for generating and verifying tool path. The students will be use CAD/CAM software to demonstrate the integration between CAD and CAM operation that includes design an object, produce a code and simulate the tool path for machining operation prior to the machining process and also generate NC part programming. Students also enables to build a project from NC part programming using CNC milling or lathe machine.	CLO1 : Calibrates machining code (G and M code) from CAD/CAM software to plan and devise holes process and milling/lathe project. (P3, PLO3) CLO2 : Build a project using CNC milling or lathe machine by utilizing related CAD/CAM simulation software. (P4, PLO5) CLO3 : Demonstrate continuous learning and information management skill while engaging in independent acquisition of new knowledge and skill to develop a project.(A3, PLO12)
	DJF41052 Manufacturing System	2	MANUFACTURING SYSTEM explains the terminologies and concepts that are necessary in the learning of manufacturing system. It provides knowledge regarding fundamental of manufacturing system, industrial robotics, process layout, material handling systems and Lean system.	CLO1 : Apply the basic concepts of manufacturing system, robotic in manufacturing, process analysis, process layout and material handling system. (C3, PLO2) CLO2 : Investigate problem solving in Lean system. (C4, PLO4) CLO3 : Demonstrate good communication skills in engineering society. (A3, PLO10)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
5	DUE50032 Communicative English 3	2	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.	CLO1 : Present gathered data in graphs and charts effectively using appropriate language forms and functions (A2 , CLS 3b) CLO2 : Prepare a high impact resume and a cover letter, highlighting competencies and strengths that meet employer's expectations (A4 , CLS 4) CLO3 : Demonstrate effective communication and social skills in handling job interviews confidently (A3 , CLS 3b)
	MPU22012 Entrepreneurship	2	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.	CLO1:Propose the value proposition of entrepreneurial idea using Business model Canvas(A3, CLS3b) CLO2:Develop a viable business plan by organizing business objectives according to priorities(A4, CLS4) CLO3:Organise the online presence business in social media marketing platform (A3, CLS4)

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COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
5	DJJ50193 Project 2	3	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.	CLO1 : Demonstrate appropriate and creative solution in solving project problems (P5, PLO3) CLO2 : Perform project plan to achieve objectives with valid and reliable results (P4, PLO4) CLO3 : Explain the project work and defend project outcomes effectively with good communication skills (A4, PLO10) CLO4 : Organize project activities and outcomes in report accordance to the specified standard format that applies engineering management principles (P4, PLO11)
	DJF51062 Manufacturing Control	2	MANUFACTURING CONTROL provides knowledge about basic principles and concept on managing an organization and major levels in manufacturing planning and control system (MPC) which will help students in making forecast, production plan, control production and manage inventory. This course also gives knowledge about production scheduling. It also includes knowledge in managing MRP system (material management), production scheduling and inventory management.	CLO1 : Attain the concept and application of Manufacturing Forecasting, Production Scheduling, Inventory Control, Productivity and Capacity Planning. (C3, PLO2) CLO2 : Integrate Material Requirement Planning (MRP) and inventory control for manufacturing process controlling activities. (C4, PLO4) CLO3 : Adopt project management framework to develop a Material Requirement Planning (MRP) according to inventory management. (A3, PLO11)

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COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
5	DJJ51072 Jig and Fixtures	2	JIG AND FIXTURE DESIGN covers basic production needs in industry. The topics taught includes types and functions of jigs and fixtures, supporting and locating, clamping and work holding principles, design economics, designing and constructing plate jig and plate fixtures. This course also provides knowledge in management, sustainability and manufacturing systems.	CLO1 : Apply the concepts and principles of jigs and fixtures in design. (C3, PLO2) CLO2 : Calibrate the 3D design by using CAD/CAM software to plan and devise mini project. (P4, PLO3) CLO3 : Demonstrate convictions towards environment and sustainability to complete assigned tasks during mini project sessions. (A3, PLO7)
	DJJ51082 Quality Control	3	QUALITY CONTROL provides knowledge on basic principle and concept of quality including statistical method in controlling products quality or services. This course also emphasizes on the application of Control Chart and Quality Control tools and also explains the quality improvement technique.	CLO1 : Apply the relation of statistics and quality management system in understanding of quality control and their application tools. (C3, PLO1) CLO2 : Determine the related quality tools and techniques to control the quality of products or services based on case study. (C4, PLO2) CLO3 : Demonstrate ability to work in team to complete the assigned tasks (A3, PLO9)
	DJF51092 Tool Design	2	TOOL DESIGN exposes the students to the knowledge of datum concept, geometric tolerances and fundamentals to design tool based on clamping and locating principle. The topics also covers the principle of tool applications in metal and non-metal process. All the topics discussed will enable the students to plan and identify the use of tooling. They will also be exposed to the application of tooling in related industries.	CLO1 : Apply appropriately the concepts of tool design method and tooling material selection in designing tools. (C3, PLO2) CLO2 : Perform the simulation of mould, tool and die design using CAD/CAM software. (P4, PLO3) CLO3 : Demonstrate conviction towards environment and sustainability to complete assigned tasks during practical work sessions. (A3, PLO7)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
6	DUT 600610 Engineering Industrial Training	10	ENGINEERING INDUSTRIAL TRAINING course will provide student with first-hand experience in an engineering-practice environment outside the polytechnic. Student 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 ethic, communication, teamwork and inter-personal and life-long learning skills at the workplace.	CLO1: perform the assigned task accordingly based on job scope requirement (P4 , PLO5) CLO2 : demonstrate responsibilities as an engineering technician while dealing with people of various background (A5 , PLO6) CLO3: practice good working ethics while undergoing industrial training (A5 , PLO8) CLO4: display ability to work in a team or independently base on the given task (P4 , PLO9) CLO5: demonstrate oral communication skill in performing job requirement (A3, PLO10) CLO6: write a report based on given task accordingly to technical practice (C3 , PLO10) CLO7: display life long learning skill in completing the given task (P4 , PLO12)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJF42012 Advanced Manufacturing Process	2	ADVANCED MANUFACTURING PROCESS provides students with an understanding and appreciation of the width and depth of the manufacturing processes and interrelationship between manufacturing processes, product design, material properties and other aspects such as humanity, economy and environment. It will introduce advanced machining process such as electrical discharge machining, laser beam, water jet and abrasive machining.	CLO1 : Expose the various method and operation for manufacturing process by consideration of material, design and economic aspect. (C3, PLO2) CLO2 : Select the appropriate manufacturing processes in making a plastic or composite component based on their characteristics. (C4, PLO4) CLO3 : Demonstrate ability to work in team to complete the assigned tasks. (A3, PLO9)
	DJF52032 Manufacturing Economy	2	MANUFACTURING ECONOMIC provides knowledge and understanding for students on economy aspect which includes concepts, categories, factor of supply and demand, basic element and characteristics of cost and decision involve in manufacturing process. This course also focuses on fixed cost, variable cost, direct and indirect cost, actual cost and break-even analysis which leads towards eliminating the wastage in manufacturing.	CLO1 : Apply knowledge to identify and classify of fixed cost, variable cost, direct and indirect cost which contribute to total cost in production. (C3, PLO2) CLO2 : Analyze correctly the actual cost and break-even analysis for decision making process. (C4, PLO4) CLO3 : Demonstrate ability to manage project including financial aspect for the task assigned. (A3, PLO11)
	DJJ42032 Instrument and Control	2	INSTRUMENTATION & CONTROL exposes the students to the basic principles in control system and its usage in industrial sector is the main focus in this course. Instrumentation and control also provide knowledge to the students in components measurement in control systems that are normally used in industries.	CLO1 : Apply the fundamental of control system and instrumentation used in engineering (C4, PLO2) CLO2 : Explore the measurement and process control system in engineering (C3, PLO4) CLO3 : Demonstrate good communication skill in presentation on assigned topics (A3, PLO10)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJJ42022 Industrial Management	2	INDUSTRIAL MANAGEMENT provides students with a strong fundamental understanding of industrial management prospect and production system planning such as inventory, scheduling, production system operation, facilities, plan location, layout and line balancing. This course also provides knowledge in quality control, and human resource management.	CLO1: Apply the basic concept of industrial management system to solve related problems. (C3, PLO2) CLO2: Analyze problems related to industrial management. (C4, PLO8) CLO3: demonstrate good communication skills. (A3, PLO10)
	DJJ52052 Railway Track system	2	RAILWAY TRACK SYSTEM provides knowledge regarding to railway track engineering concepts including track component and system design, construction, evaluation, maintenance, load distribution, and wheel/rail interaction. Topics covered include: Track layout and geometry; ballast and subgrade; ties; rail and fastenings; track analysis and design; special trackwork; grade crossings; track standards; and inspection, condition assessment, and asset management.	CLO1 :Explain the concept of Railway Track System. (C2, PLO 1) CLO2 :Apply the railway engineering and give respond in work application. (C3, PLO 5) CLO3 :Analyze the effectiveness of Railway Track System through engineering issue in group.(C4, PLO 9)
	DJM20032 C Programming	2	C Programming course provides an introduction to programme design and development. Student will learn to design, code, debug, test and document well-structured 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.	CLO1 : Explain knowledge of basic concepts of C Programming to solve given problem using an appropriate data type (C2 , PLO1) CLO2 : Constructs a high level programming language in solving variety engineering and scientific problems (P3 , PLO3) CLO3 : Present a solution for assigned project based on programming which relates to current or upcoming technologies and peripherals (A2 , PLO12)

DIPLOMA IN MECHANICAL ENGINEERING (MANUFACTURING)

COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJM40082 Programmable Logic Control	2	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.	CLO1 : Differentiate the types of automation systems and terminologies used in PLC hardware and programmes. (C2, PLO1) CLO2 : Write a PLC program related to an industrial automation system. (C5, PLO2) CLO3 : (P6, PLO3) Program a PLC for an automated application.
	DJM40092 Control System	2	CONTROL SYSTEMS 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.	CLO1 :Explain the basic concept of control system including controller principle, transfer function and stability (C2, PLO2) CLO2 :Construct experiment on different types of controller mode in order to analyse and interpretation of data (P4, PLO3) CLO3 : (A3, PLO9) Demonstrate the ability to work in team for completing assigned task during practical work session
FREE ELECTIVE	DUD10012 Design Thinking	2	This course offers the basic concept of Design Thinking through experiential learning. Students learn the five iterative phases of Design Thinking, which are Empathy, Define, Ideate, Prototype and Testing. Students will apply these design thinking principles, process and techniques to solve a real-world problem and come up with an innovative solution in the form of a product, system or service prototype.	CLO1: Apply design thinking principles, process and techniques to solve a real-world problem innovatively (C3 , CLS 2) CLO2: Demonstrate the ability to communicate ideas in solving a real-world problem (A3 , CLS 3b)

DIPLOMA IN MECHATRONIC ENGINEERING

DIPLOMA IN MECHATRONIC ENGINEERING

INTRODUCTION

In line with the 3rd Industrial Malaysia Plan (IMP3) aiming for the innovative and creative human capital development, via matching talent to expertise with market demand, Diploma in Mechatronic Engineering for polytechnic is developed to give balance emphasis on theoretical and practical aspects. The Eleventh Malaysia Plan was drawn to produced 60% out of 1.5 million workers was in TVET sector. Until now a total of 69,475 (51%) of the 136,062 technical education and vocational training (TVET) graduates in Malaysia are working as professionals and skilled workers. Thus, to keep abreast with rapid demand in TVET sector, Department of Polytechnic and Community College Education (DPCCE) progressively collaborates with major industry players in the country in developing the curriculum. The programme will take six semesters to complete, five academic semesters at their respective polytechnics and one semester of industrial training at relevant industries during the final semester. This programme complies with the Board of Engineer (BEM) requirement.

SYNOPSIS

The 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.

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

DIPLOMA IN MECHATRONIC ENGINEERING

POLYTECHNIC VISION

To be the Leading-Edge TVET Institution.

POLYTECHNIC MISSION

a. To provide wide access to quality and recognized TVET programmes.

b. To empower communities through lifelong learning.

c. To develop holistic, entrepreneurial and balanced graduates.

d. To capitalise on smart partnership with stakeholders.

EDUCATIONAL GOAL

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

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 's aspiration to increase workforce in engineering related field.

PROGRAMME EDUCATIONAL OBJECTIVE (PEO)

The Diploma in Mechatronic Engineering programme should produce balanced and competent technical workers who are :

PEO1: equipped with industry-relevant knowledge and skills in Mechatronic Engineering field.

PEO2: engaging on lifelong and continuous learning to enhance knowledge and skills.

PEO3: instilled with entrepreneurial skills and mind set in the real working environment.

PEO4: established with strong linkage with society and players in the industry.

DIPLOMA IN MECHATRONIC ENGINEERING

PROGRAMME LEARNING OUTCOMES (PLO)

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

PLO1: Knowledge : Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices

PLO2: Problem analysis : Identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4)

PLO3: Design/development of solution : 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: Investigation : Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements

PLO5: Modern tool usage : Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)

PLO6: The engineer and society : Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (DK7)

PLO7: Environment and sustainability : Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts (DK7)

PLO8: Ethics : Understand and commit to professional ethics and responsibilities and norms of technician practice

PLO9: Individual and team work : Function effectively as an individual, and as a member in diverse technical teams

PLO10: Communication : 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: Project management and finance : Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a technical team and to manage projects in multidisciplinary environments

PLO12: Life long learning : Recognise the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge

DIPLOMA IN MECHATRONIC ENGINEERING
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHATRONIC ENGINEERING								
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS	PRE-REQUISITE
			L	P	T	O		
SEMESTER 1								
Compulsory	DUE10012	Communicative English 1	1	0	2	0	2	
	MPU24XX1	Sukan	0	2	0	0	1	
		Unit Beruniform 1						
Common Core	DUW10022	Occupational, Safety & Health Engineering	2	0	0	0	2	
	DBS10012	Engineering Science	2	1	0	0	2	
	DBM10013	Engineering Mathematics 1	2	0	2	0	3	
Discipline Core	DJJ10013	Engineering Drawing	1	3	0	0	3	
	DJM10012	Mechatronic Workshop Practice 1	0	4	0	0	2	
	DJJ10033	Workshop Technology	3	0	0	0	3	
		TOTAL	**25**				**18**	
SEMESTER 2								
Compulsory	MPU23052	Sains, Teknologi dan Kejuruteraan Dalam Islam*	1	0	2	0	2	
	MPU23042	Nilai Masyarakat Malaysia**						
	MPU24XX1	Kelab/Persatuan	0	2	0	0	1	MPU24XX1
		Unit Beruniform 2						MPU24XX1
Common Core	DBM20023	Engineering Mathematics 2	2	0	2	0	3	DBM10013
Discipline Core	DJJ20053	Electrical Technology	2	2	0	0	3	
	DJM20022	Mechatronic Workshop Practices 2	0	4	0	0	2	
	DJM20032	C Programming	1	2	0	0	2	
	DJM20042	Electronic System	2	1	0	0	2	
	DJM20053	Thermofluids	2	2	0	0	3	
		TOTAL	**27**				**18**	
SEMESTER 3								
Compulsory	DUE30022	Communicative English 2	1	0	2	0	2	DUE10012
Common Core	DBM30033	Engineering Mathematics 3	2	0	2	0	3	DBM20023
Discipline Core	DJM30062	Industrial Electronics	1	2	0	0	2	
	DJM30073	Digital System	2	2	0	0	3	
	DJM30093	Engineering Mechanics	2	2	0	0	3	
	DJJ30113	Material Science and Engineering	2	2	0	0	3	
	DJJ30122	Computer Aided Design	1	2	0	0	2	DJJ10013
		TOTAL	**25**				**18**	

DIPLOMA IN MECHATRONIC ENGINEERING
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHATRONIC ENGINEERING								
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS	PRE-REQUISITE
			L	P	T	O		
SEMESTER 4								
Common Core	DJJ40132	Engineering Society	2	0	0	0	2	
Discipline Core	DJM40082	Programmable Logic Controller	1	2	0	0	2	
	DJM40092	Control System	2	1	0	0	2	
	DJM40103	Power Electronics	2	2	0	0	3	
	DJJ40153	Pneumatic and Hydraulics	2	2	0	0	3	
	DJJ40182	Project 1	2	0	0	0	2	
Elective		Elective***						
		TOTAL	**18**				**14**	
SEMESTER 5								
Compulsory	MPU21012	Pengajian Malaysia	1	0	2	0	2	
	DUE50032	Communicative English 3	1	0	2	0	2	DUE30012
	MPU22012	Entrepreneurship	1	0	2	0	2	
Discipline Core	DJM50113	Industrial Automation	2	2	0	0	3	
	DJM50122	Embedded System Application	1	2	0	0	2	
	DJJ50193	Project 2	0	4	0	0	3	DJJ40182
Elective		Elective***						
		TOTAL	**20**				**14**	
SEMESTER 6								
Industrial Training	DUT600610	Engineering Industrial Training	0	0	0	0	10	
		TOTAL	**0**				**10**	
TOTAL CREDIT VALUES							**94**	

DIPLOMA IN MECHATRONIC ENGINEERING
PROGRAMME STRUCTURE

PROGRAMME STRUCTURE FOR DIPLOMA IN MECHATRONIC ENGINEERING							
COMPONENTS	COURSE CODE	COURSE	CONTACT HOURS				CREDIT HOURS
			L	P	T	O	
ELECTIVE COURSES							
Elective courses	DJJ42022	Industrial Management	2	0	0	0	2
	DJJ42032	Instrumentation and Control	2	0	0	0	
	DJJ5012	Engineering Plant Technology	2	0	0	0	
	DJF40142	CADCAM	0	4	0	0	
	DJF51082	Quality Control	2	0	0	0	
	DJM42012	Railway 1 - Communication for Rail	2	0	0	0	
	DJM52022	Railway 2 - Signaling in Rail	2	0	0	0	
FREE ELECTIVES							
1	DUD10012	Design Thinking	1	0	0	1	2

COURSE CLASSIFICATION	TOTAL CREDIT	%
i. a) Compulsory	14	15
b) Compulsory (Bahasa Kebangsaan A)[b]	2[b]	0
ii. Common Core	15	16
iii. Discipline Core	53	56
Total Credit	**82**	**87**
v. (a) Elective	2	2
(b) Free Electives[a]	2[a]	0
vi. Industrial Training	10	11
Grand Total Credit	**94**	**100**

CLASSIFICATION	Total Hours	%
i. Lecture	51	44
ii. Practical	48	41
iii. Tutorial	18	15
Total Contact Hours	117	100

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DUE10012 Communicative English 1	2	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.	CLO1 : Participate in a discussion using effective communication and social skills to reach an amicable conclusion by accommodating differing views and opinions. (A3 , CLS 3b) CLO2 : Demonstrate awareness of values and opinions embedded in texts on current issues. (A3 , CLS 3b) CLO3 : Present a topic of interest that carries identifiable values coherently using effective verbal and nonverbal communication skills.(A2 , CLS 4)
	MPU24XX1 Sukan / Unit Beruniform 1	1	UNIT BERUNIFORM 1 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif. 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	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)
	DUW10022 Occupational, Safety and Health for Engineering	2	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.	CLO1 : Explain briefly Occupational Safety and Health (OSH) procedures, regulation and its compliance in Malaysia. (C2,PLO1) CLO2 : Initiates incident hazards, risks and safe work practices in order to maintain health and safe work environment.(A3, PLO8) CLO3 : Demonstrate communication skill in group to explain the factor that can lead to accident in workplace.(A3,PLO10)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DBS10012 Engineering Science	2	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.	CLO1 : Use basic physics concept to solve engineering physics problems. (C3, CLS 1) CLO2 : Apply knowledge of fundamental physics in activities to mastery physics concept. (C3, CLS 1) CLO3 : Perform appropriate activities related to physics concept. (P3, CLS 3a)
	DBM10013 Engineering Mathematics 1	3	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.	CLO1 : Use mathematical statement to describe relationship between various physical phenomena. (C3, CLS 1) CLO2 : Show mathematical solutions using the appropriate techniques in mathematics . (C3, CLS 3c) CLO3 : Use mathematical expression in describing real engineering problems precisely, concisely and logically. (A3, CLS 3b)
	DJJ10013 Engineering Drawing	3	ENGINEERING DRAWING course 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 CAD the 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.	CLO1 : Apply the fundamentals of technical drawing and features of CAD software in producing engineering drawing. (C3, PLO1) CLO2 : Construct the technical drawing and 2D CAD drawing according to the engineering drawing standards. (P3,PLO5) CLO3 : Propose a project report with following engineering norms and practices in engineering drawing. (A3, PLO8)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
1	DJJM10012 Mechatronic Workshop Practices 1	2	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.	CLO1 : Practice and perform correct techniques in handling fitting and machining works and equipments. (P3,PLO3) CLO2 : Practice and perform ability to operate gas and arc welding works according to Standard Operation Procedure (SOP) (P4,PLO5) CLO3 : Demonstrate the understanding and awareness of safety procedure in mechanical workshops according to the workshop safety regulations. (A3,PLO6)
	DJJ10033 Workshop Technology	3	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).	CLO1 : Apply the knowledge of basic mechanical components and equipment, hand tools and measuring equipment in workshop technology(C3, PLO1) CLO2 : Apply standard practice in operating mechanical tools and component(C3, PLO8) CLO3 : Demonstrate continuous learning and information management skills to complete assigned task(A3, PLO12)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	MPU23052 Sains, Teknolgi dan Kejuruteraan Dalam Islam	2	SAINS, TEKNOLOGI DAN KEJURUTERAAN DALAM ISLAM memberi pengetahuan tentang konsep Islam sebagai al-Din dan seterusnya membincangkan konsep sains, teknologi dan kejuruteraan dalam Islam serta impaknya, pencapaiannya dalam tamadun Islam, prinsip serta peranan syariah dan etika Islam, peranan kaedah fiqh serta aplikasinya.	CLO1 : Melaksanakan dengan yakin amalan Islam dalam kehidupan seharian (A2 , CLS 4) CLO2 : Menerangkan etika dan profesionalisme berkaitan sains teknologi dan kejuruteraan dalam Islam (A3 , CLS 5) CLO3 : Menghubungkait minda ingin tahu dengan prinsip syariah, etika dan kaedah fiqh dalam bidang sains, teknologi dan kejuruteraan menurut perspektif Islam (A4 , CLS 4)
	MPU23042 Nilai Masyarakat Malaysia	2	NILAI MASYARAKAT MALAYSIA membincangkan aspek sejarah pembentukan masyarakat, nilai-nilai agama, adat resam dan budaya masyarakat di Malaysia. Selain itu, pelajar dapat mempelajari tanggungjawab sebagai individu dan nilai perpaduan dalam kehidupan di samping cabaran- cabaran dalam membentuk masyarakat Malaysia	CLO1 : Membincangkan sejarah dan nilai dalam pembentukan masyarakat di Malaysia (A2 , CLS 4) CLO2 : Menerangkan etika dan profesionalisme terhadap konsep perpaduan bagi meningkatkan semangat patriotisme masyarakat Malaysia (A3 , CLS 5) CLO3 : Menghubungkait minda ingin tahu dengan cabaran-cabaran dalam membentuk masyarakat Malaysia (A4 , CLS 4)
	MPU24XX1 Kelab / Persatuan / Unit Beruniform 2	1	KELAB memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif UNIT BERUNIFORM 2 memfokuskan kepada penguasaan pengetahuan dan kemahiran khusus secara holistik bagi mengukuhkan pembentukan kemahiran insaniah pelajar yang positif	CLO1 : Mempamerkan kemahiran khusus bagi kursus berkaitan (P2 , CLS 4) CLO2 : Menunjukkan kepimpinan dan kerja berpasukan berdasarkan penguasaan kemahiran dan amalan positif (A3 , CLS 3d)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	DBM20023 Engineering Mathematics 2	3	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.	CLO1 : Use algebra and calculus knowledge to describe relationship between various physical phenomena. (C3, CLS 1) CLO2 : Solve the mathematical problems by using appropriate and relevant fundamental calculus techniques. (C3, CLS 3c) CLO3 : Use mathematical language to express mathematical ideas and arguments precisely, concisely, and logically in calculus. (A3, CLS 3b)
	DJJ20053 Electrical Technology	3	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.	CLO1 :Explain the principles and fundamental of electrical circuits, electromagnetism, transformers and electrical machine (C2, PLO1) CLO2 :Solve the problem related to electrical circuits, electromagnetism, transformers and electrical machine (C3, PLO1) CLO3 :Organize appropriately experiments in groups according to the Standard Operating Procedures. (P4, PLO5)
	DJM20022 Mechatronic Workshop Practices 2	2	MECHATRONICS WORKSHOP PRACTICE 2 enhances knowledge on CNC and EDM and also enables student to carry out related task scopes. This course also emphasizes on how to operate CNC and EDM machines properly.	CLO1 : Constructs a CNC and EDM machine programming according to machining instruction and related tasks. (P3, PLO3) CLO2 : Perform the CNC and EDM machines according to Standard Operating Procedure. (P4, PLO5) CLO3 : Demonstrate the ability to work as individual and as a team to complete assigned tasks. (A3, PLO9)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
2	DJM20032 C Programming	2	C Programming course provides an introduction to programme design and development. Student will learn to design, code, debug, test and document well-structured 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.	CLO1 : Explain knowledge of basic concepts of C Programming to solve given problem using an appropriate data type. (C2 , PLO1) CLO2 : Constructs a high level programming language in solving variety engineering and scientific problems. (P3 , PLO3) CLO3 : Present a solution for assigned project based on programming which relates to current or upcoming technologies and peripheral. (A2 , PLO12)
	DJM20042 Electronic Systems	2	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.	CLO1 : Apply the characteristics and properties of semiconductor materials. (C3,PLO1) CLO2 : Construct a electronic circuit based on schematic diagram. (P4,PLO5) CLO3 : Demonstrate understanding of electronic circuit. (A3,PLO10)
	DJM20053 Thermofluids	3	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.	CLO1 : Organize appropriately experiments in groups according to the Standard Operating Procedures. (C3,PLO1) CLO2 : Solve problem correctly related thermodynamics and fluid mechanics with appropriate formula and theories. (P4,PLO5) CLO3 : Demonstrate ability to work in team to complete assigned tasks. : (A3,PLO9)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DUE30022 Communicative English 2	2	COMMUNICATIVE ENGLISH 2 emphasizes the skills required at the workplace to describe products or services as well as processes or procedures. This course will also enable students to make and reply to enquiries and complaints.	CLO1 : Describe a product or service effectively by highlighting its features and characteristics that appeal to a specific audience (A3 , CLS 3b) CLO2 : Describe processes, procedures and instructions clearly by highlighting information of concern (A3 , CLS 4) CLO3 : Demonstrate effective communication and social skills in handling enquiries and complaints amicably and professionally (A3 , CLS 3b)
	DBM30033 Engineering Mathematics 3	3	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.	CLO1 : Demonstrate and understanding of the common body of knowledge in mathematics. (C3, CLS 1) CLO2 : Demonstrate problems solving skills in engineering problems. (C3, CLS 3c) CLO3 : Use mathematical expression in describing real engineering precisely, concisely, and logically. (A3, CLS 3b)
	DJJM30062 Industrial Electronics	2	INDUSTRIAL ELECTRONICS provides exposure to mechanical, electrical and electronic devices. This course discusses structures of circuits, switches, relays, solenoids, sensors, and telemetry systems.	CLO1 : Explain the function of operational principal of switch, relay, solenoid, sensor and telemetry system. (C2, PLO1) CLO2 : Display types of switches, relay, solenoid and sensors according to operational principle. (P4, PLO5) CLO3 : Comply the switches, relay, solenoid, electronic control devices, converter and sensors in various circuit.(A2, PLO10)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DJM30073 Digital System	3	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	CLO1 : Distinguish the characteristics and operations of various digital circuits. (C4, PLO1) CLO2 : Construct digital circuits based on schematic diagrams. (P4, PLO5) CLO3 : Demonstrate the role of digital circuits in real world applications. (A3, PLO7)
	DBJ30093 Engineering Mechanics	3	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.	CLO 1: Solve problems related to static and dynamics based on the concepts and principle of engineering mechanics (C3, PLO 1) CLO 2: Analyze engineering related problems based on fundamentals of static and dynamics. (C4, PLO 2) CLO 3: Organize appropriately experiment in groups according to Standard Operation Procedures. (P4, PLO 5)
	DJJ30113 Material Science and Engineering	3	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.	CLO1 : Apply the fundamental of material science to identify the materials, properties, behavior, processes and treatment. (C3 ,PLO1) CLO2 : Performed appropriate material testing according to the Standard Operating Procedures. (P4 , PLO5) CLO3 : Demonstrate the ability to work individually and in groups to complete assigned tasks during the practical work session. (A3 ,PLO9)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
3	DJJ30122 Computer Aided Design	2	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.	CLO1 : Apply CAD commands in order to produce engineering drawing. (C3, PLO1) CLO2 : Construct 3D drawing of Mechanical Components according Drawing Standards. (P4, PLO5) CLO3 : Demonstrate a presentation with following technical standard communication. (A3,PLO10)

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COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJJ40132 Engineering and Society	2	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	CLO1 : Determine the important of work ethics, bylaws and professionalism in engineering profession. (C4,PLO8) CLO2 : Determine the needs for sustainable and green engineering towards providing the solutions in engineering field. (C4,PLO7) CLO3 : Implement the roles of engineering profession towards the developing of society and its challenges in globalization (C3,PLO6)
	DJM40082 Programmable Logic Controller	2	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.	CLO1 : Differentiate the types of automation systems and terminologies used in PLC hardware and programmes . (C2, PLO1) CLO2 : Write a PLC program related to an industrial automation system. (C5, PLO2) CLO3 : Program a PLC for an automated application. (P6, PLO3)
	DJM40092 Control System	2	CONTROL SYSTEMS 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.	CLO1 : Explain the basic concept of control system including controller principle, transfer function and stability. (C2, PLO2) CLO2 : Construct experiment on different types of controller mode in order to analyse and interpretation of data. (P4, PLO3) CLO3 : Demonstrate the ability to work in team for completing assigned task during practical work sessions. (A3, PLO9)

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COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
4	DJM40103 Power Electronics	3	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	CLO1: Distinguish the characteristics and operations of various power electronic devices, AC & DC converters and electrical drives (C3, PLO1) CLO2 : Construct power electronic converter and electrical drive circuits based on schematic diagram. (P4, PLO3) CLO3 : Demonstrate effectively on well-defined engineering of power electronic application . (A3, PLO10)
	DJJ40153 Pneumatic and hydraulics	3	PNEUMATIC & HYDRAULICS provides knowledge and understanding to the importance of pneumatics and hydraulics circuits, equipment and design along with its usage in the industry.	CLO1 : Apply the basic concept and function of pneumatics and hydraulics system. (C3 , PLO1) CLO2 : Design pneumatic, electro-pneumatic and hydraulic circuit according to assigned tasks. (C5 , PLO3) CLO3 : Perform experiment on pneumatic, electro-pneumatic and hydraulic circuit during practical session. (P4 , PLO5)
	DJJ40182 Project 1	2	PROJECT 1 provides students with solid foundation on knowledge and skills in formulating project proposal preparation, writing and presentation	CLO1 : Identify the engineering problems to be solved. (C4, PLO2) CLO2 : Analyze methods to solve problems. (C4, PLO7) CLO3 : Propose a solution to problems. (A3, PLO11)

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COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
5	MPU21012 Pengajian Malaysia	2	**PENGAJIAN MALAYSIA** membincangkan sejarah dan politik, perlembagaan Malaysia dan sistem pemerintahan negara, kemasyarakatan dan perpaduan, pembangunan negara dan isu-isu keperihatinan negara. Kursus ini adalah bertujuan untuk melahirkan graduan yang mempunyai identiti kebangsaan dan semangat patriotisme yang unggul	CLO1 : Menerangkan nilai sejarah bangsa dan negara di Malaysia (A3 , CLS5) CLO2 : Menghubungkait sikap dan tanggungjawab yang signifikan dengan sistem pemerintahan Negara (A4 , CLS5) CLO3 : Membentuk minda ingin tahu menerusi aktiviti kemasyarakatan atau patriotisme dalam kalangan pelajar (A3 , CLS4)
	DUE50032 Communicative English 3	2	**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.	CLO1 : Present gathered data in graphs and charts effectively using appropriate language forms and functions (A2 , CLS3b) CLO2 : Prepare a high impact resume and a cover letter, highlighting competencies and strengths that meet employer's expectations (A4 , CLS4) CLO3 : Demonstrate effective communication and social skills in handling job interviews confidently (A3 , CLS3b)
	MPU22012 Entrepreneurship	2	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.	CLO1:Propose the value proposition of entrepreneurial idea using Business model Canvas(A3, CLS3b) CLO2:Develop a viable business plan by organizing business objectives according to priorities(A4, CLS4) CLO3:Organise the online presence business in social media marketing platform (A3, CLS4)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
5	DJM50113 Industrial Automation	3	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.	CLO1 : Apply the fundamental concept of industrial automation including the mechanical system, actuator control and sensory devices. (C2, PLO1) CLO2 : Develop control structure for industrial automation system based on process specification .P4, PLO5) CLO3 : Demonstrate good communication skills in group on assigned topic. (A3, PLO10)
	DJM50122 Embedded System Application	2	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.	CLO1 : Explain basic concept of microprocessor and embedded system. (C2, PLO3) CLO2 : Construct a programming language in solving in hardware interfacing. (P4, PLO5) CLO3 : Perform problem solving skill in assigned practical work. (A2, PLO9)
	DJJ50193 Project 2	3	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.	CLO1 : Demonstrate appropriate and creative solution in solving project problems (P5, PLO3) CLO2 : Perform project plan to achieve objectives with valid and reliable results (P4, PLO4) CLO3 : Explain the project work and defend project outcomes effectively with good communication skills (A4, PLO10) CLO4 : Organize project activities and outcomes in report accordance to the specified standard format that applies engineering management principles (P4, PLO11)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
6	DUT 600610 Engineering Industrial Training	10	ENGINEERING INDUSTRIAL TRAINING course will provide student with first-hand experience in an engineering-practice environment outside the polytechnic. Student 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 ethic, communication, teamwork and inter-personal and life-long learning skills at the workplace.	CLO1: perform the assigned task accordingly based on job scope requirement (P4 , PLO5) CLO2 : demonstrate responsibilities as an engineering technician while dealing with people of various background (A5 , PLO6) CLO3: practice good working ethics while undergoing industrial training (A5 , PLO8) CLO4: display ability to work in a team or independently base on the given task (P4 , PLO9) CLO5: demonstrate oral communication skill in performing job requirement (A3 , PLO10) CLO6: write a report based on given task accordingly to technical practice (C3 , PLO10) CLO7: display life long learning skill in completing the given task (P4 , PLO12)

DIPLOMA IN MECHATRONIC ENGINEERING
COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJJ42022 Industrial Management	2	INDUSTRIAL MANAGEMENT provides students with a strong fundamental understanding of industrial management prospect and production system planning such as inventory, scheduling, production system operation, facilities, plan location, layout and line balancing. This course also provides knowledge in quality control, and human resource management.	CLO1 : Apply the basic concept of industrial management system to solve related problems. (C3, PLO2) CLO2 : Analyze problems related to industrial management. (C4, PLO8) CLO3 : Demonstrate good communication skills. (A3, PLO10)
	DJJ42032 Instrumentation and Control	2	INSTRUMENTATION & CONTROL exposes the students to the basic principles in control system and its usage in industrial sector is the main focus in this course. Instrumentation and control also provide knowledge to the students in components measurement in control systems that are normally used in industries.	CLO1 : Apply the fundamental of control system and instrumentation used in engineering. (C4, PLO2) CLO2 : Explore the measurement and process control system in Engineering. (C3, PLO4) CLO3 : Demonstrate good communication skill in presentation on assigned topics. (A3, PLO10)
	DJJ52012 Engineering Plant Technology	2	ENGINEERING PLANT TECHNOLOGY provides an introduction to power plant technology industry such as steam power plant, gas turbine power plant, diesel power plant, compressed air plant and water pump.	CLO1 : Classify the concepts and technology of power plant system and components to solve related problem based on its application and functions. (C4,PLO2) CLO2 : Implement the professional ethics and responsibility and norms of technician practice in power plant system and components. (C3,PLO8) CLO3 : Demonstrate skill of communications effectively on well-defined engineering activities with the engineering community and with society of large and information management skills based on related engineering plant technology. (A3,PLO10)

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COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJF40142 CADCAM	2	CAD/CAM explains the theory and basic of coding languages, structures and the use of CAD/CAM systems for generating and verifying tool path. The students will be use CAD/CAM software to demonstrate the integration between CAD and CAM operation that includes design an object, produce a code and simulate the tool path for machining operation prior to the machining process and also generate NC part programming. Students also enables to build a project from NC part programming using CNC milling or lathe machine.	CLO1 : Calibrates machining code (G and M code) from CAD/CAM software to plan and devise holes process and milling/lathe project. (P3, PLO3) CLO2 : Build a project using CNC milling or lathe machine by utilizing related CAD/CAM simulation software. (P4, PLO5) CLO3 : Demonstrate continuous learning and information management skill while engaging in independent acquisition of new knowledge and skill to develop a project. (A3, PLO12)
	DJF51082 Quality Control	2	QUALITY CONTROL provides knowledge on basic principle and concept of quality including statistical method in controlling products quality or services. This course also emphasizes on the application of Control Chart and Quality Control tools and also explains the quality improvement technique.	CLO1 : Apply the relation of statistics and quality management system in understanding of quality control and their application tools. (C3, PLO1) CLO2 : Determine the related quality tools and techniques to control the quality of products or services based on case study. (C4, PLO2) CLO3 : Demonstrate ability to work in team to complete the assigned tasks (A3, PLO9)
	DJM42012 Railway 1—Communication for Rail	2	RAILWAY 1 -COMMUNICATION FOR RAIL exposes the student to the principle of railway communication. This course covers basic concept of telecom, cabling, networking, transmission, telephone in rail environment. Students are exposed to Railway Communication System.	CLO1 : Apply the basic concept in railway communication environment. (C3, PLO1) CLO2 : Recognize the importance of communication in railway environment. (CLO2, PLO5) CLO3 : Perform understanding of railway communication protocol and application. (P4, PLO10)

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COURSE SYNOPSIS & COURSE LEARNING OUTCOME (CLO)

SEMESTER	COURSE	CREDIT	SYNOPSIS	CLO
ELECTIVE	DJM52022 Railway 2—Signalling in Rail	2	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	CLO1 : Apply the basic concept to railway signalling according to Malaysia Railways mainline. (C3, PLO1) CLO2 : Perform the basic concept of signalling in mainline for the railway's networks. (P4, PLO2) CLO3 : Demonstrate the understanding concept of signalling in railways by using practical work by group. (A3, PLO5)
FREE ELECTIVE	DUD10012 Design Thinking	2	This course offers the basic concept of Design Thinking through experiential learning. Students learn the five iterative phases of Design Thinking, which are Empathy, Define, Ideate, Prototype and Testing. Students will apply these design thinking principles, process and techniques to solve a real-world problem and come up with an innovative solution in the form of a product, system or service prototype.	CLO1: Apply design thinking principles, process and techniques to solve a real-world problem innovatively (C3 , CLS 2) CLO2: Demonstrate the ability to communicate ideas in solving a real-world problem (A3 , CLS 3b)

CONCLUSION

Student Study Guide contains all the important instruments in Diploma in Mechanical Engineering, Diploma in Mechanical Engineering (Automotive), Diploma in Mechanical Engineering (Manufacturing) and Diploma in Mechatronic Engineering such as Programme Learning Outcome (PLO), synopsis each course and complete program structure for students to plan and complete their studies successfully. This is important as PSMZA is in their way to establish the Outcome Base Education (OBE).

Hopefully, **Student Study Guide** functionally well to be the main guidance to the students during their study period to help them to understand the structure of the programme and allow the early preparation for proper planning in their study at PSMZA.

Thank You..

REFERENCES

References

1. Buku Panduan dan Peraturan Am Pelajar Politeknik, Jabatan Pengajian Politeknik.
2. Arahan-arahan Peperiksaan dan Kaedah Penilaian
3. Garis Panduan Kecemerlangan Sistem Penasihatan Akademik Politeknik, Jabatan Pengajian Politeknik
4. Garis Panduan Pengurusan dan Kaedah Penilaian Latihan Industri Politeknik, Jabatan Pengajian Politeknik.
5. https://psmza.mypolycc.edu.my/
6. https://www.google.com/obe