POLITEKNIK MALAYSIA
KUCHING SARAWAK

***DEPARTMENT OF* ELECTRICAL ENGINEERING**
COURSE OUTLINE

1.	**NAME OF COURSE**	POWER ELECTRONICS
	COURSE CODE	DET40073
2.	**SYNOPSIS**	POWER ELECTRONICS course is aimed to equip students with the knowledge and skills related to power electronic devices and its application in power conversion. This course also will focus on the operational principle of rectifiers, choppers, inverters and AC voltage controller circuits. Emphasis is given more on producing the output voltage waveforms of the converters.
3.	**CREDIT VALUE**	3
4.	**PRE-REQUISITE/ CO-REQUISITE (IF ANY)**	None

5. **COURSE LEARNING OUTCOMES(CLO):**
Upon completion of this course, students should be able to:

CLO1	Analyze and investigate the well-defined operational behaviors, principle and basic concepts of power electronics by using schematics circuits. (C4, PLO4)
CLO2	Construct converters circuits and make observation on displayed waveforms using appropriate methods and equipments. (P4, PLO5)
CLO3	Demonstrate the ability to practice leadership skills to complete assigned power electronics tasks. (A3, PLO9)

PROGRAMME LEARNING OUTCOMES (PLO):

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).

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

6. **ASSESSMENT METHOD:**

The course assessment consists of:

i. Continuous Assessment (CA) – 60%
ii. Final Examination (FE) – 40%

Assessment	Quantity	Percentage (%)
Quiz	2	10%
Test	1	10%
End Of Chapter	2	10%
Practical Work	6	25%
Practical Work (Generic Skills)	2	5%
Final Examination	1	40%

Notes : Passing Requirement (Commence Session II 2022/2023)

a) Continuous Assessment (CA) ≥40%
b) Final Examination (FE) ≥20%

7. **DISTRIBUTION OF STUDENT LEARNING TIME**

TOPIC	GUIDED LEARNING (F2F) (HOURS)										INDEPENDENT LEARNING (NF2N) (HOURS)							Total Of SLT (HOURS)
	Lectures	Practical	Tutorial	QUIZ	Test	Practical Work	Practical Work (Generic Skill)	End Of Chapter	Others	Final Examination	Lectures	Test	Quiz	Practical Work	Practical Work (Generic Skill)	End Of Chapter	Final Examination	
TOPIC 1	2	0	0	0.5	1	3	2	0	1.5	2	2	2	0.5	1.5	1	14.5	6	120
TOPIC 2	7	8	0						1.5		11							
TOPIC 3	5.5	4	0								7.5							
TOPIC 4	6	4	0								8							
TOPIC 5	6	4	0								8							
TOTAL	26.5	20	0	0.5	1	3	2	0	3	2	36.5	2	0.5	1.5	1	14.5	6	120

8. **TEACHING SCHEDULE**

Topic No.	TOPIC/SUBTOPIC	Recommended Contact Hours	Assessment Method	Week
1.0	**OVERVIEW OF POWER ELECTRONIC DEVICES** This topic covers the basic knowledge characteristic of power electronics devices includes Silicon Controlled Rectifier (SCR), Gate Turn Off SCR, TRIAC	2 hours lecture	PW1 (CLO3/PLO9)	W1
2.0	**AC TO DC CONVERTER** This topic apply the principle operation of single phase and three phase AC to DC converters. Its also covers the calculation and waveform analysis for variable types of AC to DC converters.	7 hours lecture 8 hours practical	PW1 PW2 PW3 (CLO3/PLO9) QUIZ 1 (CLO1/PLO4)	W2-W5
3.0	**DC TO DC CONVERTER** This topic apply the principle operation of DC to DC converters. Its also covers the calculation and waveform analysis for step down and step up DC to DC converters.	5.5 hours lecture 4 hours practical	PW3 PW4 (CLO3/PLO9) EOC1 (CLO1/PLO4)	W5-W8
4.0	**DC TO AC CONVERTER** This topic apply the principle operation of single phase and three phase DC to AC converters. Its also covers the calculation and waveform analysis for the inverters output voltage and current.	6 hours lecture 4 hours practical	PW4 PW5 (CLO3/PLO9) QUIZ 2 (CLO1/PLO4)	W8-W11
5.0	**AC TO AC CONVERTER** This topic apply the principle operation of single phase AC to AC converters includes AC voltage controller and Cycloconverter. Its also covers the calculation and waveform analysis for the converters output voltage and current.	5 hours lecture 4 hours practical	PW5 PW6 (CLO3/PLO9) EOC2 TEST (CLO1/PLO4)	W11-W14

9.	**REFERENCES**	Main: 1. Hamid.H & Soowan.P (2020). Power Electronics:Polytechnics Series. Oxford Fajar Sdn. Bhd. Additional : 1. El-Sharkawi, M. A. (2012). Electric Energy : An Introduction, Third Edition. Bosa Roca, United States: Taylor & Francis Inc. 2. Hart, D. W. (2010). Power Electronics. Mcgraw Hill Higher Education. 3. M. D. Singh and K. B. Khanchandani. (2008). Power Electronics. Tata McGraw-Hill Education. 4. Mohan, N. (2012). Electric Power Systems : A First Course. New York, United States: John Wiley & Sons Inc. 5. Rashid, M. H. (2013). Power Electronics : Circuits, Devices & Applications. Boston, United States: Pearson Education (US). 6. Rashid, M. H. (2013). Power Electronics: Pearson New International Edition : Circuits, Devices and Applications. Harlow, United Kingdom: Pearson Education Limited

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Date: 01/08/2025