



**FACULTY OF MECHANICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA**

**COURSE OUTLINE
SEMESTER MARCH 2026- JUL 2026**

Course Code : MEM 261
Course Name : WORKSHOP PRACTICE II (AMALAN BENGKEL II)
Course Level : 4- DIPLOMA EM110
Credit Unit : 1
Contact Hours : 2 (Lecture: 0 hrs/week; Tutorial: 0 hr/week; Practical: 2 hrs/week)
Part : 3
Prerequisite : None
Resource
Person : Rohidatun Binti Mahmod @ Wahab
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Group PEM1103	WELDING I (SMAW)	WELDING II (MIG)	CASTING (Sand Testing)	FOUNDRY Sand Casting (mould)
A	Madam Rohidatun	Ts. Dr. Azman	Ir. Dr. Akmal	Sir Rizal
B	Madam Rohidatun	Ts. Dr. Azman	Ir. Dr. Akmal	Sir Rizal
C	Ts. Dr. Azman	Sir Mohd Nor Hakim	Dr. Mohamad Irwan	Sir Rizal
D	Ir. Dr. Akmal	Sir Mohd Nor Hakim	Dr. Mohamad Irwan	Ir. Ts. Dr. Ahmad Faiz
E	Ir. Dr. Akmal	Sir Hj Muhamad	Prof. Madya Dr. Hj Mohd Mahadzir	Sir Mohd Nor Hakim
F	Ts. Dr. Azman	Sir Hj Muhamad	Prof. Madya Dr. Hj Mohd Mahadzir	Sir Mohd Nor Hakim
G	Ts. Dr. Rahman	Sir Muhammad Faris	Madam Mahfuzah	Madam Rosniza

Course Outcomes

Upon completion of this course, students should be able to:

- CO1** Conduct appropriate methods, techniques, and tools to produce a part in accordance with workshop procedures. [PO4, PLO3] (P4)
- CO2** Perform appropriate techniques, resources, and modern engineering tools to address well-defined engineering problems in each workshop activity, with an awareness of their limitations. [PO5, PLO3] (P4)

Course Description

This course serves to consolidate and extend previously acquired knowledge and skills in mechanical engineering through the execution of a real-world, open-ended engineering project. Students will be required to apply appropriate methods, techniques, and tools in the execution of welding and casting processes. All project deliverables must be completed in accordance with prevailing industry standards, codes, and practices.

Students are further required to employ appropriate modern engineering computing and information technology tools in addressing clearly defined engineering challenges, with due consideration given to the dimensional constraints inherent to machining processes. In addition, students will be introduced to workshop rules and regulations, occupational safety, and professional ethics, thereby ensuring adherence to sound practice within the discipline of mechanical engineering.

CO-PO MATRIX	(ETAC)		(MOHE)	(MQF 2.0)
	PO4	PO5	LO2	PLO3
CO1	✓		✓	✓
CO2		✓	✓	✓

ATTENDANCE

Attendance is compulsory for all lectures and students.

Syllabus Content

WEEK	HOUR	CHAPTER	CONTENT/SUB-CHAPTER (SEM OCT 2023)	
W1	2	CHAPTER 1.0: INTRODUCTION TO SAFETY & REGULATION	1.1	Introduction
			1.2	General Workshop Safety Rules
			1.3	Industrial Safety
			1.4	Occupational Hazard & Control
			1.4.1	Personal Protective Equipment PPE
			1.6	Fire safety
			1.7	Summary
W2	2	SAFETY & REGULATION	i	SAFETY & REGULATION
			ii	Lab tour
W3-8	12	CHAPTER 2.0: WELDING PROCESS	2.1	Overall safety in welding
			2.2	Electrodes, filler rods, flux and shielding gases
			2.3	Gas welding [oxyacetylene gas welding]
			2.4	Arc welding [SMAW, TIG, MIG]
			2.5	Spot welding
W9-14	12	CHAPTER 3.0: METAL CASTING & FOUNDRY PROCESS	3.1	Overall safety in metal casting
			3.2	Melting practices
			3.3	Sand casting [moulding materials, patterns, cores, elements of gating systems]
			3.4	Die casting/ Investment Casting
			3.5	Cleaning and casting defects
W15	Revision week			

Teaching Methodology

- Practical Classes (Workshop)

Assessment

Course Work : **100%**

Continuous Assessments	Percentages
1. Practical Test [CO1, PO4]	: 40%
2. Practical Test [CO2, PO5]	: 40%
3. Technical Report [CO1, PO4]	: 20%
Total Marks	100%

References/ Recommended Textbook

1. *H.S. Bawa, Workshop Technology, Tata McGraw-Hill, 1995, ISBN: n/a*
2. *Serope Kalpakjian and Steven R. Schmid, Manufacturing Processes for Engineering Materials, 6th edition, Prentice Hall, 2010, ISBN: n/a*
3. *P.N. Rao, Manufacturing Technology : Foundry, Forming and Welding, Tata McGraw-Hill, 2001, ISBN: n/a*
4. *Serope Kalpakjian, Steven R. Schmid, Manufacturing Engineering and Technology in SI Units, 8, Pearson, 2022, ISBN: 1292422246*

Appendix 1: Structure Assessment Mechanism (SAM) Semester September 2026 - Februari 2027 (20264)

BLOCK 1	BLOCK 1 28 Sept 2026 – 13 Nov 2026							BLOCK 2 16 Nov2026 – 4 Dec 2026			BLOCK 3 4 Dec 2026 – 1 Jan 2027				BLOCK 4 4 Jan 2027 – 22 Jan 2027			
WEEK / GROUP	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	21 – 27 Disember 2026 [Krismas - 25 Disember]	WEEK 13	WEEK 14	WEEK 15	WEEK 16	WEEK 17
	28 Sept 2026 – 20 Dis 2026													28 Dec 2026 – 9 Jan 2026				
A,B,C,D,E J,F,G: 1	Safety Briefing	SAFETY & REGULATION Lab tour	Welding 1	Welding 1	Technical Report	Welding 2	Welding 2	Technical Report	Casting 1	Casting 1	Technical Report	Foundry 1		Foundry 1	Technical Report			
A,B,C,D,E J,F,G: 2			Casting 1	Casting 1	Technical Report	Foundry 1	Foundry 1	Technical Report	Welding 1	Welding 1	Technical Report	Welding 2	Welding 2	Technical Report				
Lecturer	Explains the course learning outcomes Provides a detailed specification of assignment requirements and the corresponding marking/grading scheme Clarifies the requirements of each course component in accordance with the relevant programme standards, regulations, or circulars Specifies the timeline/duration allocated for the completion of assignments										For courses that do not incorporate a final examination, students shall be duly informed that continuous assessment will constitute between 30% and 70% of the overall evaluation Student performance shall be monitored on an ongoing/continuous basis				Final Exam			
Student	Possess a clear understanding of the course learning outcomes and requirements Adhere to the scheme of work provided Be well-informed of the assessment methods and marking scheme Be cognisant of the passing requirements for each course component										Obtain continuous assessment marks from the lecturer Complete the remaining assignments within the timeframe stipulated							

OUTLINE SYLLABUS ADAB MEM261

	TOPIC	LEARNING OUTCOMES	ASSESSMENT	A.D.A.B ELEMENT		PROPOSED ACTIVITY
W1 (28 Sept – 2 October 2026) 2 Hours	SAFETY BRIEFING i. Introduction to Workshop Practice MEM261 ii. OBE Awareness iii. General Workshop Safety Rules (Workshop Layout, Emergency Exit, Pathway) iv. Personal Protective Equipment v. Fire Safety vi. Introduction to Sustainability vii. Workshop Tour viii. Introducing Assistant Engineer ix. Setup a group - 4 group per class (4 person per group)	1. Understand the fundamentals of Workshop Practice 2. Know the method of assessments – Written Test, Practical Test and Case Study 3. Understand general workshop rules and regulations. 4. Understand basic knowledge on sustainability related to workshop.	Continuous Assessments 1. Practical Test 2. Technical Report	Analyse (Anticipate learner's needs)	Situate (S)	Student learning style survey/questionnaire Building a good connection with students early in the semester
				Assess		Evaluate students' recent knowledge in this course (Entry-Exit Survey)
				Design and Delivery	Digest (DG)	Presenting topics, course learning outcomes, scheme of work, syllabus etc.
				Built in Belief	B4 Manners as Knowledge Seekers	Dos and Don'ts in workshop (rules & regulation)
				Built in Belief	B6 Self-Relationship	Ice breaking related to course.
				Situate/Digest	Situate (S)/ Digest (DG)	Provide an overview of the topics correlated to the practical activities mentioned.
W2 (5 October – 9 October 2026) 2 Hours	SAFETY & REGULATION	1. Lab tour				
W3 -W5 (12 October – 30 October 2026) 6 Hours	WORKSHOP SESSION: WELDING 1 i. Overall safety in welding ii. Electrodes, filler rods, flux and shielding gases Arc welding [SMAW] iii. Joining Method [Lap Joint, T-Joint, Butt Joint, Corner Joint] Welding Techniques [Zigzag, Spot, Continues]	1. Understand overall safety in welding. 2. Able to perform SMAW using different sizes of electrode for different types of joint.	Continuous Assessments 1. Practical Test 2. Technical Report	Situate	Reflect (R) Synthesize (ST) Situate (S)	Indicating the integration of learning. Using instructions that are congruent with the advancement of current knowledge. Using discernment, acknowledge the diversity of student perspectives

W6 -W8 (2 Nov – 20 Nov 2027) 6 Hours	WORKSHOP SESSION: WELDING 2 i. Overall safety in welding ii. Electrodes, filler rods, flux and Metal Inert Gas [MIG] iii. Joining Method [Lap Joint, T-Joint, Butt Joint, Corner Joint] i. Welding Techniques [Zigzag, Spot, Continues]	1. Understand overall safety in welding. 2. Able to perform MIG using wire electrode for different type of joint.	Continuous Assessments 1. Practical Test 2. Technical Report	Create	Create (CR)	Using encouragement to assist students to convey facts, information, and opinions about the experimental activity confidently.
				Design and Delivery	Synthesize (ST)	Revise and summarize important activity at the end of class
				Connect/Digest	Connect (CN)/ Digest (DG)	Engage students in the learning process.
W9 -W11 (23 November – 11 Dec 2026) 8 Hours	WORKSHOP SESSION: METAL FOUNDRY i. Overall safety in metal casting ii. Material [Aluminum Ingot] iii. Mould Making Process [Moulding materials, Patterns, Cores, Elements of Gating Systems] iv. Melting Process [Type of Furnace] v. Pouring Process vi. Finishing and Casting Defect	1. Understand the overall safety in metal casting. 2. Able to produce mould completed with gating system. 3. Perform pouring process. 4. Able to do finishing and can identify casting defects	Continuous Assessments 1. Practical Test 2. Technical Report	Connect/Digest	Connect (CN)/ Digest (DG)	Engage students in the learning process.
				Design and Delivery	Digest (DG) Delivery (DV)	Using the correct terms, concept principals and examples clearly.
				Design and Delivery	Synthesize (ST)	Revise and summarize important activity at the end of class

22 December -28 December 2025	MID SEMESTER BREAK / SPECIAL BREAK (21 December - 27 December 2026) (Christmas Day *25 December 2027)					
W12 -W14 (14 Dec 2026– 1 Jan 2027) 4 Hours	WORKSHOP SESSION: METAL CASTING i. Overall safety in metal casting ii. Sand Testing Preparation	1. Understand the overall safety in metal casting. 2. Able to determine the sand grain size and b. Calculates the Grain Fineness Number (GFN) for moulding material of sand casting.	Continuous Assessments 2. Practical Test 2. Technical Report	Connect/Digest	Connect (CN)/ Digest (DG)	Engage students in the learning process.
				Design and Delivery	Digest (DG) Delivery (DV)	Using the correct terms, concept principals and examples clearly.
				Design and Delivery	Synthesize (ST)	Revise and summarize important activity at the end of class

STUDY WEEK/ REVISION WEEK 21 January – 17 January 2027
FINAL EXAM 18 January -7 February 2027

