	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Aircraft Engineering Department	

MODULE DESCRIPTOR FORM

Module Information

Module Title	Manufacturing Processes	**Module Delivery**	
Module Type	SUPLEMENT	**Theory**	
Module Code	AIE245		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	2	**Semester of Delivery**	4
Administering Department	Aircraft Engineering	**College**	Engineering
Module Leader	Zahraa Salah	**e-mail**	zahraasalahjassim@gmail.com
Module Leader's Acad. Title	Asst. Lec.	**Module Leader's Qualification**	M.Sc.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval	01/01/2025	**Version Number**	2024

Relation With Other Modules

Prerequisite module	AIE235	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	1. Describe the various manufacturing processes that are used for the production of Mechanical parts and products. 2. Classify manufacturing processes according to the needs of products construction. 3. Understand how to use the theoretical knowledge of various manufacturing processes 4. Analyze, compare and finally gain theoretical experience for the advantages and limitations of different manufacturing processes. 5. Evaluate the better way of manufacturing and construction of mechanical parts or products by means of various manufacturing processes and the corresponding manufacturing Machines. 6. Design the production of a mechanical component or a specific product using the Manufacturing processes of casting, bulk deformation, sheet metal forming, joining CNC machine.
Module Learning Outcomes	**Knowledge and Understanding** 1. Classification of the different types of manufacturing processes. 2. Distinguish between different types of casting and differentiate between their output product characteristics. 3. Knowledge of, the sheet metal forming such as bending ,starching squeezing ,plunge and the bulk forming methods such as rolling, extrusion ,forging . 4. Characterize the major machining operations of turning, milling, and drilling via description of cutting tools used and basic components of the machine tools. 5. Have a thorough knowledge of the different operating processes such as turning, milling and cutting by describing the cutting tools used and the basic components of the machine tools. 6. Knowledge of cutting tools and various traditional and advanced cutting processes. 7. Knowledge and distinction between different welding methods such as gas welding, resistance welding, different types of electric arc welding and advanced welding methods such as laser welding and plasma welding. 8. Knowing the types, and how to operate automated CNC machines. **Specific skills** 1. How to choose the suitable type of manufacturing process. 2- Enable the student to learn and understand the Classification and the major of the manufacturing processes

	3- Correlate the material type with the possible fabrication processes. 4- Describe the operations and tools for major manufacturing processes. 5- Highlight the process design parameters to eliminate defective products. 6- Enable the student to know the traditional and non-traditional manufacturing process
Indicative Contents	1. Describe the various manufacturing processes that are used for the production of Mechanical parts and products [6 hrs]. 2. Understand the different types of casting process types such as: sand casting, shell casting, pressure die casting, and continuous casting [6 hrs]. 3. Understand the different types of defects that occurs in sand casting and the methods to prevent defects generation [9 hrs] 4- Understand the metal forming methods that used with the mechanical parts such as rolling process, extrusion process, wire drawing, sheet drawing and deep drawing processes [9 hrs]. 5- Evaluate the better way of welding techniques that used with metals and how to select the suitable welding type for each kind of materials with understanding their welding mechanism [6 hrs]. 6- Understand the non-traditional cutting methods that available and how to use [6 hrs].
Learning and Teaching Strategies	
Strategies	The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach a solution. Through textbooks and lectures, in addition to the seminars.

Student Workload (SWL)			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	42	**Unstructured SWL (h/w)**	2.8
Total SWL (h/sem)	75		

Module Evaluation				
	Time/ Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**

Formative assessment	**Quizzes**	4	20% (20)	4, 6,10,12	All
	Assignments	2	10% (10)	5,11	All
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	8	All
Summative assessment	**Midterm Exam**	2 hrs.	10% (10)	7	All
	Final Exam	3 hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**metal process** Introduction of metal process. Classification of the main types of manufacturing process
Week 2	**Casting process** Sand Casting : Sand mold Type of patterns Pattern Materials Pattern allowances
Week 3	Molding sand Properties Cores –Types and applications Molding machines– Types and applications; Melting furnaces : Blast and Cupola Furnaces;
Week 4	**Principle of special casting processes :** Shell casting Investment casting Continues casting Pressure die casting Centrifugal Casting
Week 5	**Defects** General defects in all casting methods. Defects in Sand casting.
Week 6	**Metal forming** Introduction for cold and hot working Recrystallization temperature effect Rolling process Types of rolling mill
Week 7	**Extrusion process** Direct extrusion Indirect extrusion Impact extrusion Hydrostatic extrusion

Week 8	**Forging process**
Week 9	**Drawing processes:** Wire drawing. Tube drawing. Deep drawing
Week 10	**Machining operations (Cutting):** Cutting conditions. Cutting tools. Turning operations. Milling operations. Drilling operations
Week 11	**Welding processes:** Classification of welding processes. Fusion welding processes. Electric Arc Welding. Metal Arc Welding. Tungsten and Metal Inert gas welding
Week 12	**Fusion welding:** Oxy acetylene welding. Thermite welding. Laser welding. Diffusion welding. Brazing and soldering
Week 13	**Welding by pressure:** Electric resistance welding. Friction welding. Explosion welding
Week 14	**Non-traditional cutting processes:** Cutting with ultrasonic pulses.
Week 15	Electrochemical operation process. Operation process by laser
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Exp. 1:
Week 2	Exp. 2:
Week 3	Exp. 3:

Week 4	Exp. 4:
Week 5	Exp. 5:
Week 6	Exp. 6:
Week 7	Exp. 7:

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	H. C. F. Fritz, Manufacturing Processes 1 and 2, Springler, 2011.	Yes
Recommended Texts	H. N. Gubta, R. C. Gubta and Arun Mittal, Manufacturing Processes, 2nd. Edition, New Age International (P) Limited, Publishers, 2010	No
Websites		

APPENDIX:

GRADING SCHEME				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.