



Course Specification

(Bachelor)

Course Title:	Casting and forming processes
Course Code:	ME3132
Program:	Mechanical engineering
Department:	Mechanical engineering
College:	College of Engineering and Architecture
Institution:	Umm Al Qura University
Version:	Course Specification Version Number
Last Revision Date:	29 December 2024

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A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐ University	☐ College	☒ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (5th level)					
4. Course General Description:					
The course provides an introduction to casting and forming processes used in industry. A brief look into casting technology, equipment, processes, applications, and defects. Also discussed are bulk and sheet metal forming procedures, each metal forming process's capabilities, and the force and power requirements for each of the metal forming processes under consideration.					
5. Pre-requirements for this course (if any):					
Engineering Drawing -ME2133					
6. Co-requisites for this course (if any):					
7. Course Main Objective(s):					
This course aims to introduce the fundamentals of casting manufacturing technologies, equipment, methods, applications, and flaws. Students will also be able to apply their knowledge to choose the best forming process for a variety of items, as well as analyze the benefits and drawbacks of each.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2 Lectures- 3 lab	100%
2	E-learning		
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	45
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Identify the various casting and forming techniques and their advantages and disadvantages (limitations).	K1, I	Lectures: given on topics as class progress, with especial consideration within the class to link the existing topic with students' existing knowledge and further with the general overview.	As class/topics progress, exercises/home work are assigned. Short quizzes (20 minutes) in class are given; in addition, true/false, multiple choice item on the midterm and final exams are given
1.2	Classify casting and forming defects, including causes and cures.	K1, K2	- Review: review the content of each lecture and clarify any matters not understood. - Assignments: groups of students up to 3 are assigned to join in a team work; which	



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			includes solving problems in various structural members and submit reports (the work, which should be completed by week 14, involves look up of reference materials and	
...				
2.0	Skills			
2.1	Justify the selection of the suitable casting and/or forming processes for a certain product.	S1, S2, (P)		
2.2	Design a casting and/or forming process to meet desired needs within realistic constraints such as economic, environmental, manufacturability, and sustainability	S1, S3, S4 (I,P)		
...				
3.0	Values, autonomy, and responsibility			
3.1	Function effectively as a member or leader of the team	V1 (P)		
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
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1.	Introduction	3
2.	Solidification of Metals	3
3.	Fluid Flow, Fluidity of Molten Metal and Heat Transfer	3
4.	Defects of casting	3
5.	Expendable-mold, Permanent-pattern Casting processes	3
6.	Expendable-mold, Expendable-pattern Casting processes	3
7.	Permanent-mold Casting Processes, and Inspection of casting	3
8.	Fundamental of forming processes	3
9.	Rolling Processes	3
10.	Forging	3
11.	Extrusion	3
12.	Wire and Tube Drawing	3
13.	Sheet Metal Forming: Shearing	3
14.	Sheet Metal Forming: Bending	3
15.	Sheet Metal Forming: Deep Drawing	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Five Assignment	3,5,7,9,11	25%
2.	Two Regular Exams	8,13	25%
3.	Final exam	About 16 or 17	50%
...			100%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Manufacturing Engineering and Technology, 8th Edition, Serope Kalpakjian, Prentice Hall Publishing Co., 2019.
Supportive References	
Electronic Materials	The course is a basic course for which many electronic resources are available
Other Learning Materials	

2. Required Facilities and equipment





Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom. Casting workshop Faculty workshop
Technology equipment (projector, smart board, software)	Data Show
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Faculty	Direct/indirect
Effectiveness of Students assessment	Program Coordinator	Direct/indirect
Quality of learning resources	Student	Direct/indirect
The extent to which CLOs have been achieved	Program Coordinator	Direct/indirect
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

