



Course Specification

(Bachelor)

Course Title: **Engineering Design**

Course Code: **ME3090**

Program: **BSc Mechanical Engineering**

Department: **Mechanical Engineering Department**

College: **College of Engineering and Architecture**

Institution **Umm Al-Qura University**

Version: **1**

Last Revision Date: **26 December 2024**

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A. General information about the course:

1. Course Identification

1. Credit hours: (3 Hours)

2. Course type

- A. ☐ University ☒ College ☐ Department ☐ Track ☐ Others
- B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: (Level 4/year 2)

4. Course General Description:

This course instils lifelong learning, creative problem solving, team work, and design thinking. Also provides engineering students with the skills to communicate technical information to various audiences for various purposes. Introduce them to the concepts, theory and practice of engineering ethics. They also trained to consider ethics, safety, health, life cycle, and sustainability when solving any engineering design problem.

5. Pre-requirements for this course (if any):

None

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

The course prepare students well for the professional skills of engineering design and communication, and help them to make ethical decisions when confronted with any engineering problem.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2 Lec. 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	32
2.	Laboratory/Studio	42
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		74

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	Demonstrate understanding of the complete problem solving design process.	K1	Lectures and Assignments	Exams and Quizzes
1.2	Identify the overall concept of technical writing which include a variety of technical document styles and formats.	K1		
1.3	Understand consequences of an ethical decisions when confronted any engineering problem.	K2		
2.0	Skills			
2.1	Apply engineering design knowledge to solve any engineering problem.	S1	Capstone Design Project	Reports and Presentations
2.2	Practice different forms of technical documents and documentation style they will be using in their chosen field of study	S3, S4		



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
...				
3.0	Values, autonomy, and responsibility			
3.1	Function effectively as an individual as well as a member of team in self-learning activities.	V2, V3	Project and Assignments	Reports and Presentations
3.2	Recognize the importance of the commitment to the highest ethical and professional conduct.	V1		
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Engineering Design	2
2.	Critical Thinking, Creative Problem Solving, and Public Speaking	6
3.	Basic steps in Engineering Design Process.	6
4.	Types of technical reports	4
5.	Instructions and guidelines for writing a technical report.	4
6.	Documentation in technical writing.	4
7.	Multi-disciplinary teams formation and discussion of various project ideas, case-studies	8
8.	The importance of ethics in science and engineering	4
9.	Ethical theories and applications	4
10.	Basics of ethical analysis and decision making	4
11.	Project Proposal: Documentation of Specifications, objectives of the project, project management,	14
12.	Evaluation of Proposal: ethically, Safety, Health, Manufacturability, life-cycle, and sustainability	14
Total		74



D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	HW assignment 1: My profile written assignment	2	5%
2.	HW assignment 2:Electronic Portfolio (EP)	8	5%
3.	HW assignment 3	13	5%
4.	Quiz (Total 3 quizzes)	Every 4 weeks	15%
5.	Capstone design project progressing	Every 4 weeks	10%
6.	Final project: report (written report)	14	15%
7.	Final Project Proposal Presentation	15	15%
8.	Final exam	17	30%

*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	Fogler, H. Scot and Leblanc, Steven, E. Strategies for Creative Problem Solving, 4 th Ed. NJ: Prentice Hall, Englewood Cliffs, 2018
Supportive References	- Beer, D. & McMurrey, D (2009). A guide to writing as an engineer (3rd edition). John Wiley & Sons - Engineering Ethics, Charles B. Fleddermann, 4th edition. 2012.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	- Lecture room - Computer Lab
Technology equipment (projector, smart board, software)	Data show and a computer access for a PC with Microsoft office installed
Other equipment (depending on the nature of the specialty)	



F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect
Effectiveness of Students assessment	Peer reviewr	Direct
Quality of learning resources		
The extent to which CLOs have been achieved	Faculty	Girect
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

