



Course Specification

— (Bachelor)

Course Title: Mechanical Drawing
Course Code: ME2132
Program: B.Sc. in Mechanical Engineering
Department: Mechanical Engineering
College: College of Engineering and Architecture
Institution: Umm Al-Qura University
Version: v1.0
Last Revision Date: 14 January 2025

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A. General information about the course:

1. Course Identification

1. Credit hours: (.....)

2. Course type

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

3. Level/year at which this course is offered: (Fourth Level (Second Year))

4. Course General Description:

This course provides students with the fundamental principles and techniques of mechanical drawing. It emphasizes dimensioning, fits, tolerances, surface and geometric symbolizing, sectioning, and assembly drawings. Students will also learn to use Inventor Software for 2D sketching, 3D modeling, and generating engineering drawings. The course integrates practical knowledge with modern CAD tools to improve visualization and technical communication skills.

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

Engineering Graphics (8041101-2)

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

None

7. Course Main Objective(s):

- To equip students with the technical skills to create and interpret mechanical drawings.
- To develop proficiency in industry standards for fits, tolerances, and geometric dimensioning.
- To introduce students to modern CAD tools for 2D and 3D mechanical design.
- To foster collaboration, problem-solving, and independent learning through drawing exercises and projects.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	15	16.67%
2	E-learning	-	-
3	Hybrid • Studio • Computer lab	75	83.3%
4	Distance learning	-	-





No	Mode of Instruction	Contact Hours	Percentage

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	15
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (Computer lab)	45
Total		90

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	Acquaint to the basics of engineering fits, tolerances, and symbols used in drawing.	K1	Lectures, studio discussions, and lab exercises	Assignments, and quizzes,
1.2	Describe the application of industry standards in mechanical engineering graphics.	K1	Real-life case studies, CAD exercises	Assignments, final project
1.3	Recognize the basics of design principles, couplings, joints, and bearings.	K1	Studio exercises, CAD modeling	Lab reports, quizzes
2.0	Skills			
2.1	Apply drawing principles to create detailed and accurate sketches.	S3	Hands-on lab work, CAD tutorials	Term project, lab assignments
2.2	Use CAD software to create 3D models and	S3	CAD lab exercises, interactive tutorials	Final CAD exam, project





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	generate assembly drawings.			evaluation
...				
3.0	Values, autonomy, and responsibility			
3.1	Take responsibility for completing assignments individually and submitting solutions on time.	V2	Group discussions, peer feedback	Individual assignment submissions
3.2	Effectively communicate with peers and instructors to solve drawing challenges collaboratively.	V2	Group activities, collaborative CAD exercises	Group project evaluations, participation assessment
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Mechanical Drawing and Engineering Symbols	.5
2.	Fits, Tolerances, and Interchangeability	.5
3.	Dimensioning Techniques and Geometric Symbolizing	1
4.	Introduction to CAD Software (Inventor): Basics of 2D Sketching	1
5.	Advanced 3D Modeling Using CAD Software (Inventor): Extrude, Revolve, and Loft and other Commands	2
6.	Assembly Drawings: Joints, mates, flush, constrains and other commands	3
7.	Creating Assembly Drawings, Sectioning, Profiles, and Dimensionin Using CAD Software	2
8.	Practical Case Studies: Design of Couplings, Joints, valves, and Other Mechanical Components	3
9.	Final CAD Project: Designing and Presenting an Assembly Drawing	2
Total		15



D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizze	4,6,8	5%
2.	Execiese	Weekly	15%
3.	Assignments	Weekly	20%
4.	Final CAD Projec	Week 13	30%
5.	Final Exam	Week 15	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	1. Engineering Drawing and Design* by David A. Madsen (2nd Edition, 1995) 2. *Mastering Autodesk Inventor* by Curtis Waguespack
Supportive References	1. Engineering Drawing and Graphic Technology* by Thomas E. French (14th Edition, 1993)
Electronic Materials	Online tutorials for Autodesk Inventor (Autodesk Learning Hub)
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	CAD Lab with a minimum of 20 computers installed with Autodes
Technology equipment (projector, smart board, software)	Projector, Smart Board, and drawing tablet
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Faculty	Course evaluations, peer review
Effectiveness of Students assessment	Faculty, Program Leader	Analysis of CLO attainment and feedback
Quality of learning resources	Students, Facult	Surveys and resource usage analysis



Assessment Areas/Issues	Assessor	Assessment Methods
The extent to which CLOs have been achieved	Faculty, Peer Reviewer	CLO-based assessment analysis
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

