2023
TP-153

Course Specification
(Bachelor)

Course Title:	Engineering Graphics and Design
Course Code:	GE1103
Program:	Electrical Engineering
Department:	Electrical Engineering
College:	College of Engineering
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	V5
Last Revision Date:	01-01-2025

Table of Contents

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: (1st level, 1st year)					
4. Course general Description:					
This course introduces the students to the computer drafting software (AutoCAD) in order to be able to model parts and assemblies. It uses parametric and non-parametric solids, surface and wire frame models. It explains part editing, two-dimensional documentation of models along with the planar projection theory. It includes sketching of perspective, isometric, multi-view, and section views as a main tool to conceptualize ideas. It also explains dimensioning guidelines and tolerance techniques. A Team or an individual design project will be assigned as a final illustration to increase students understanding of drawing techniques and solving problem through design learned in the course.					
5. Pre-requirements for this course (if any)**:**					
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6. Co-requisites for this course (if any)**:**					
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7. Course Main Objective(s):					
• The importance and use of graphics and drawings in the field of engineering. • The different types of drawings used in the field of engineering and their purpose. • The standards and technical conventions used in technical graphical communication. • An overview of the engineering design process and logic. • The creation of technical drawings and solid modeling.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom	-	-

No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
K1	Interpret and create standard engineering drawings	1.1	Lectures, demos, hands-on practice	Exams, Lab assignments, technical reports
K2	Apply orthographic projection techniques	7.1	Demos, interactive exercises, case studies	Exams, Lab assignments, technical reports
2.0	**Skills**			
S1	Problem-solving and critical thinking skills	2.4	Case studies, group projects, problem-based learning	Exams, Lab assignments, technical reports
S2	Use CAD software tools	6.6	Hands-on lab, software tutorials,	Lab performance, design

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			project-based learning	projects, peer review
3.0	**Values, autonomy, and responsibility**			
V1	Communicate through technical drawings	3.3	Demos, interactive feedback, peer review	Lab exercises, presentations

C. Course Content

No	List of Topics	Contact Hours
1	Week 1: Introduction to Engineering Graphics Lecture (3 Hrs) Overview of engineering graphics, its importance, and applications in electrical engineering. Introduction to types of drawings: orthographic, isometric, perspective. Graphical standards and conventions. Lab (1 Hr) Introduction to manual drawing tools and techniques. Basic sketching exercises.	4
2	Week 2: Basic Geometrical Construction Lecture (3 Hrs) Lines, angles, and geometrical shapes. Construction of polygons, tangents, and arcs using graphical tools. Lab (1 Hr) Manual drawing exercises focusing on basic geometrical shapes and constructions.	4
3	Week 3: Orthographic Projection - I Lecture (3 Hrs) Introduction to orthographic projection: Principles and applications. First-angle and third-angle projection methods. Lab (1 Hr) Sketching basic objects in orthographic views (front, top, side).	4
4	Lecture (3 Hrs) Projection of 3D objects in multiple views. Dimensioning in orthographic drawings. Lab (1 Hr) Orthographic projection of slightly more complex objects with 4dimensioning.	4
5	Lecture (3 Hrs)	4

	Introduction to isometric projection. Rules for converting 2D orthographic views into 3D isometric drawings. Lab (1 Hr) Simple exercises converting orthographic views to isometric views.	
6	Week 6: Isometric Drawings - II Lecture (3 Hrs) Creating isometric views of complex objects. Importance of scales in isometric drawings. Lab (1 Hr) Isometric drawing practice of electrical components.	4
7	Week 7: Sectional Views and Auxiliary Views Lecture (3 Hrs) Introduction to sectional views for internal features. Auxiliary views for inclined surfaces. Lab (1 Hr) Practice drawing sectional and auxiliary views for given objects.	4
8	Week 8: Midterm Exam and Review Lecture (3 Hrs) Review of orthographic and isometric projections, sectional views. Midterm exam covering Weeks 1-7. Lab (1 Hr) Review lab work and assist with any drawing issues.	4
9	Week 9: Introduction to CAD Software (e.g., AutoCAD) Lecture (3 Hrs) Overview of CAD software for engineering design. Introduction to the interface and basic tools of AutoCAD (or similar software). Lab (1 Hr) Basic 2D drawing in CAD software (lines, circles, arcs).	4
10	Week 10: 2D CAD Drawings - I Lecture (3 Hrs) Creating orthographic projections using CAD tools. Layering, dimensioning, and annotations in CAD. Lab (1 Hr) CAD exercises for creating orthographic views of simple objects.	4
11	Week 11: 2D CAD Drawings - II Lecture (3 Hrs) Advanced 2D CAD techniques: grids, snap tools, and object properties. Electrical schematics using CAD. Lab (1 Hr) Electrical circuit diagram drafting using CAD software.	4
12	Week 12: 3D CAD Modeling - I Lecture (3 Hrs)	4

	Introduction to 3D modeling concepts in CAD. Creation of basic 3D objects from 2D drawings. Lab (1 Hr) Hands-on practice with simple 3D models using CAD tools.	
13	Week 13: 3D CAD Modeling - II Lecture (3 Hrs) Modeling complex components and assemblies in 3D. Conversion of 3D models to orthographic projections. Lab (1 Hr) Practice in designing complex 3D electrical components using CAD.	4
14	Week 14: Dimensioning, Tolerancing, and Annotations Lecture (3 Hrs) Importance of precise dimensioning and tolerancing in designs. Use of annotations and symbols in engineering drawings. Lab (1 Hr) Practice adding dimensions and tolerances to CAD models and drawings.	4
15	Week 15: Final Project Presentations and Review Lecture (3 Hrs) Final project presentations where students demonstrate their design work. Course review and discussion of important concepts for the final exam. Lab (1 Hr) Final project demonstration and assessment.	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Evaluations (AutoCAD)	5^{th}, 8^{th}, 11^{th} & 13^{th}	20%
2.	Midterm exam	8^{th}	20%
3.	Home works	Overall	5%
4.	Sessional design project	15^{th}	15%
5.	Final exam	16^{th}	40%

*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	Gary Bertoline, Wiebe, Hartman, Ross, Fundamentals of Graphics Communication: 2009, 6th edition, McGraw-Hill (USA).
Supportive References	College of Engineering IMSIU, Engineering Graphics and Design Handbook.
Electronic Materials	Video tutorials given by the class instructor
Other Learning Materials	Free student version of AutoCAD is available at www.autodesk.com/free-software/autocad

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Computer Lab with at least 30 computers having AutoCAD software installed.
Technology equipment (projector, smart board, software)	AutoCAD
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	Students	Indirect
Quality of learning resources	Relevant Focus Group	Indirect
The extent to which CLOs have been achieved	Dept. Quality Committee	Direct
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	