Engineering Drawing and Computer Aided Design

COURSE CODE:	ENE-112
COURSE NAME:	Engineering Drawing and Computer Aided Design
CREDIT HOURS:	Theory = 1 Practical = 2 Total = 3
CONTACT HOURS:	Theory = 16 Practical = 96 Total = 112
PREREQUISITE:	None
MODE OF TEACHING:	One hour of lecture per week (33%)
	Six hours of lecture per week (67%)

COURSE DESCRIPTION:

In this course students will learn the fundamentals of engineering drawing using manual and Computer Aided tools. As they deepen their understanding with basic engineering drawing concepts, the students will be challenged with class work assignments related to 2D & 3D, machine, & architectural drawings with focus on components related to the fields of Engineering. The course will introduce principles of Engineering drawing techniques, symbols and nomenclature needed for architectural drawings, different structural plans, and 3D drawing. Course material will be presented through lectures and classroom projects. Students will be expected to complete Lab work inside the class.

COURSE OBJECTIVES:

At the end of this course, the students will be able to:

1. Describe the fundamentals of Engineering Drawing
2. Apply the state-of-the-art computer drafting for the Geo-informatics

RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

The course is designed so that students will achieve the PLOs:

RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

The course is designed so that students will achieve the PLOs:

1	Engineering Knowledge:	☐	7	Environment and Sustainability:	☑
2	Problem Analysis:	☐	8	Ethics:	☐
3	Design/Development of Solutions:	☐	9	Individual and Teamwork:	☐
4	Investigation:	☐	10	Communication:	☐
5	Modern Tool Usage:	☐	11	Project Management:	☐
6	The Engineer and Society:	☑	12	Lifelong Learning:	☐

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will demonstrate competency by being able to:

No.	CLO	Domain	Taxonomy level	PLO
1.	**Describe** the fundamentals of Engineering Drawing	Cognitive	2	1
2.	**Produce** and Interpret Engineering Drawings using manual drawing tools and AutoCAD.	Psychomotor	4	5

Open-Ended Lab

3	Apply the concepts of Engineering Drawing to develop 2D/ 3D drawings using AutoCAD software.	Psychomotor	3	5

TOPICS COVERED WITH THEIR CONTRIBUTION TO PLOs:

Theory:

Week	Topic
1	Introduction to Engineering Drawing & Drawing Instruments Line Types

2-3	1. Lettering 2. Geometric Construction 3. Scales
4	1. Dimensioning 2. Projection Theory (Perspective & Parallel Projections)
5	Isometric Drawings
6	Sectional Views
7-8	Understanding of Different Types of Drawing
9	1. Basic Concepts of CAD 2. Drawing Setup procedure
10	Introduction to different Commands, Importance of Layers, Page Setup, Print Layout
11	Construction of Basic 2D Drawing Objects Using Auto CAD
12	Introduction to 3D drawings and setting up of 3D layout
13-14	Significance of Using CAD in Producing & Interpreting 2D & 3D Drawings/ Layouts for various Engineering applications
15	Use of AI in Drawing Automation
16-17	Open Ended Lab

Practical:

Week	**Topic**
1	Introduction to Engineering Drawing a. Drawing Instruments b. Managing Space on Drawing Sheets c. Line Types
2-3	1. Lettering 2. Geometric Construction 3. Scales

4	1. Dimensioning 2. Projection Theory (Perspective & Parallel Projections)
5	Isometric Drawings
6	Sectional Views
7-8	Produce & Interpret Manual Drawings
9	1. Basic Concepts of CAD 2. Drawing Setup procedure
10	1. Basic Commands Iincluding texts, layering and defining styles 2. Layout Design, Printing Properties
11	Construction of Basic 2D Drawings using AutoCAD
12	Construction of Basic 2D Drawings using AutoCAD
13-14	Produce & Interpret 2D & 3D Drawings/ Layouts for various Engineering applications
15	Application of AI in Drawing Automation
16-17	Open Ended Lab

The course may be divided into two halves

i. First Half will be for Manual Drawing, and it will be completed before the MSEs. Drawing Hall will be required for that
ii. Second Half will be for CAD and classes will be conducted in Computer Labs

TEXTBOOK

Civil Engineering Drawing by J.S. Layal

REFERENCE BOOKS:

N.D Bhatt, Engineering Drawing and Graphics

Engineering Drawing by Zahid Ahmed Siddiqui

Elementary Engineering drawing by N.D. Bhatt

Engineering Drawing and Introduction to AUTO CAD by Dhananja

ASSESMENT SYSTEM:

CLOs Assessment

Cognitive	Psychomotor
Spreadsheet	Rubrics

Relative Grading

Theoretical Work		100%
	Quiz 10%	
	Assignments 10%	
	Mid Semester Exam 30%	
	End Semester Exam 50%	
Practical Work		100%
	Laboratory Assignments 40%	
	Laboratory Quiz 30%	
	Project 30%	
Total		100%