Course	ENR114 ENGINEERING VISUALIZATION AND DRAWING	Semester	Monsoon Semester 2024
Faculty Name(s)	Bhawnath Tiwari, Dharamashi Rabari, Shuja Ahmed	Contact	bhawnath.tiwari@ahduni.edu.in, dharamashi.rabari@ahduni.edu.in, shuja.ahmed@ahduni.edu.in
School	SEAS	Credits	2
GER Category:	Not Applicable	Teaching Pedagogy Enable:NO	P/NP Course: Can not be taken as P/NP

Schedule	Section 1	08:00 am to 09:00 am	Sat	29-07-24 to 26-11-24
		09:00 am to 10:00 am	Sat	29-07-24 to 26-11-24
		10:00 am to 11:00 am	Sat	01-08-24 to 26-11-24
		11:00 am to 12:00 pm	Sat	29-07-24 to 26-11-24
	Section 2	10:00 am to 11:00 am	Sat	29-07-24 to 26-11-24
		11:00 am to 12:00 pm	Sat	29-07-24 to 26-11-24
		12:00 pm to 01:00 pm	Sat	29-07-24 to 26-11-24
		01:00 pm to 02:00 pm	Sat	29-07-24 to 26-11-24
	Section 3	02:00 pm to 03:00 pm	Sat	29-07-24 to 26-11-24
		03:00 pm to 04:00 pm	Sat	29-07-24 to 26-11-24
		04:00 pm to 05:00 pm	Sat	29-07-24 to 26-11-24
		05:00 pm to 06:00 pm	Sat	29-07-24 to 26-11-24
Prerequisite	Not Applicable			
Antirequisite	Not Applicable			
Corequisite	Not Applicable			

Course Description	This course develops the ability to think and communicate pictorially. Concepts of perspectives, orthogonal projections, sectional views, and assembly drawings will be introduced. Free-hand sketching, and making drawings with graphics and CAD software will be extensively practiced. Skills on making animations using animation and CAD software will be imparted. Methods of dimensioning and use of standard symbols in mechanical, electrical, architectural, and process plants of will be introduced. AR/VR tools will be used to augment visualization. The importance of CAD in product design will be introduced via small projects.
Course Objectives	The educational objectives of the course are to: CEO1 Develop capability in visualize objects and understanding their salient features; CEO2 Learn to create 2D and 3D models in CAD packages; CEO3 Develop capability in making free-hand sketches and place dimensions; CEO4 Learn to depict objects in various types of drawings, such as, perspective, projections, and sections; CEO5 Visualize objects in motion, including use of AR/VR tools; CEO6 Learn to make sketches and animations in software packages; and CEO7 Learn to make models from electrical, process, and architectural drawings.
Learning Outcomes	After completing this course, a student should be able to, • Express products/parts in free-hand sketches; • Prepare 2D and 3D models of objects and assemblies in CAD packages; • Use CAD modelling to design engineering objects, with dimensions; • Interpret given CAD drawings and be able to edit/modify them; • Make animations of mechanisms/objects in motion; • Read an electrical and process drawings and prepare a simple model; • Use AR/VR tools for visualization and animation software for physics-based simulations.
Pedagogy	Lectures and Hands-on Experiments
Expectation From Students	

Assessment/Evaluation	• End Semester Examination:
	  ◦ Written - 40%
	• Other Components:
	  ◦ Continuous Evaluation - 40%
	  ◦ Quiz - 20%

Attendance Policy	As per Ahmedabad University Policy.
Project / Assignment Details	Each session includes sketching and AutoCAD exercise which will be evaluated as continuous evaluation. Two quizzes will be conducted during the course.
Course Material	Text Book(s) • Visualization, Modeling, and Graphics for Engineering Design, K. Lieu and S.A. Sorby, 2 Edition, Delmar Cengage Learning, ISBN: 1285172957, Year: 2016, Reference Book • Fundamentals of Engineering Drawing, W.J. Luzadder and J.M. Duff, 11 Edition, Peachpit Press, ISBN: 0133350509, Year: 1992,
Additional Information	

Session Plan

NO.	TOPIC TITLE	TOPIC & SUBTOPIC DETAILS	READINGS,CASES,ETC.	ACTIVITIES	IMPORTANT DATES
1	Introdution	Course Overview, History of sketching	K. Lieu and S.A. Sorby, Chapter 1, Pages 1-1:1-30		
2	Sketching	Perspective view- one-point, two-point, three-point, Free sketching in Graphics editor packages like blender/Inkscape	K. Lieu and S.A. Sorby, Chapter 2, Pages 2-2:1-12		
3	Projection	Concept of projection, , Basics	K. Lieu and S.A. Sorby, Chapter 10, Pages 10-1:10-20		
4	Projection	Principles of dimensioning	K. Lieu and S.A. Sorby, Chapter 15, Pages 15-1:10-25		
5	Projection	Orthogonal projection	K. Lieu and S.A. Sorby, Chapter 10, Pages 10-22:10-33		
6	Sectional Projections	Drawing sectional views to show interior details. Understanding cutting planes and types of sections.	K. Lieu and S.A. Sorby, Chapter 3, Pages 3-26:3-30		
7	Surfaces	Development of Surfaces, Drawing intersection lines between different shapes (cylinders, cones, etc.)	K. Lieu and S.A. Sorby, Chapter 6, Pages 6-2:6-30		
8	Company Standards	Company standards and techniques applied in engineering graphics.	Engineering Drawing Manual by NASA		
9	Mid Term Examination Week	Mid Term Examination Week			
10	Computer Aided Graphics	Introduction to Computer aided graphics, 2D Sketching Basics, Constraints and Dimensions	Autocad Software		

11	2D Sketching	Advanced 2D Sketching, Creating more complex shapes: arcs, splines, and polygons	Autocad Software		
12	3D Modelling Basics	3D Modeling Basics, Introduction to 3D modeling techniques.	Autocad Software		
13	3D Shapes	Creating basic 3D shapes using extrude, revolve	Autocad Software		
14	3D Models	Modifying 3D Models- fillet, chamfer, shell, and draft.	Autocad Software		
15	Assemblies	Creating Assemblies- Adding components and arranging them in an assembly. Constraints in assemblies- Applying assembly constraints (mates, aligns). Drawings	Autocad Software		
16	Detailed Drawings	Creating Detailed Drawings-Generating 2D drawings from 3D models.	Autocad Software		
17	Views	Creating views, sections, and adding dimensions,	Autocad Software		
18	Surface Modelling Techniques	Introduction to surface modeling techniques	Autocad Software		
19	Rendering Techniques	Rendering and Visualization-Basic rendering techniques for realistic visualization.	Autocad Software		
20	Animation Software	Animation software: Introduction to AR/VR techniques and their applications	Autocad Software		
21	CAD LAB Examination	CAD LAB Examination	-		
22	End-semester Examination	End-semester Examination	-		