DIRECTORATE OF LIFELONG LEARNING

UNIVERSITY OF KASHMIR

Syllabus of course: AutoCAD(2D+3D) **Course duration: 3 Months**

This syllabus is designed to equip learners with the skills to use AutoCAD software in real-world projects, preparing them for work in design and drafting roles across various industries.

Chapter 1: Introduction to AutoCAD/ Drawing Setup

- **Overview of AutoCAD as a computer-aided design (CAD) software.**
- **Applications in industries like architecture, engineering, and manufacturing.**
- **User Interface (UI) Basics**
  - Overview of the drawing area, status bar, and navigation tools.
  - Invoking Commands in AutoCAD
    - Keyboard
    - Ribbon
    - Application Menu
    - Tool Palettes
    - Menu Bar
    - Toolbar
    - Shortcut Menu
  - Workspace Settings.
  - Choosing background color /Options.
- **Creating and Managing Files:**
    - How to create, save, and open drawings.
    - Units & Limits
    - Use of Template file
    - File formats used in AutoCAD (DWG, DXF).
    - Organizing drawings with layers.

Chapter 2: Getting Started with AutoCAD

- **Dynamic Input Mode**
  - Enable pointer Input
  - Enable Dimension Input where possible
  - Show command prompting and command input near the crosshairs
  - Drafting Tooltip Appearance
- **Drawing Lines in AutoCAD**
  - The Close Option
  - The Undo Option
- **Invoking the Tools using dynamic input /command prompt**
- **Coordinate System**
  - Absolute Coordinate System
  - Relative Rectangular Coordinate System
  - Relative Polar Coordinate System
  - Direct Distance Entry
- **Create Basic Drawings using Line & Coordinate Systems.**

- **Selection Types**
  - Window selection
  - Crossing selection

- Lasso selection
- Crossing polygon
- All selection
- Fence
- Window polygon

Chapter 3: Starting with Advanced Sketching

- Drawing **Arcs**
- Drawing **Circles**
- Drawing **Rectangles/Polygons**
- Drawing **Ellipses/Elliptical Arcs**
- Drawing **Splines**
- Drawing **Polylines**
- Drawing **Donuts**
- Placing **Points**
- Drawing **Infinite lines:** XLINE/RAY
- **To Create various Drawings using advanced sketching commands.**

Chapter 4: Working with Drawing Aids

- **Introduction**
- **Understanding the Concept and Use of Layers**
- **Working with Layers**
  - Creating New Layers
  - Making a Layer Current
  - Controlling the Display of Layers
  - Deleting Layers
  - Selective Display of Layers
  - Isolating and Unisolating Layers
  - Controlling the layer settings
- **Object Properties**
  - Changing the Color
  - Changing the Linetype
  - Global and Current Linetype Scaling
  - Changing the Lineweight
- **Changing the Object Properties Using the Properties Palette**
- **Drafting settings Dialog Box**
  - OSNAP
  - POLAR TRACKING
  - SNAP/GRID
  - Drawing Straight Lines Using the Ortho Mode
  - Using Auto Tracking
- **Function and Control keys**
- **To Create Drawings using layers.**

Chapter 5: Editing Sketched Objects

Editing Sketches

- Moving the Sketched Objects
- Copying the Sketched Objects

- Creating Multiple Copies
- Creating an Array of Selected Objects
- Creating a Single Copy
- Copying Objects Using the Base Point Pasting Contents from the Clipboard

- Offsetting Sketched Objects

  - Through Option
  - Erase Option
  - Layer Option

- Rotating Sketched Objects
- Scaling the Sketched Objects
- Filleting the Sketches
- Chamfering the Sketches
- Blending the Curves
- Trimming the Sketched Objects
- Extending the Sketched Objects
- Stretching the Sketched Objects
- Lengthening the Sketched Objects
- Arraying the Sketched Objects

  - Rectangular Array
  - Polar Array
  - Path Array

- Mirroring the Sketched Objects
- Text Mirroring
- Breaking the Sketched Objects

  - Two-point break
  - Single point break

- Placing Points at Specified Intervals
- Dividing the Sketched Objects
- Joining the Sketched Objects
- **Practise Exercises To use appropriate modify tools.**

Chapter 6: Creating Texts, Tables and Hatching Drawings

- Creating Text
  - Writing single line text
  - Entering special characters
  - Creating multiline Text
  - Editing text both single and multiline
  - Creating Text Styles

- Creating Tables in the drawing
  - Inserting Tables in the drawing
  - Creating a new table style
  - Modifying tables

- Features of Hatching
    - Hatch Patterns
    - Hatch Boundary
    - Hatching Drawings Using the Hatch Tool
    - HatchEdit
- **Add text /tables/hatch patterns in practise Exercises.**

Chapter 7: Basic Dimensioning

- Need for Dimensioning
- Dimensioning in AutoCAD
- Fundamental Dimensioning Terms
    - Dimension Line
    - Dimension Text
    - Arrowheads
    - Extension Line
    - Center Mark and Centerline
- Creating Dimensions
    - Creating Linear Dimensions
    - Creating Aligned Dimensions
    - Creating Arc Length Dimensions
    - Creating Baseline Dimensions
    - Creating Continued Dimensions
    - Creating Angular Dimensions
    - Creating Diameter Dimensions
    - Creating Jogged Dimensions
    - Creating Radius Dimensions
    - Creating Jogged Linear Dimensions
    - Generating Center Marks and Centerlines
    - Creating Ordinate Dimensions
    - Maintaining Equal spacing between Dimension
    - Creating Dimension Break
    - Creating Inspection Dimensions
    - Dimension Style Dialogue box
- Multileaders
    - Drawing Multileaders
    - Adding Leaders to Existing Multileader
    - Removing Leaders from Existing Multileader
    - Multileader Style Dialogue box
- **Apply dimensions in already created practise Exercises.**

Chapter 8: Working with Blocks

- Concept of Blocks
- Formation of Blocks
- Layer, Colors, Linetype, Lineweight for blocks.
- Converting entities into Blocks
- Inserting blocks
- Using **Tool palette** to insert Blocks
- Modifying properties of blocks in tool palette
- Using **DesignCenter** to insert Blocks
- **Practise Exercises USING BLOCKS/DESIGN CENTER/TOOL PALETTE.**

Chapter 9: Model Space Viewports, Paper Space Viewports Layouts

- Model Space and Paper Space/Layouts
- Model Space Viewports (Tiled Viewports)
- Creating Tiled Viewports
- Making a Viewport Current
- Paper Space Viewports (Floating Viewports)
- Creating Floating Viewports
- Creating Rectangular Viewports
- Creating Polygonal Viewports
- Converting an Existing Closed Object into a Viewport
- Controlling the Display of Objects in Viewports
- Locking the Display of Objects in Viewports
- Controlling the Properties of Viewport Layers
- Plotting Drawings in AutoCAD
- Plotting Drawings Using the Plot Dialog Box
- **Practise Exercises applying use of viewports/layouts and plot the drawings…….**

Chapter 10: Getting Started With 3D

- Starting Three-Dimensional (3D) Modeling in AutoCAD
- To Start 3D workspace in AutoCAD for creating (3D Models).
- Use of Three-dimensional Drawing
- Types of 3D Models
    - Wireframe Models
    - Surface Models
    - Solid Models
- Use of ViewCube to view objects easily in AutoCAD
- Changing the Viewpoint Using the View Cube
- Changing the Viewpoint Using the Ribbon
- View controls
- Visual style controls
- Navigation modes
    - Free orbit
    - Continuous Orbit

- Creating Solid Models (Predefined Solid Primitives)
    - Creating a Solid Box
    - Creating a Solid Cone
    - Creating a Solid Cylinder
    - Creating a Solid Sphere
    - Creating a Solid Torus
    - Creating a Solid Wedge
    - Creating a Pyramid
    - Creating a Polysolid
    - Creating a Helix

- Creating Complex Solid Models by Applying Boolean Operations
    - Combining Solid Models
    - Subtracting One Solid from the Other

- Intersecting Solid Models
- Checking Interference in Solids

- Creating Extruded Solids
  - Extruding along the Normal
  - Extruding with a Taper Angle
  - Extruding along a Direction
  - Extruding along a Path
- Creating Revolved Solids
- Creating Swept Solids
- Creating Lofted Solids
- Creating Presspull Solids
- Create Basic 3d Models Using Solid Primitives.
- Create Advanced 3d Models Using Solid Modelling tools.

Chapter 11: Modifying 3D Objects

- Filleting Solid Models
- Chamfering Solid Models
- 3D Mirror
- 3D Move
- Rotate 3D
- 3D Array
- To edit solid Models using SOLIDEDIT Command
  - Extrude Faces
  - Taper Faces
  - Move Faces
  - Copy Faces
  - Offset Faces
  - Delete Faces
  - Rotate Faces
  - Color Faces
  - Extract Edges
  - Color Edges
  - Imprint
  - Copy Edges
  - Offset Edge
- Edit Basic/ Advanced 3d Models Using Solid Editing tools.

Final project where students apply learned skills Preparing drawings for presentation and documentation. Creating drawings or models for a specific industry.