

# **Autodesk Inventor Certified User**

# **Target Audience**

This course is designed for:

- Students, designers, and professionals in mechanical engineering, product design, and manufacturing industries.
- Individuals aiming to validate their Autodesk Inventor skills and obtain the Autodesk Certified User (ACU) certification.
- Beginners or intermediate users of Autodesk Inventor looking to enhance their knowledge and proficiency in 3D mechanical design.

#### **Course Objective**

To equip participants with the foundational skills and knowledge required to efficiently use Autodesk Inventor for 3D mechanical design, simulation, and documentation, and to prepare them for the Autodesk Certified User (ACU) certification exam.

#### **Course Outcome**

- Create and modify 3D parts and assemblies.
- Generate detailed technical drawings with annotations and dimensions.
- Perform basic simulations for design validation.
- Prepare confidently for the Autodesk Certified User exam.

**Course Outline:** The course comprises **40-hours** of theory and labs and is divided into **14** different chapters. Each chapter will be followed by hands-on lab exercises to reinforce learning and gauge understanding of the topics covered.





#### **Chapter 1. Introduction to Inventor**

Installing Autodesk Inventor Getting Started with Autodesk Inventor Starting a New Inventor File Invoking the Part Modeling Environment

- Ribbon
- File Menu
- Quick Access Toolbar
- InfoCenter
- Browser
- ViewCube
- Navigation Bar
- Status Bar

Invoking the Assembly Environment Invoking the Drawing Environment Invoking the Presentation Environment Identifying Inventor Files Creating and Accessing a Project Invoking a Marking Menu Customizing the Color Scheme Choosing the User Interface Theme Exporting Files to Other CAD Formats

#### **Chapter 2. Drawing Sketches with Autodesk Inventor**

Invoking the Part Modeling Environment Invoking the Sketching Environment Working with the Selection of Planes Specifying Units Specifying Grids and Snap Settings Creating a Line Entity Creating an Arc by using the Line Tool Creating a Circle

- Creating a Circle by using the Center Point Circle Tool
- Creating a Circle by using the Tangent Circle Tool Creating an Ellipse Creating an Arc







- Creating an Arc by using the Three Point Arc Tool
- Creating an Arc by using the Tangent Arc Tool

• Creating an Arc by using the Center Point Arc Tool

Creating a Rectangle

- Creating a Rectangle by using the Two Point Rectangle Tool
- Creating a Rectangle by using the Three Point Rectangle Tool
- Creating a Rectangle by using the Two Point Center Rectangle Tool

• Creating a Rectangle by using the Three Point Center Rectangle Tool Creating a Slot

- Creating a Slot by using the Center to Center Slot Tool
- Creating a Slot by using the Overall Slot Tool
- Creating a Slot by using the Center Point Slot Tool
- Creating a Slot by using the Three Point Arc Slot Tool
- Creating a Slot by using the Center Point Arc Slot Tool

Creating a Polygon

Creating a Spline

- Creating a Spline by using the Control Vertex Spline Tool
- Creating a Spline by using the Interpolation Spline Tool
- Creating an Equation Driven Spline
- Creating a Bridge Curve

Editing a Spline

- Editing an Interpolation Spline
- Editing a Control Vertex Spline

# **Chapter 3. Editing and Modifying Sketches**

Trimming Sketch Entities

- Trimming Sketch Entities Up to their Nearest Intersection
- Trimming Sketch Entities by Defining Boundaries
- Trimming Sketch Entities Dynamically

Extending Sketch Entities

- Extending Sketch Entities Up to their Nearest Intersection
- Extending Sketch Entities by Defining Boundaries

Splitting Sketch Entities

Offsetting Sketch Entities

Creating a 2D Fillet

Creating a 2D Chamfer

Patterning Sketch Entities

• Creating a Rectangular Pattern







• Creating a Circular Pattern

Creating Construction and Centerline Entities Mirroring Sketch Entities Moving a Sketch Entity Creating a Copy of Sketch Entities Rotating an Entity Scaling Sketch Entities Stretching Sketch Entities

#### **Chapter 4. Applying Constraints and Dimensions**

#### Applying Constraints

- Applying Horizontal Constraint
- Applying Vertical Constraint
- Applying Coincident Constraint
- Applying Collinear Constraint
- Applying Concentric Constraint
- Applying Parallel Constraint
- Applying Perpendicular Constraint
- Applying Tangent Constraint
- Applying Smooth Constraint
- Applying Symmetric Constraint
- Applying Equal Constraint
- Applying Fix Constraint

Controlling the Display of Contraints Controlling Constraint Settings Applying Dimensions

- Applying a Horizontal Dimension
- Applying a Vertical Dimension
- Applying an Aligned Dimension
- Applying an Angular Dimension
- Applying a Diameter Dimension
- Applying a Radius Dimension
- Applying a Linear Diameter Dimension

Controlling Dimension Settings Modifying/Editing Dimensions Working with Different States of a Sketch







- Under Constrained Sketch
- Fully Constrained Sketch

Displaying Available Degrees of Freedom

# **Chapter 5. Creating Base Feature of Solid Models**

Creating an Extrude Feature Creating a Revolve Feature Navigating a 3D Model in Graphics Area

- Navigating a 3D Model by Using the Navigation Tools
- Navigating a 3D Model by Using the Mouse Buttons
- Navigating a 3D Model by Using the ViewCube

Changing the Visual Style of a Model

- Realistic
- Shaded
- Shaded with Edges
- Shaded with Hidden Edges
- Wireframe
- Wireframe with Hidden Edges
- Wireframe with Visible Edges Only
- Monochrome
- Watercolor
- Sketch Illustration
- Technical Illustration

# **Chapter 6. Creating Work Features**

Creating Work Planes

- Creating a Work Plane Through Selected Geometries
- Creating a Work Plane at an O set Distance
- Creating a Work Plane Parallel to a Face/Plane
- Creating a Work Plane in the Middle of Two Faces/Planes
- Creating a Work Plane through the Midplane of a Torus
- Creating a Work Plane at an Angle
- Creating a Work Plane Passing Through Three Points
- Creating a Work Plane Passing Through Two Coplanar Edges
- Creating a Work Plane Tangent to a Face through an Edge
- Creating a Work Plane Tangent to a Face through a Point
- Creating a Work Plane Tangent to a Face and Parallel to a Plane







- Creating a Work Plane Normal to an Axis Through a Point
- Creating a Work Plane Normal to a Curve

Creating Work Axes

- Axis Tool
- On Line or Edge Tool
- Parallel to Line through Point Tool
- Through Two Points Tool
- Intersection of Two Planes Tool
- Normal to Plane through Point Tool
- Through Center of Circular or Elliptical Edge Tool
- Through Revolved Face or Feature Tool

Creating Work Points

- Point Tool
- Grounded Point Tool
- On Vertex, Sketch point, or Midpoint Tool
- Intersection of Three Planes Tool
- Intersection of Two Lines Tool
- Intersection of Plane/Surface and Line Tool
- Center Point of Loop of Edges Tool
- Center Point of Torus Tool
- Center Point of Sphere Tool

Creating a User Coordinate System

# **Chapter 7. Creating Work Features**

Using Advanced Options of the Extrude Tool Using Advanced Options of the Revolve Tool Working with a Sketch having Multiple Profiles

- Projecting Geometries
- Projecting Geometries onto the Sketching Plane
- Projecting Intersecting Edges onto the Sketching Plane
- Projecting 2D Sketch onto a Face
- Projecting Geometries of a .DWG File

Creating a Section View

- Creating a Half Section View
- Creating a Quarter Section View
- Creating a Three-Quarter Section View

Editing a Feature and its Sketch

• Editing a Feature and its Sketch







Displaying Earlier State of a Model Re-ordering Features of a Model Measuring the Distance between Entities Assigning an Appearance

- Assigning Appearance by using the Appearance Tool
- Assigning Appearance by using the Appearance Drop-down List
- Copying and Pasting an Appearance by Using the Adjust Tool Applying a Material
  - Applying a Material by Using the Material Tool
  - Applying a Material by Using the Material Drop-down List
- Assigning Finishes/Manufacturing Data Calculating Physical Properties

# Chapter 8. Advanced Modeling – II

Creating a Sweep Feature

- Creating a Sweep Feature Along a Path
- Creating a Sweep Feature Along a Path with Fixed Orientation
- Creating a Sweep Feature Along a Path and a Guide Rail
- Creating a Sweep Feature Along a Path and a Guide Surface
- Creating a Sweep Feature by Sweeping a Toolbody Along a Path

Creating a Loft feature

- Creating a Loft Feature with Sections
- Creating a Loft feature with Sections and Guide Rails
- Creating a Loft feature with Sections and a Centerline
- Creating an Area Loft feature

Creating a Coil feature

Creating an Emboss Feature

Creating a Mark Feature

Creating a Rib Feature

- Creating a Rib Feature Normal to the Sketching Plane
- Creating a Rib Feature Parallel to the Sketching Plane

Applying an Image on a Face of a Model

Creating a Shell Feature







## **Chapter 9. Patterning and Mirroring**

Creating a Rectangular Pattern Creating a Circular Pattern Creating a Sketch Driven Pattern Suppressing Features and Pattern Occurrences Unsuppressing Features and Pattern Occurrences Mirroring a Feature or a Body

#### **Chapter 10. Advanced Modeling - III**

Creating Holes Creating Threads Creating Fillets

- Creating Edge Fillets
- Creating Face Fillets
- Creating Full Round Fillets

**Creating Chamfers** 

Splitting a Face and a Solid Body

- Splitting a Faces of a Model
- Splitting a Solid Body

Creating 3D Sketches and Curves

- Creating a 3D Sketch by Using the Line Tool
- Creating a Helical Curve
- Creating a 3D Intersection Curve
- Creating a Silhouette Curve
- Creating a 3D Projected Curve
- Creating a 3D Curve on a Face
- Creating 3D Curves by Projecting Existing Geometries

#### Chapter 11. Working with Assemblies – I

Working with Bottom-up Assembly Approach Working with Top-down Assembly Approach Creating an Assembly using Bottom-up Approach Inserting Components in the Assembly Environment Working with Degrees of Freedom Applying Constraints

- Applying Assembly Constraints
- Applying Motion Constraints
- Applying Transitional Constraints







• Applying Constraint Set Constraints Applying Joints

- Applying a Rigid Joint
- Applying a Rotational Joint
- Applying a Slider Joint
- Applying a Cylindrical Joint
- Applying a Planar Joint
- Applying a Ball Joint

Editing Constraints and Joints Deleting Constraints and Joints

Moving and Rotating Individual Components

- Moving a Component by using the Free Move Tool
- Rotating a Component by using the Free Rotate Tool

## Chapter 12. Working with Assemblies – II

Creating an Assembly by using the Top-down Approach Editing Assembly Components

- Editing Assembly Components within the Assembly Environment
- Editing Assembly Components in the Part Modeling Environment Patterning Assembly Components
  - Creating an Associative Pattern
    - Creating an Associative Pattern
  - Creating a Rectangular/Circular Pattern

Mirroring Components of an Assembly

Copying Components of an Assembly

Creating Bill of Material (BOM) of an Assembly

# **Chapter 13. Creating Animation and Exploded Views**

Invoking the Presentation Environment Capturing Actions on the Timeline Capturing Tweaks on the Timeline Editing Time and Properties of a Tweak Deleting a Tweak Creating a Snapshot View

- Creating a Linked Snapshot View
- Creating an Independent Snapshot View

Editing a Snapshot View

Renaming a Snapshot View Deleting a Snapshot View







Publishing a Snapshot View to a Raster Image Creating an Exploded View in a Drawing File Creating a New Storyboard Creating a New Scene Playing Animation of a Storyboard Publishing Animation to a Video File

#### **Chapter 14. Working with Drawings**

- Invoking the Drawing Environment Editing the Sheet Size Editing/Creating the Title Block Editing the Drafting Standard Creating the Base View of a Model Creating Projected Views Working with Angle of Projection Defining the Angle of Projection Creating Other Drawing Views
  - Creating an Auxiliary View
  - Creating a Section View
  - Creating a Detail View
  - Creating an Overlay View
  - Creating a Break View
  - Creating a Break Out View
  - Creating a Slice View
  - Creating a Crop View

Deleting a Drawing View Applying Dimensions

• Applying Drawing Dimensions

Applying Drawing Draw

Adding Balloons

- Adding Balloons Automatically
- Adding Balloons Manually

