

# **MECHANICAL DRAFTING & MODELING WITH AUTODESK INVENTOR (INCLUDES AUTOCAD)**

- 1. Name** MECHANICAL DRAFTING & MODELING WITH AUTODESK INVENTOR (INCLUDES AUTOCAD)
- 2. Sector** : **Information & Communication Technology**
- 3. Code** : **ICT 224**
- 4. Entry Qualification** : **SSC Pa and MES course Of Production & manufacturing sector**
- 5. Terminal Competency** : On completion of the training, participants would be able to:
- Do the work on Mechanical 3D Modeling & design.
  - Apply this knowledge to understand the engineering design work flow process in the Manufacturing Industry.
  - Acquire knowledge of 3D design visualization.
- 6. Duration** 60 Hrs
- 7. Contents** Given below

<b>Practical Competencies</b>	<b>Underpinning Knowledge (Theory)</b>
<p><b>Introduction to AutoCAD</b></p> <ul style="list-style-type: none"> <li>• Introduction of AutoCAD Window dialog box, Menu bars, toolbars, Command window.</li> <li>• Drawing &amp; Modifying CADD (Computer Aided Drafting &amp; Designing) commands.</li> </ul> <p><b>Introduction to 2D Drafting</b></p> <ul style="list-style-type: none"> <li>• Draw Commands □ Line, Circle, Rectangle, Ellipse, Polygon, Point, Region.</li> <li>• Make a block, write it &amp; then insert it in any file.</li> <li>• Putting a single &amp; multiple texts in a drawing.</li> <li>• Modifying commands □ Erase, copy, mirror, offset, array, scale, stretch, trim &amp; Extend.</li> <li>• Chamfering &amp; filleting corner of drawing.</li> <li>• Modifying the sketch grid spacing.</li> <li>• Create parametric dimension.</li> <li>• Delete &amp; Add Dimensions.</li> </ul>	<p><b>Introduction to AutoCAD</b></p> <ul style="list-style-type: none"> <li>• Introduction of AutoCAD Window dialog box, Menu bars, toolbars, Command window.</li> <li>• UCS Co-ordination System □ X, Y &amp; Z Co-ordination.</li> <li>• Units, Drawing limits, Grids.</li> <li>• Function keys, Paper size &amp; shortcut keys.</li> </ul> <p><b>Introduction to 2D Drafting</b></p> <ul style="list-style-type: none"> <li>• Draw Commands □ Line, Circle, Rectangle, Ellipse, Polygon, Point, Region.</li> <li>• Modifying commands □ Erase, copy, mirror, offset, array, scale, stretch, trim &amp; Extend.</li> <li>• Layers, Linetype, color &amp; line weight.</li> <li>• Dimension menu commands.</li> <li>• Template file, Title block.</li> </ul> <p><b>Introduction to 3D</b></p> <ul style="list-style-type: none"> <li>• Introduction to 3D Modeling. X Y, Z plane, 3D Grips &amp; other tools on the 3D sketch</li> </ul>

<p><b>Introduction to 3D</b></p> <ul style="list-style-type: none"> <li>• Sketch 3D line on X, Y &amp; Z planes.</li> <li>• Creating work axis &amp; work points.</li> <li>• Modifying the work feature.</li> </ul> <p><b>Modeling</b></p> <ul style="list-style-type: none"> <li>• <b>Solid Modeling</b> Extrude sketch geometry, Sweep geometry along a path, revolve sketch geometry, Coil feature, Rib &amp; Web feature.</li> <li>• Create hole feature on part, Create a shell feature with varying thickness.</li> <li>• Add chamfer &amp; edge fillet feature to a part.</li> <li>• <b>Surface Modeling</b> Create a curved surface, Revolved surface, Ruled Surface, Edge Surface.</li> </ul> <p>using Title block, Detailing &amp; Section view.</p> <ul style="list-style-type: none"> <li>• Apply material, background, light □ Point, Distance, Spot light, landscaping.</li> <li>• Making slide &amp; running run script file.</li> <li>• Creating view ports &amp; views &amp; plotting it.</li> <li>• Creating a flat &amp; flange wall in sheet metal modeling.</li> <li>• Constraining component by mating plane faces.</li> <li>• Creating assembly components in place.</li> </ul> <p>Copying &amp; mirroring assembly.</p> <ul style="list-style-type: none"> <li>• Making exploded assemblies - Making detail drawing of Machine drawing, dismantling machine component. Adaptive Assemblies.</li> <li>• <b>Project</b>.g. Universal coupling.</li> </ul>	<p>panel bar. Drawing environment- Paper space &amp; Model space.</p> <p><b>Boolean Operation</b></p> <ul style="list-style-type: none"> <li>• Subtract, Union, &amp; Intersect.</li> </ul> <p><b>Dimension</b></p> <ul style="list-style-type: none"> <li>• Dimensional and geometric constraints. Parametric dimension □ Automatic dimension. (Linear, aligned, angular Baseline, Continue, Tolerance, Leader.)</li> </ul> <p><b>Solid Modeling</b></p> <ul style="list-style-type: none"> <li>• Boolean, Polysolid, Cone, Pyramid, Wedge, Torus.</li> <li>• Solid Editing commands □ Union, Subtract, and Intersect.</li> <li>• 3D modifies commands □ 3D Mirror, Rotate 3D, Array 3D, Align the object.</li> </ul> <p><b>Surface Modeling</b></p> <ul style="list-style-type: none"> <li>• Create a curved surface, Revolved surface, Ruled Surface, Edge Surface, and Tabulated Surface.</li> <li>• 2D solid, Edge, 3D face, 3D Mesh.</li> </ul> <p><b>Assembly Modeling</b></p> <ul style="list-style-type: none"> <li>• Assembly co-ordination system</li> </ul> <p><b>Position Constraints</b></p> <p>Place &amp; constraint component, Edit constraint.</p> <p><b>Adaptive work plane</b></p> <ul style="list-style-type: none"> <li>• Defining work plane - XY, YZ, XZ plane.</li> <li>• Work axis.</li> <li>• Work point.</li> </ul>
---	---

## **LIST OF TOOLS & EQUIPMENTS**

**1. Hardware:** 20 workstations of suitable configuration

**2. Software** : 20 licenses of Autodesk Inventor software