



# **COURSE CONTENTS FOR THE AVTS COURSES**

**AT CAD- CAM LAB,  
ATI, VIDYANAGAR,  
HYDERABAD**



I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAD-01</b>
IV	COURSE TITLE	<b>AutoCAD BASICS</b>
V	DURATION	01 Week
VI	PREREQUISITE	Degree / Diploma in branch of engineering or NTC/NAC with two years of industrial experience
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to understand 2D AutoCAD commands and able to draft 2D drawings independently.		

**VII Course Content :**

<b>Theory topics</b>	<b>Practical Topics</b>
Introduction to AutoCAD, Setting up drawing environment – Workspace, Limits & units, Co-ordinate system. Creating objects using Draw commands, Editing drawings using Modify commands, Creating dimensions, Drawing with precision- Drafting aids & Formatting objects. Blocks, Design center, References, Layers, Parametric constraints, Script writing, Isometric views.	Practice on standard geometrical shapes. Drafting 2D mechanical component drawings. Constructing the sub-assembly drawings.



I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAD-02</b>
IV	COURSE TITLE	<b>AutoCAD- 2D DRAFTING AND 3D MODELING</b>
V	DURATION	02 Weeks
VI	PREREQUISITE	Degree / Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to understand 2D & 3DAutoCAD commands and able draft the required drawings and develop solid modeling independently.		

**VIII Course Content :**

<b>Theory topics</b>	<b>Practical Topics</b>
Introduction to AutoCAD, Setting up drawing environment – Workspace, Co-ordinate system. Creating & Editing 2D objects, Creating dimensions, Drafting aids, Blocks, Design center, References. Concepts of Modeling and primitives. Understanding 3D views and Projection. . Working with Solid Primitives and interactive view in 3D, Creating 3D Objects from 2D. Editing 3D objects using Boolean operation, Solid Editing and 3D operations. Introduction to Mesh and Mesh creation and editing. Working with Multiple view ports in 3D	Practice on standard geometrical shapes, Drafting 2D mechanical component drawings, Constructing the sub-assembly drawings, Creating solid shapes, Constructing wireframe, surface and solid objects, Constructing solid mechanical components.  Project :- Developing Ball Bearing and Piston.



I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAD-03</b>
IV	COURSE TITLE	AutoCAD-MEP (Mechanical essentials)
V	DURATION	01 Week
VI	PREREQUISITE	Degree / Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience. And should have completed AutoCAD basics course
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to gain necessary skills needed for draft, design and document building systems design using the program.		

**VIII Course Content :**

Theory topics	Practical Topics
Introduction: - Understanding Workspaces, project navigator. Creating Schematic drawings. Designing with space and zone objects. Modeling an MEP systems., analyzing systems, Detailing views, Annotation, constructions documents understanding object types and styles, understanding display manager.	Practice on user interface, Practice on Spaces and zones, Practice on Layout, Practice on creating section and elevation, Practice on creating schedules, Practice on Floor plan, Practice on Details and callouts  Project:- Design and developing HVAC Floor plan layout



I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAD-04</b>
IV	COURSE TITLE	AutoCAD-MEP (Electrical essentials)
V	DURATION	01 Week
VI	PREREQUISITE	Degree / Diploma in Electrical branch of engineering or NTC/NAC with two years of industrial experience. And should have completed AutoCAD basics course
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will gain fundamental skills required to navigate AutoCAD MEP and use its tools to create and modify electrical systems.		

**VIII Course Content :**


Theory topics	Practical Topics
Introduction: - Understanding Workspaces, project navigator. Creating Schematic drawings. Attaching Architecture Drawings to MEP Drawings. Creating Electrical and Power Circuits. Creating Circuits Wiring. Customizing and Creating Panel Schedule. Configuring and Creating Cable Trays and Conduit. Adding Tags and annotations. Creating Sections and Elevations. Creating Electrical Floor Plans layouts. Importing and exporting to AutoCAD. Creating Project template.	Practice on user interface, Practice on Spaces and zones, Practice on Layout Practice on Creating Electrical and Power Circuits, Practice on creating Cable, Practice on creating section and elevations, Practice on Floor lay out  Project:- Design and developing electrical layout.



I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAD-05</b>
IV	COURSE TITLE	<b>Creo (Pro-e) -Basic</b>
V	DURATION	01 Week
VI	PREREQUISITE	Degree/Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to understand how to practically use Creo for a design in an optimal way and grants skills to enable him to independently create functional and stable part models.		

**VI Course Content :**

<b>Theory topics</b>	<b>Practical Topics</b>
Introduction to Creo modelling and basic concepts, Using the creo interface, concept of parametric, Constraints-dimensional geometrical, Selecting and Editing, Sketcher geometry, Creating datum Features: Planes and Axes, Creating extrudes, Revolves and Ribs, Creating sweeps and blends, Creating holes, shells and drafts, Creating rounds, chamfers , Copy and mirror tools, Creating patterns	a) Practice on Interface b) Practice on Sketcher c) Practice on Feature d) Practice on Part modeling  Group Projects :- Mechanical Part design /modeling

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I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAD-06</b>
IV	COURSE TITLE	<b>Creo (Pro-e) –Advanced</b>
V	DURATION	02 Weeks
VI	PREREQUISITE	Degree/Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience. And should have completed Creo- Basic course
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to understand how to practically use Creo for a designing Assembly models.		

## VI Course Content :

Theory topics	Practical Topics
Review of Part modeling, Basic Assembly Creation with constraints, Exploding assemblies, Using layers, Adv Assembly Design, Behavioral Modeling, Sheet metal Design, Detailing (Drawing), Editing view, Mechanism Simulation.	a) Practice Assembly modeling b) Practice on Sheet Metal Design c) Practice on Drawing Group Projects :- Assembly design /modeling




I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAD-07</b>
IV	COURSE TITLE	<b>CATIA – Basic</b>
V	DURATION	01 Week
VI	PREREQUISITE	Degree/Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to understand about parametric modeling and able to build new part in 3D Platform.		

**VI Course Content :**

Theory topics	Practical Topics
Introduction to CATIA- Workbenches, Understanding the functions of toolbars, Drawing sketches. editing and modifying sketches, Constraining sketches, Creating base features, Creating hole, dress up, rib features, Editing features, Transformation features – translate, rotate, mirror, patterns	a)Practice on navigation and Workbenches b) Practice on Drawing Sketches c) Practice on Modifying sketches d) Practice on Constraining Sketches e) Practices of Creating features f) Practice on Editing Features g) Practice on Transformation of features



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I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAD-08</b>
IV	COURSE TITLE	<b>CATIA – Advanced</b>
V	DURATION	02 Weeks
VI	PREREQUISITE	Degree/Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience. And should have completed CATIA- Basic course
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to understand about parametric modeling and able to build part modeling and assemble the parts.		

## VI Course Content :


Theory topics	Practical Topics
Create and edit surfaces - Projecting Intersection curves. Create and edit assemblies - Building Assemblies, Moving components Assembly constraints. Prepare CATIA drawings of Parts and Assemblies- Drawing files, Creating & Editing views, Inserting frames and title blocks, Annotating drawings Bill of Material. Create and edit sheet metal components - Walls, Flanges, Bends and Folding, Create and animate mechanism - Designing a Mechanism	a) Practice on Create and Edit surfaces b) Practice on Create and Edit assemblies c) Practice on Creating Drawings d) Practice on Creating and Editing Sheet metal e) Practice on Mechanism Designing  Project :- Design and developing of Turbine Rotor



I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAE-01</b>
IV	COURSE TITLE	<b>ANSYS- Basic Analysis</b>
V	DURATION	02 Weeks
VI	PREREQUISITE	Degree/Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to use the Ansys and solve a selected range of engineering problems and validate a Finite Element model using a different range of techniques		

**VIII Course Content :**


Theory topics	Practical Topics
Basic Analysis Procedure, Getting started with ansys, Modeling in ansys, Material properties. Element properties, Meshing, Boundary conditions, Solution, Post-processing.	a) Practice on Importing Solid model b) Practice on Bottom-up Modeling c) Practice on Variable Loads and Boundary Conditions. d) Practice on post processing Project :- Structural Analysis of 2D bracket

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I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD - CAM LAB</b>
III	COURSE CODE	<b>CAE-02</b>
IV	COURSE TITLE	<b>ANSYS- Advanced Analysis</b>
V	DURATION	02 Weeks
VI	PREREQUISTE	Degree/Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience . And should have completed Ansys- basic course
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to use the Ansys for solving non-linear problems and structural analysis.		

**VIII Course Content :**

Theory topics	Practical Topics
Reviewing steps in analysis: creating geometry, meshing, loading & solving. Reviewing results and checking validity and solution. Meshing –multiple element attributes, controlling mesh density, changing mesh, mapped meshing. Mesh extrusion and swept meshing, retrieving data base information. Introduction to solvers, Geometric non liner problems, Creating shell meshing, Structural Analysis Types: Liner and non liner static, analysis procedure. Model analysis procedure.	a) Practice on Meshing b) Practice on Static analysis c) Practice on Modal Analysis d) Practice on post processing

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I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD-CAM LAB</b>
III	COURSE CODE	<b>CAM-02</b>
IV	COURSE TITLE	<b>MASTERCAM- MILLING</b>
V	DURATION	01 Weeks
VI	PREREQUISITE	Degree/Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to understand the application of mastercam software and able to generate part programme for 2D milling operation.		

### VIII Course Content :


Theory topics	Practical Topics
Introduction on Master CAM. Concepts on 2D drawing and Solid design. Exposure to Milling. Tool path generation and verification. Tool parameter and job set up parameter. Program generation using Post Processor. Tool path generation and simulation exercises.	a) Practice on tool path generation/ sketching. b) Practice on stock setup, Practice on Tool selection and parameter selection. c) Creating simulation of 2D contour operation, pocketing operation, drilling operation and facing. Demonstration on d) Transfer of post processor programme to Vertical Machining center.



I	SECTION CODE	<b>CAD</b>
II	SECTION NAME	<b>CAD-CAM LAB</b>
III	COURSE CODE	<b>CAM-03</b>
IV	COURSE TITLE	<b>MASTERCAM- TURNING</b>
V	DURATION	02 Weeks
VI	PREREQUISTE	Degree/Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to understand the application of mastercam software and able to generate part programme for 2D Turning operation.		

**VIII Course Content :**

Theory topics	Practical Topics
Introduction on Master CAM. Concepts on 2D drawing and Solid design. Exposure to Turning. Tool path generation and verification. Tool parameter and job set up parameter. Program generation using Post Processor. Practice on Master CAM (Lathe) exercises. Tool path generation and simulation exercises. NC file generation using Post Processor.	<ul style="list-style-type: none"> <li>a) Practice on tool path generation / sketching.</li> <li>b) Practice on stock setup /chuck selection, c) Practice on Tool selection and parameter selection.</li> <li>d) Creating simulation of 2D Turning operation – Rough turning, face turning, step turning, taper turning and C-axis operation.</li> <li>e) Demonstration on Transfer of post processor programme to Turn mill center.</li> </ul>

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II	SECTION NAME	<b>CAD-CAM LAB</b>
III	COURSE CODE	<b>CAM-01</b>
IV	COURSE TITLE	<b>3D PRINTER</b>
V	DURATION	01 Week
VI	PREREQUISITE	Degree/Diploma in Mechanical branch of engineering or NTC/NAC with two years of industrial experience
VII	<b>OBJECTIVES</b>	
On completion of the course, the learner will be able to design, develop and produce models in 3D printer		

### VIII Course Content :

Theory topics	Practical Topics
Introduction & Evolution of 3D Printing, Evolution of 3D Printing, 3D CAD file formats, Various Printing technologies , Classification of 3D printer , Principles. Object placement, Slicing and printing, Print settings, Idea on 3D Printing materials	<ol style="list-style-type: none"> <li>1. Practice on Interface with modelling software.</li> <li>2. Practice on Model creation</li> <li>3. Practice on Editing features</li> <li>4. Practice on converting modelling file to 3D printer supported file formats.</li> <li>5. Practice on the interface of Slicing software.</li> <li>6. Practice on preparing model for print-Import, scale, rotate and repair.</li> <li>7. Practice on Printer setting for controlling printer.</li> <li>8. Practice on transferring files from PC to 3D printer using different media.</li> <li>9. Practice on preparing printer for print.</li> <li>10. Practice on levelling the build platform</li> </ol>