

VALUE ADDED COURSES (VAC)

- Mechanical Department of Engineering offers two types of Value Added Courses. The courses are conducted by external agencies after the college hours.
- The Second Year Students are offered course on CAD: CATIA
- The Third Year Students are offered course on CAE: Hyper Works Level 1

Syllabus for CATIA Course

CATIA SYLLABUS		
Module	Session	Contents
Introduction	1	CATIA as CAD software: Concept of Parametric Modeling, Feature Based Modeling, User Interface, Mouse operations, File types and Management, drawing profiles. Major user industries of Catia. Why Catia is preferred?
	2	Sketcher: Profile toolbar, operation (corner, chamfer, relimitations, transformations, project 3D element), constraints, types of constraints, workbench
Sketcher	3	Sketcher: sketch tools, tools (Sketch solving status, sketch analysis, output feature), visualization toolbar, user selection filter.
	4	Modeling of Machined component: Material Addition and Removal (Pad, Pocket, Shaft, and Groove), Sketch and Positioned Sketch, Types of Fillets, Types of Chamfer, Types of Hole
Modelling of Machined Component (Part Modelling)	5	Modeling of Machined component - 2. Pattern (Rectangular, Circular, User), Thread/Tap, Datum Features (Plane, Axes, Points), Simple Draft. Frequently used commands for Machined components in Catia / Creo
	6	Advance Design features : Axis System, Types of draft, Shell, Stiffener, rib slot, Multisection solid, Removed multisection solid, Apply Material, Measure, Render
	7	Introduction To Multibody concept: Copy Paste, Paste special, Insert body, Boolean Operations (Add,remove,Intersect), Transformation (Translation, Mirror, Scaling, Affinity).
	8	Multibody concept:- Standard example , Negative body concept (Boolean Operations)

	9	Advance Features: Parameters, Formula, Relations, Design Table.
Drafting	10	Introduction: To Drafting & Detailing Theory:- (types Generative – Interactive), Initial Drafting setting, Sheet Background, Views (ortho, ISO), Dimensions (Types- Generate Dimension & Create Dimension).
	11	Views: (Aux, Section, Details, Clipping, Broken), View properties, DATUMS & Tolerance
	12	Annotations:- GD & T, Symbols, Note, Leaders, Table, Symbols (Machining, Roughness, Welding, Custom), Dress-up Toolbar.
	13	Surfacing Modeling based Plastic Component:- Environment, Tool bars, Surface Creation (Extrude, Revolve, Sphere, and Cylinder), Surface Modification, Surface Editing (Trim, Split, Shape Fillet, Close Surface, and Thickness).
	14	Surfacing: Offset (All 3 types), Fill, Blend, Join, healing, Project-Combine.
	15	Advanced Surfacing: Adaptive Sweep, Sweep (ALL), Multisection Surface.
Wire-frame Modeling	16	Wire-frame Modeling: Point, Line, Planes, Curves, Circle-Conic, STANDARD EXAMPLES. Use of wire frame modeling,
BIW Templates	17	BIW Templates: What are BIW, Junction, Diabolo, Hole, Mating Flange, Bead, and Blend Corner
Assembly & Mechanism	18	Introduction to Assembly: Types of assembly approach, Types of Constrains and DOF, placement of components in the Assembly, Manipulating Components, BOTTOM UP Approach
Assembly & Mechanism	19	Top Down Approach: Part, Product, Component, Space Analysis, Reuse Pattern, Save management.
	20	Assembly Drafting: Scene (Exploded View), Bill of material, Ballon creation, Graph Tree Reordering.

Syllabus for CAE Course Hyper Works Level 1

- Theory of FEM and CAE
- 1D Theory - Rod , Bar, Beam - Tension , Compression, Simply Supported and Fix - Fix problems
- Line Mesh of Roll cage and Geometry Editing on Line Data of Roll Cage
- 2D Theory , Getting Started with Hyper Mesh, Opening and Saving Files, Working with Panels, Organizing a Model, Controlling the Display

- Importing and Repairing CAD, Generating a Mid surface, Simplifying Geometry, Refining Topology to Achieve a Quality Mesh
- Plate with hole - with washer and without washer
- Auto Meshing, Meshing without Surfaces, 2-D Mesh in Curved Surfaces, QI Mesh Creation, Checking and Editing Mesh
- Plate with Hole - Biasing - Panels - Ruled, Spline, skin, Drag, spin, line drag, automesh
- Panels - Surface, Surface Edit, Defeature, Midsurface, quick Edit, Edge Edit
- 3D Theory , Creating and Editing Solid Geometry
- Tetrameshing, Creating a Hex-Penta Mesh using Surfaces, Creating a Hexahedral Mesh using the Solid Map Function
- solids, solid edit, drag, spin, line drag, tetramesh, solid map, linear solid, solid mesh
- Linear Static Analysis
- Thermal Stress Analysis
- Normal Modes Analysis
- Inertia Relief Analysis
- Buckling Analysis
- Weld Simulation
- Composite Analysis
- Axi-Symmetric Analysis
- Non-Linear Gap Analysis
- Random Response Analysis
- Coupled Linear Heat Transfer/Structure
- Linear Steady State Heat Convection Analysis
- Linear Transient Heat Transfer Analysis
- Thermal Stress Analysis using Anisotropic Material
- Heat Transfer Analysis using GAP Element
- Direct Frequency Response Analysis
- Modal Frequency Response Analysis
- Direct Transient Dynamic Analysis
- Modal Transient Dynamic Analysis
- Pretension Bolt Analysis
- Fatigue using S-N (Stress - Life) Method
- Fatigue using E-N (Strain - Life) Method
- Complex Eigenvalue Analysis
- Response Spectrum Analysis
- Computation of Equivalent Radiant Power.