



**GOVERNMENT OF TAMILNADU**  
**DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI**  
**STATE PROJECT COORDINATION UNIT**  
**(Established under Canada India Institutional Cooperation Project)**

**CURRICULUM**

Course Name	<b>PARAMETRIC DESIGN USING CATIA</b>
Course Code	ME/2020/032
Course Duration	60 Hours
Minimum Eligibility Criteria	ITI/10 <sup>th</sup> /+2/Diploma/Graduates
Pre-requisites (if any)	-
Course Objectives	<p>Training module has been designed to provide the participants to</p> <ul style="list-style-type: none"> <li>• Ensure the basics of 3D Model creation for design, visualization, analysis, animation and prototype used in manufacturing industries.</li> <li>• Design the product as if it were in the real world of manufacturing</li> </ul>
Course Outcomes	<p>At the end of training, the trainees will be able to</p> <ul style="list-style-type: none"> <li>• Identify and apply the concepts for creating 3D models used for manufacturing the real-time components and other industrial application.</li> <li>• Develop 3D models, 2D drawings, assembly models and assembly drawings using CATIA V5 software with manufacturing standards in an industry.</li> </ul>
Expected Job Roles	Design and Modelling Engineer

**TEACHING AND SCHEME OF EXAMINATION**

Course Code	Course Name	Hours		Assessment Marks		Duration of the Examination
				Min	Max	
ME/2020/032	<b>PARAMETRIC DESIGN USING CATIA</b>	Theory	20	10	20	3 Hours
		Practical	40	40	80	
		Total	60	50	100	

**ME/2020/032 - PARAMETRIC DESIGN USING CATIA**

**DETAILED SYLLABUS**

Unit No	Modules	No. of Hours	
		Theory	Practical
<b>I</b>	<b>Introduction to CAD/CAM and CATIA</b>	<b>4 Hours</b>	
1.1	CATIA Fundamentals	02	
1.2	Introduction to CAD/CAMB-Rep and CSG Techniques – Working Features		
1.3	Primitive Base Features		
1.4	<b>Practical:</b> ➤ Base features practice for the given drawing.		02
<b>II</b>	<b>CATIA Sketching Fundamentals</b>	<b>10 Hours</b>	
2.1	Creation of sketches – Entity creation and modification	03	
2.2	Sketching Base Features using dimensions and constraints.		
2.3	<b>Practical:</b> ➤ Sketching Base Features to create part models for the given drawing		07
<b>III</b>	<b>Creation of 3D Models</b>	<b>10 Hours</b>	
3.1	Extruding Features and Revolving Features	03	
3.2	Pad, Pocket, Thin Solid, Shaft, Groove, Hole, Threaded Hole		
3.3	Rib, Slot, Stiffener, Loft, Remove Lofted Material		
3.4	Dress-up Features - Fillet, Chamfer, Draft, Shell, Thickness, Thread/Tap		
3.5	<b>Practical:</b> ➤ Creating Extrude, Revolve sweep models for the given drawing		07
<b>IV</b>	<b>Creation of Reference Features and Engineering Features</b>	<b>6 Hours</b>	
4.1	Creation of Datum Planes, Axis, Curves and Points	02	
4.2	Creation of Holes – Linear, Axial, Radial holes		
4.3	Creation of Ribs & Shell		
4.4	Creation of Fillet and Chamfer		
4.5	<b>Practical:</b> ➤ Creating Datum, Hole, ribs, Shell, etc., features for the given drawings		04
<b>V</b>	<b>Modification of Features</b>	<b>10 Hours</b>	
5.1	Copy, Paste, Mirror & Move	03	
5.2	Pattern tool – Rectangular and Circular, Split and combine		
5.3	Bending parts		
5.4	Editing sketch and Feature editing		

5.5	<b>Practical:</b> ➤ Editing of part models		07
<b>VI</b>	<b>Introduction to Creation of Sections and File Export / Import</b>	<b>10 Hours</b>	
6.1	Creation of Sectional views, Color and Appearance	04	
6.2	Creation of STL, IGES, STEP and JPEG models		
6.3	<b>Practical:</b> ➤ Creating Sectional views and converting the model files		06
<b>VII</b>	<b>Introduction to Surface Modeling, Assembly modeling and Drafting</b>	<b>10 Hours</b>	
7.1	Extruded and Revolve Features of Surface Modeling	03	
7.2	Creation of Assembly models – Mate - Align - Fix - etc.		
7.3	<b>Practical:</b> ➤ Surface Modeling and Assembling the Solid component for the given part models		07
<b>Total Theory and Practical hours</b>		<b>20</b>	<b>40</b>
<b>Total hours</b>		<b>60</b>	

#### HARDWARE REQUIREMENTS

S. No.	LIST OF TOOLS /EQUIPMENTS
1	High End Workstation (with Intel Processor i5 or i7) with 1 TB HDD / 16 GB DDR4 RAM / 2GB PCI Graphics Card / KBD / Mouse
2	22" Wide LCD / LED Monitor
3	Microsoft Operating system (Windows 8 / 10 - 64 Bit Support)

#### SOFTWARE REQUIREMENT

S. No.	LIST OF SOFTWARE
1	CATIA V5-6 or Higher (Educational or Commercial License)

#### REFERENCE BOOKS

S. No.	Name of the Book	Author	Publisher & Year
1	CATIA V5-6 R2017 for Designers	Sham Tickoo / TIET	BPB Publications, 2018
2	CATIA V5-6 Release 2017 – User Guides	Dassaults Systems	Dassaults Systems, France

## ASSESSMENT AND CERTIFICATION

S. NO.	Criteria for Assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory and Practical.
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions)
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training, Certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

## END EXAMINATION

### ALLOCATION OF MARKS

S.NO	Description	Max.Marks
1.	Theory Examination	20
2.	Practical Examination	
	a) Aim and Procedure	20
	b) Demonstration / Execution	25
	c) Result & Viva Voce	15
	d) Record	20
<b>Total Marks</b>		<b>100</b>

## THEORY MODEL QUESTION PAPER

ME/2020/032 - PARAMETRIC DESIGN USING CATIA

(Maximum Marks: 20)

Answer any **Twenty** questions:

**20x1=20 Marks**

1. Use the... ..... Command to trim off the inside portion of the circle.
2. The type of 3D model that has edges, but no surfaces or volume, is the\_\_\_\_\_.
3. A 3D model that has edges and surfaces but no interior or mass is a\_\_\_\_\_.
4. Apply a dimensional..... to the distance between the flats of the hexagon
5. Abbreviation of CATIA is \_\_\_\_\_
6. Deactivate the..... Constraint icon (it should be blue).
7. Reactivate the.....Constraints icon (it should be orange).
8. Apply ..... to the rectangle and change their values.
9. Draw the triangle using the..... Command.
10. Mirror the entire solid, select the..... icon in the Transformation Features toolbar.
- 11.will automatically be applied such as tangencies, coincidences, parallelisms, etc.
- 12.will automatically be applied when corners (fillets) or chamfers are created, or when quantities are entered in the value field.
13. Reactivate the Snap to Point icon and draw the.....
14. The default color of an HTML document is .....
15. How to set default color on surface?
16. What is CATIA software used for.....
17. Drawing in CATIA is a bit .....as it is an advanced design software with engineering capabilities.
18. What is the basic necessity for revolve option?
19. What is the default unit for Catia V5?
20. Mention file types used in Catia V5.
21. Construction elements assist in sketching the required profile in ..... ?
22. What is the file extension of a part file?
23. Which is the Neutral file extensions can be used for the part file?
24. Using ..... option will create a corner Chamfer for Bolt.
25. Is it possible to give a variable distance for a feature in rectangular pattern?