



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

CURRICULUM

Course Name	SOLID WORKS
Course Code	ME/2020/012
Course Duration	60 Hours
Minimum Eligibility Criteria	ITI/10th/+2/Diploma/Graduates
Pre-requisites (if any)	Basic knowledge in Engineering Drawing /Graphics
Course Objectives	Training module has been designed for the participants to <ul style="list-style-type: none"> • Create and edit 2D sketches • Model 3D Parts using feature based modelling and wizards • Assemble 3D machine systems and checking for inferences • Generate Part and Assembly drawings and different views • Understand and analyse simple finite element models
Course Outcomes	At the end of training, the participants will be able to <ul style="list-style-type: none"> • Create 2D sketches and modify them • Build and modify 3D model of machine components • Construct Assembly models • Generate Part and Assembly drawings • Generate various sectional views and BOM • Simulate simple finite element analysis of mechanical components
Expected Job Roles	CAD Designer

TEACHING AND SCHEME OF EXAMINATION

Course Code	Course Name	Hours		Assessment Marks		Duration of the Examination
				Min	Max	
ME/2020/012	SOLID WORKS	Theory	24	10	20	3 Hours
		Practical	36	40	80	
		Total	60	50	100	

ME/2020/012 – SOLID WORKS
DETAILED SYLLABUS

Unit No.	Modules	No. of Hours	
		Theory	Practical
I	Sketching	10 Hours	
1.1	Sketcher Workbench – Understanding the Software Environment	04	
1.2	Working Planes		
1.3	Sketch - Entities And Geometry		
1.4	Rules – sketch relations - symmetry		
1.5	Dimensions		
1.6	Editing a sketch		
1.7	Practical: <ul style="list-style-type: none"> ➤ Creation sketches for the components listed in the Part Modeling and Assembly Modeling 		06
II	Part Modeling	20 Hours	
2.1	Feature - Working Planes – Extrusion	08	
2.2	Revolve – Boss – Cut		
2.3	Hole Wizard - Filletting and Rounds – Chamfers		
2.4	Copy – Move – Rotate – Mirror – Scale – Shells – Ribs – Draft – Patterns		
2.5	Part Editing – Rebuilding Models – Reorder – Reroute		
2.6	Practical: <ul style="list-style-type: none"> ➤ Create the model of Clutch Lever ➤ Create the model of Clamp Stop ➤ Create the model of Vice Jaw ➤ Create the model of Soap Case ➤ Create the model of Angle Flange on tube cutting, Swaging, flaring and bending 		12

III	Assembly Modeling	10 Hours	
3.1	Bottom-Up Approach and Top-Down Approach- Creating Assembly – Positioning of First Component - Degrees of Freedom	04	
3.2	Adding components – mating components – using part configurations		
3.3	Subassemblies – smart mates		
3.4	Checking the assemblies – exploded assemblies		
3.5	Practical: <ul style="list-style-type: none"> ➤ Create an assembly of Blower ➤ Create an assembly of Press Tool ➤ Create an assembly of Radial Engine with five cylinders 		06
IV	Automated Drafting	10 Hours	
4.1	Generating Part Drawings – Assembly Drawings - Views –Types	04	
4.2	Creating Sectional Views – Details Views – Editing and Modifying the Drawing Views, Representation of Cutting Plane		
4.3	Dimensioning and Drafting Abbreviations- Surface Finish Symbols – Tolerances- Title Block		
4.4	Bill of Materials –Creating Templates		
4.5	Practical: <ul style="list-style-type: none"> ➤ Drawing practice for the components created in the Part Modeling ➤ Drawing practice for the components created in the Assembly Modeling 		06
V	Introduction to FEA & Animation	10 Hours	
5.1	Building Finite Element Model - Loads - Boundary Conditions - Degrees of Freedom	04	
5.2	Simulation - Analysis of Stress and Thermal Models		
5.3	Simple mechanism design using assemblies		
5.5	Practical: <ul style="list-style-type: none"> Simulate a simple cantilever beam with point load Simulate a simply supported beam with point load Simulate a simple plate subjected to thermal load 		06
Total Theory and Practical hours		24	36
Total hours		60	

HARDWARE REQUIREMENT

S. NO.	LIST OF TOOLS /EQUIPMENTS
1.	Desktop Computer: Intel Core i7-9700,(8 Core, 12MB Cache, 3.0Ghz, 4.7 Ghz Turbo w/UHD Graphics 630) DirectX Graphics card 16GB, 2X8G, DDR4 2666MHz Non-ECC Memory M.2 256GB PCIe NVMe Class 40 SSD 3 Button Optical mouse with scroll option 101MM Keyboard ergonomically deigned
2.	Laser Printer
3.	UPS with power backup for 30 minutes

SOFTWARE REQUIREMENT

S. NO.	LIST OF SOFTWARE
1.	Operating Systems – Windows 10 Pro 64 bit or above
2.	Solid works 2016 or above

REFERENCE BOOKS

S. NO.	NAME OF THE BOOK	AUTHOR	PUBLISHER
01	Mastering Solid works 1st Edition	Matt Lombard	John Wiley & Sons, Indianapolis, Indiana, 2018
02	Beginners guide to SOLIDWORKS 2018 Level 1	Alejandro Reyes	SDC Publications, USA, 2017
03	Learn SOLIDWORKS 2020: A hands-on guide to becoming an accomplished SOLIDWORKS Associate and Professional	Tayseer Almattar	Packt Publishing Ltd., Birmingham, UK, 2019
04	Solid works 2019: A Power Guide for Beginners and Intermediate User	John Willis, and Sandeep Dogra	CAD Artifex, USA, Sixth Edition, 2019
05	Solid works 2018 Basic Tools Perfect	Paul Tran	SDC Publications, USA, 2017
06	Solid works for Beginners: Getting Started with Solid works Learn by Doing	Arsath Natheem	Independently Published, 2018
07	Solid works 2020 Tutorial Perfect	David C. Planchard	SDC Publications, USA, 2019
08	Official Certified Solid works Professional Certification Guide Solid works 2018, 2019, & 2020	David C. Planchard	SDC Publications, USA, 2019

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
Total Marks		100

THEORY MODEL QUESTION PAPER

ME/2020/012 - SOLID WORKS

(Maximum Marks: 20)

(N.B: Answer any **Twenty** questions)

20x1= 20 Marks

1. Are you able to use icons greyed out in Solid Works?
2. Write the use of Smart dimensions.
3. Write the steps to draw a circle.
4. Write the steps to draw a rectangle.
5. Write the steps to extrude objects.
6. How do you use revolve command in solid works?
7. How do you use cut extrude command in solid works?
8. How do you use fillet command in solid works?
9. How do you use shell command in solid works?
10. Write the steps to use hole command in solid works.
11. Is it possible make through holes in object using solid works?
12. Write the steps to copy of objects in solid works.
13. How do you use mirror command in solid works?
14. Are you able to scale objects in solid works as 0.5 scale factor?
15. Are you able to scale objects in solid works as 1.5 scale factor?
16. Is non-uniform scale option available in solid works?
17. What do you mean by rip?
18. Draw an example of circular patterns used in solid works.
19. Draw an example of linear patterns used in solid works.
20. What is meant by top down approaches?
21. What is meant by top down approaches?
22. How do you use quick mate options in assembly?
23. Define sectional views.
24. Define model views.
25. Define projected views.