



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

Course Name	ADVANCED PLASTICS INJECTION MOULD DESIGNING USING 3D SOFTWARE
Course Code	ME/2020/029
Course Duration	70 Hours
Minimum Eligibility Criteria	ITI/10th/+2/Diploma/Graduates
Pre-requisites (if any)	Basic knowledge in 3D software
Course Objectives	Training module has been designed for the participants to <ul style="list-style-type: none"> • Understand the geometrical and dimensional tolerances. • Understand injection mould elements and feed system. • Understand the various types of injections moulds. • Know the 3D modeling software commands • Obtain knowledge in Design of Plastics Injection Mould.
Course Outcomes	At the end of training, the participants will be able to <ul style="list-style-type: none"> • Create the design of standard mould base. • Create the design of multi-impression two plate injection mould. • Create design of injection mould for internal undercut components.
Expected Job Roles	Plastics Mould Designer

TEACHING AND SCHEME OF EXAMINATION						
Course Code	Course Name	Hours		Assessment Marks		Duration of the Examination
				Min	Max	
ME/2020/029	ADVANCED PLASTICS INJECTION MOULD DESIGNING USING 3D SOFTWARE	Theory	20	10	20	3 hours
		Practical	50	40	80	
		Total	70	50	100	

ME/2020/029 - ADVANCED PLASTICS INJECTION MOULD DESIGNING USING 3D SOFTWARE

DETAILED SYLLABUS

Unit No.	Modules	No. of Hours	
		Theory	Practical
I	Introduction to Geometrical Tolerances and Practice on 3D Modeling using UG NX /CREO	15 Hours	
1.1	Introduction- Geometrical and Dimensional Tolerances- Tolerance Frame -Tolerance - Characteristic Symbol-Datum-Symbols used on Drawings and Software - Part modeling - Datum Plane – Constraint – Sketch – Dimensioning – Extrude – Revolve - Sweep – Blend – Protrusion – Extrusion – Rib – Shell – Hole – Round – Chamfer - Copy – Mirror – Assembly – Align – Orient.	5	
1.2	Practical ➤ Practice to make 3D drawing		10
II	Plastics Injection Mould Design	10 Hours	
2.1	Basic terminology and mould construction - Cavity and core - Integer cavity - Integer core – Insert cavity – Insert core – Bolster – Types of bolsters. Guide pillar and Guide bush – Function of Guide pillars	4	
2.2	Practical ➤ Integer Core and Integer Cavity with Retainer Plate Assembly ➤ Guide Pillar and Guide bush Assembly ➤ Bolster Assembly		6
III	Plastics Injection Mould Design	10 Hours	
3.1	Sprue bush – Spherical seating Sprue bush – Flat seating Sprue bush - Register ring – Sprue bush mounted register ring – Front plate mounted register ring - Mould plate fastening. Design of Feed system - Sprue - Runner - Runner cross section shape - Runner size - Runner Layout - Balancing of runners - Design of gate system - Gates – Positioning of gates – Balancing of gates - Types of gate - Sprue gate - Edge gate - Overlap gate - Fan gate - Tab gate - Diaphragm gate - Ring gate - Film gate - Pin point gate - Submarine gate - Winkle gate.	3	
3.2	Practical ➤ Sprue bush and register ring assembly ➤ Sprue bush and register ring assembly ➤ Sprue bush and register ring assembly		7
IV	Plastics Injection Mould Design	10 Hours	
4.1	Ejection mechanism – Ejector grid - Types of Ejector grid - Ejector plate assembly - Actuation of Ejector plate assembly return system - Types of Ejection.	3	
4.2	Practical ➤ Ejector Plate Assembly		7

V	Plastics Injection Mould Design	25 Hours	
5.1	Types of injection moulds -General arrangement of Two plate and Three plate moulds - Single-impression moulds – Multi- Impression moulds – Internal undercut components.	5	
5.2	Practical <ul style="list-style-type: none"> ➤ Design of standard Mould Base. ➤ Design of Multi impression two plate Injection Mould. ➤ Design of Injection Mould for internal undercut components 		20
Total Theory and Practical Hours		20	50
Total Hours		70	

HARDWARE REQUIREMENT

S.NO	LIST OF TOOLS /EQUIPMENTS
1	Personal Computer
2	Laser Printer

SOFTWARE REQUIREMENT

S.NO	LIST OF SOFTWARE
1.	Any 3D software (Auto CAD / PRO-E / Solid works)

REFERENCE BOOKS

S.NO	NAME OF THE BOOK	AUTHOR	PUBLISHER
01	Injection Mould Design	R.G.W.Pye	Longman Scientific & Technical (Wiley), New York.
02	Plastic mould engineering handbook	J. Harry Dubois &Waying I. Prible	Van Nostrand Reinhold Co., New York.
03	Injection mould design fundamentals	Glanvil Denton	Industrial Press, California.
04	Product Design	Ronald D. Beck	Van Nostrand-Reinhold Co. New York.
05	Designing with creo parametric 3.0	Michael J. Rider Ph.D.,	SDC Publications, Kansas, USA.

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/2020/029 - ADVANCED PLASTICS INJECTION MOULD
DESIGNING USING 3D SOFTWARE

(Maximum Marks: 20)

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

20x1= 20 Marks

1. What are the types of Plastics?
2. Name any two Thermoplastic Materials.
3. Phenol Formaldehyde is Thermo set Material? Give the reason.
4. Define Bulk Factor.
5. What is Additive?
6. Expand RIM. Write short notes on RIM.
7. What are the functions of Injection moulding machine?
8. Define Cycle Time.
9. What is Clamping Tonnage?
10. What is Mould? List its functions.
11. What Feed System?
12. What are the functions of Runner?
13. Write short notes on Balancing of runner.
14. Define Shrinkage.
15. What is Parting Line? List the types of Parting Line.
16. Write Short notes on Cavity Layout.
17. What are the different types of cam actuation in Split Mould?
18. Define Undercut.
19. What is under feed mould?
20. Discuss about Hot runner Mould.
21. What is the use of Ribs and Boss in the plastic product?
22. What is draft angle? Why it is provided in plastic product?
23. What are the methods of decoration of plastic products?
24. Draw any two codes of recycling of plastic with illustration.
25. List the advantages of preventive maintenance.