



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Plastics Engineering

Course / Subject Code : DI03023031

Course Name : Technology for Injection Molding

w. e. f. Academic Year:	2024-25
Semester:	3 rd
Category of the Course:	PCC

Prerequisite:	None
Rationale:	As a part of major processes through which plastic raw materials are converted into products, Injection molding process is very significant. If we look at the conversion of plastic raw materials to product, Injection molding process has a major share of around 35%. As Extrusion and Injection molding are two major plastic processing techniques, A Diploma plastic engineer must be able to understand all aspects of the injection molding process. Study of an Injection molding process need to be categories in to machine, process, troubleshooting & applications. One can find several products around daily activities ranging from tooth brush to automobile components.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Operate an Injection molding machine	A
02	Troubleshoot injection molding process.	R
03	Perform post-injection molding operations.	U
04	Use auxiliary equipments for injection molding machine.	U
05	Select proper materials for injection molding process	R

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA(M)	PA(I)	ESE (V)	
3	0	2	4	70	30	20	30	150



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Plastics Engineering

Course / Subject Code : DI03023031

Course Name : Technology for Injection Molding

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	<ul style="list-style-type: none">• Introduction<ul style="list-style-type: none">➤ Construction, working and neat sketch of various types of injection molding machine➤ Ram type injection molding machine➤ Reciprocating screw type injection molding machine➤ Construction, working and neat sketch of various parts of injection molding machine• Screw and its Terminology<ul style="list-style-type: none">▪ General purpose screw▪ PVC screw▪ Nylon screw• Barrel<ul style="list-style-type: none">➤ Nitriding barrel➤ Bimetallic barrel➤ Heating & cooling of barrel• Nozzle<ul style="list-style-type: none">➤ Standard nozzle➤ Thermal seal nozzle➤ Mechanical Seal nozzle➤ Spring loaded nozzle• Hopper<ul style="list-style-type: none">➤ Drive system (Hydraulic and Electrical)➤ Non return type ring valve	21	47



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Plastics Engineering

Course / Subject Code : DI03023031

Course Name : Technology for Injection Molding

	<ul style="list-style-type: none">● Clamping mechanism➤ Types of clamping mechanism➤ Toggle clamping (Single and Double toggle)➤ Hydraulic clamping➤ Compare hydraulic clamping & Toggle clamping		
2.	<ul style="list-style-type: none">● Injection moulding process➤ Material selection criteria➤ Process steps➤ Injection moulding cycle diagram➤ Process variables➤ Trouble shooting➤ Advantages & disadvantages➤ Injection moulding applications➤ Post moulding operations	15	33
3.	<ul style="list-style-type: none">● Basics of auxiliary equipment➤ Hopper loader➤ Hopper drier➤ Chilling plant➤ Cooling tower➤ Heat exchangers➤ Scrap grinders➤ Magnetic separators	09	20
	Total	45	100



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Plastics Engineering

Course / Subject Code : DI03023031

Course Name : Technology for Injection Molding

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks(in %)					
R Level	U Level	A Level	N Level	E Level	C Level
30	30	10	0	0	0

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Injection Molding Advanced Troubleshooting Guide: The 4m Approach	Randy Kerkstra Steven Brammer	Publication:Hanser ISBN :978-1-56990-834-1 Year:2021
2	Injection Molding:Technology and Fundamentals	Musa R. Kamal , Avram I. Isayev	Publication:Hanser ISBN: 978-3446416857 Year:2009
3	Injection molding machine	A.Whelan	Publication: Elsevier applied science publishers ISBN: 0-85334-245-8 Year: 1984
4	Injection molding theory and practice	Irvin I. Rubin	Publication: Wiley ISBN: 978-81-265-4576-6 Year:2014
5	Injection molding handbook	Dominick V.Rosato, Donald V. Rosato, Marlene G. Rosato	Publication: Springer Science+Business Media, LLC ISBN 978-1-4613-7077-2 Year:2000
6	Plastics Materials and Processes	Seymour S.Schwartz, Sidney H. Goodman	Publication: Van ISBN:9780442227777 Year:1982



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Plastics Engineering

Course / Subject Code : DI03023031

Course Name : Technology for Injection Molding

(b) Open source software and website:

1. www.technologystudent.com
2. www.paulsontraining.com
3. www.traininteractive.com/knowledge/previews/injection
4. www.people.bath.ac.uk/en3hl/inject

Suggested Course Practical List:

No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Study of an injection moulding machine.	1	02
2	Demonstrate hydraulic and toggle clamping mechanism.		02
3	Operate an injection moulding machine		04
4	Determine cycle time of injection moulding machine for given product.		04
5	Measure the effect of process variables (temperature/pressure) on quality of end product in injection moulding process	2	02
6	Measure the effect of process variables (suck-back/Reduced Injection Pressure) on quality of end product in injection moulding process.		02
7	Identify the defects in an injection molded products & suggest remedies.		04
8	Change the old mold with new product mold.		04
9	Demonstrate various auxiliary equipments.	3	02
10	Operate scrap grinder machine for recycling of plastic waste		04
TOTAL			30



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Plastics Engineering

Course / Subject Code : DI03023031

Course Name : Technology for Injection Molding

List of Laboratory/Learning Resources Required:

S. No.	Equipment Name with Broad Specifications
1	Injection molding machine
2	Molds
3	Crane
4	Cooling tower
5	Hopper loader
6	Scrap grinder
7	Weighing scale
8	Hopper dryer

Suggested Project List:

1. Collect products made by injection molding process.
2. Chart preparation on troubleshooting in an injection molding.
3. Activities during Mold change: Detailed statement indicating activities during changing of molds.
4. Auxiliary equipments: Show utilities of all these auxiliary equipments.
5. Injection molding machine construction: Neat sketch along with names of all parts.

Suggested Activities for Students:

1. Students will collect samples of various injection molded products.
2. Students will visit nearby injection molding process industry.
3. Students will showcase different types of defective products.

* * * * *