



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Plastics Engineering

Course Code : DI03023021

Course Name : Plastic Extrusion Technology

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

Prerequisite:	Plastic Extrusion Technology
Rationale:	Plastics extrusion technology is the most widely used processing technique for plastic materials. A polytechnic diploma engineer has to use this technology in the extrusion machines and production process of various extruded products. The knowledge of extrusion technology will also help to understand and develop advance extrusion processes. Hence the course has been designed to develop this competency and its associated cognitive, practical and affective domain learning outcomes.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Operate extruder machine.	A
02	Select appropriate material for extrusion process.	U
03	Perform post extrusion operations in extrusion process.	U
04	Troubleshoot problems in extrusion process.	U
05	Use auxiliary equipment for extruders.	A

*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



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Course Content:

Unit No.	Content	No. of Hours	% of Weightage
UNIT – I	Extruder Machine <ul style="list-style-type: none">- Machine Specification and glossary of terms.- Classification of Extruder Machines.- Types, Constructional Features and Function of<ul style="list-style-type: none">• Screw• Barrel• Thrust bearing• Drive system• Hopper• Screen• Breaker plate- Heating system of screw and barrel- Cooling system of screw and barrel	14	35% (25 Marks)
UNIT– II	Basic Extrusion Process <ul style="list-style-type: none">- Working Principle- Process ability of various polymers- Process variables- Role of Rheology in polymer processing.- Material characteristics and selection criteria- Types of Extrusion process: Dry and Wet- Melting process	7	15% (10 Marks)
UNIT– III	Post Extrusion Process <ul style="list-style-type: none">- Introduction- Equation of output- Start-up and Shut-down of extruder- Post extrusion techniques- Trouble shooting of Manufacturing Process- Applications – Products of Extrusions	6	15% (10 Marks)
UNIT – IV	Extrusion Plants <ul style="list-style-type: none">- Individual extrusion systems, Dies, Sizing and Downstream equipments, Faults, Causes and Remedies along with complete Manufacturing Processes and Line Diagram of following:<ul style="list-style-type: none">• Film• Pipe• Sheet• Profile	13	25% (18 Marks)



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	<ul style="list-style-type: none">• Wire/cable• Monofilaments• Coating-lamination• Palletizing• Box strapping		
UNIT – V	Auxiliary Equipment <ul style="list-style-type: none">- Introduction- Automatic feeder/ Vacuum Hopper Loader- Automatic Screen Changer- Rotating Die- Oscillating haul-off- Crammer Feeder	05	10% (07 Marks)
Total		45	100%

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
35%	35%	30%	-	-	-

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:

S.No.	Title of Book	Author	Publication with place, year and ISBN
1	Extrusion of plastics	E.G. Fisher	The Plastics Institute
2	Extrusion Technology	Allan L. Griff	Krieger Pub Co ISBN 088275386X kindle
3	Plastics Extrusion technology handbook	S.Levy	Industrial Press Inc., 1989
4	Handbook of Plastic Processing Technology	D.V.Rosato	Springer
5	Plastics Extrusion Technology	Fried helm Hence	Hanser Publishers
6	Polymer Extrusion	Chris Rauwendaal	HanserVerlag



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7	Plastics Engineering Hand book	J. Fradeos	Van Nostrand Reinhold Company
8	Plastics Engineering Hand book	M Berins	Springer
9	Plastic materials and processes	S.S.Schwartz & S.H.Goodman	Van Nostrand Reinhold Company
10	Plastics Extrusion Technology	Allan L. Griff	New York, Reinhold Pub. Corp

(b) Open source software and website:

- a) <https://ndl.iitkgp.ac.in>
- b) <http://www.bpf.co.uk/>
- c) <http://www.youtube.com>
- d) <http://www.technologystudent.com/>
- e) <http://www.notesandsketches.co.uk/Index.html>
- f) <http://www.paulsontraining.com>
- g) <http://www.traininteractive.com>
- h) http://en.wikipedia.org/wiki/Plastics_extrusion

Suggested Course Practical List:

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Study of an extruder machine and prepare a report on it.	1	02
2	Prepare specifications of extruder machines available in the laboratory.	1	02
3	Operate pipe extrusion plant with changing various process parameters.	4	04
4	Identify processing problems on an extrusion pipe plant and suggest solutions.	4	02
5	Operate blown film extrusion plant with changing various process parameters.	4	04
6	Identify processing problems on blown film plant and suggest their solutions.	4	02
7	Operate pelletizing plant with changing various process parameters.	4	04



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8	Identify processing problems on pelletizing plant and suggest solutions.	4	02
9	Set process parameters on sheet plant and operate it.	4	04
10	Identify processing problems on sheet plant and suggest solutions for it.	4	02
11	Demonstrate various auxiliary equipment used in Extrusion plant.	5	02
Total			30

List of Laboratory/Learning Resources Required:

Sr. No.	Equipment Name with Broad Specifications
1	Blown Film Plant
2	Pipe Plant
3	Pelletizing Plant
4	Sheet Plant
5	Vacuum Feed Hopper
6	Crammer Feeder

Suggested Project List:

1. Prepare a chart for different types of screw.
2. Prepare a chart for Single Screw Extruder Machine.
3. Prepared a chart for Material selection criteria for Extrusion process.
4. Prepare chart for line diagram of various Extrusion plant.
5. Prepared a chart for troubleshooting of various Extrusion Plant.
6. Collect products made by Extrusion Process.

Suggested Activities for Students:

1. Assignments
2. Technical Quiz/MCQ Test
3. Presentation on some course topic
4. I-net based assignments
5. Students are encouraged to register themselves in various MOOCS such as: Swayam, edx, Coursera, Udemy etc to further enhance their learning

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