



# GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3172317

Semester – VII

Subject Name: Advanced Blow molding and Extrusion Techniques

Type of course: Professional Elective Course

Prerequisite:

Rationale: At the end of this course the student will be able to understand advanced blow and extrusion molding processes and their application areas.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
	<b>Advanced Blow Molding Techniques</b>	
1	<b>Stretch Blow molding:</b> Introduction, Definition ,Materials, and Machines-Cold Tube Process, Two stage process, and Single stage process-Advantages and disadvantages, Orientation, Preform Designing, Extrusion stretch blow molding , Injection Orientation Blow Molding	6
2	<b>Co-Extrusion Blow Moulding:</b> Definition, purpose, Advantages, Co-Extruded Structure, Materials, Arrangement of Extruders for Co-Extrusion, Commercial Multi-Layered Structures, Product design for Co-Extrusion Systems, Co-Extrusion Equipments like Extruders, weight feeder, Melt pumps, Melt pipes, Process, Start-up and shut down procedure.	8
3	<b>Other Blow Molding Processes:</b> Neck ring process, Drape process, Dip / displacement processes, Blow molding of irregular shaped parts	4
	<b>Advanced Extrusion Techniques</b>	
4	<b>Twin screw extruder</b> -Types of Twin Screw- Co Rotating & Counter Rotating, Intermeshing and Non-intermeshing, -Compare Twin Screw and Single screw extruder	5



# GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3172317

	-Vented screw	
5	<b>Co-extrusion Techniques</b> -Introduction - Materials used in coextrusion -Dies for coextrusion -Advantages of coextruded products	<b>5</b>
6	<b>Reactive Extrusion</b> Reactive Extrusion: Introduction, how the extruder behaves like a chemical reactor, Twin screw extruder as reactive extruder, design, why corotating extruders preferred, dispersive and distributive mixing, screw design concepts, types of low, devolatilization, grafting of maleic anhydride on polyolefins, partial glycolysis of PET conversion of polymer back to monomer.	<b>04</b>
7	<b>Specialized Processes:</b> Extruder details, dies, processing conditions, process description, raw materials and applications of: <ul style="list-style-type: none"><li>• Nylon braided pipes,</li><li>• Hose pipe ,</li><li>• Reinforced pipes,</li><li>• Fishing net,</li><li>• Heat shrink film,</li><li>• Cling film,</li><li>• Corrugated sheets and pipes</li><li>• Air Bubble Films :</li><li>• Retort Films,</li><li>• Lacquered Films:</li><li>• Cast Polypropylene (CPP) films</li></ul>	<b>10</b>

**Suggested Specification table with Marks (Theory): (For BE only)**

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
<b>20</b>	<b>25</b>	<b>10</b>	<b>5</b>	<b>5</b>	<b>5</b>

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**

**Subject Code: 3172317**

## Reference Books:

1. Plastics Blow moulding hand book by Norman Lee
2. Blow moulding of plastics by E.G.Fisher
3. Extrusion of Plastics by Fisher
4. Blow moulding hand book by Rosato & Rosato
5. Plastics processing data hand book by Rosato & Rosato
6. Extrusion: The definitive processing guide and Handbook by Harold F Giles
7. Reactive Extrusion: Principles and Applications, Editors: Günter Beyer, Christian Hopmann , Wiley Publishers.
8. Reactive Extrusion Systems by Leon P.B.M. Janssen

## Course Outcomes:

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

Sr. No.	CO statement	Marks % weight age
CO-1	Explain the advanced blow molding techniques and its applications	20
CO-2	Compare different advanced blow molding techniques and its working	20
CO-3	Explain the advanced extrusion techniques and its applications	20
CO-4	Compare different advanced extrusion techniques and its working	15
CO-5	Describe the working of specialized extrusion techniques and its applications	25

**List of Experiments: - As per the syllabus topics**

**Major Equipment:**

**List of Open Source Software/learning website:**

- i. <https://nptel.ac.in/>
- ii [www.pslc.ws](http://www.pslc.ws)