GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3152307
Semester – V
Subject Name: Plastics Extrusion Technology

Type of course: Professional Core Course

Prerequisite: -

Rationale: The student will be able to understand the constructional features of single and twin screw extruder, various types of extruder dies and lines. After going in the industry, the student will be able to operate an Extruder and troubleshoot problems related to extrusion.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	4	5	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	**Introduction:** Extrusion, Classification of extruder machines, Principle of working of Single and Twin Screw, Basic Terminologies of extruder, Drag flow, Pressure flow, Leak flow.	**04**
2	**Constructional features of screw Extruder:** Extruder Screws Barrel and feed throat Feed Hopper Grooved Barrel Technology Heating & Cooling systems, Thrust bearing assembly Die assembly: Breaker plate, screen and screen changers Extruder drives Devolatilization in screw extruder Material Selection Criteria Melting Mechanism	**10**
3	**Twin screw extruder:** Twin vs. single screw extruder Intermeshing (Co-rotating and counter-rotating) and non intermeshing twin screw extruders	**05**
4	**Screw design for extruder :** Standard extruder screw and modification of the standard extruder screw, Vented extruder screw designs	**05**

	Multi-flighted extruder screw Mixing screws	
5	**Extrudion lines:** Pipe and tube Wire coating and Cable coating Sheet and film (Tubular and Flat) Monofilaments Profile extrusion Palletizing Coating Co extrusion	**11**
6	**Dies for extruder** Typical extrusion dies-Straight through, cross head dies and offset dies. Wire covering cross head die Dies for tubular film, Flat film dies Sheet dies Pipe and Tube dies Dies for solid sections Coextrusion dies	**05**
7	**Trouble shooting extruders:** Problems, its causes and remedies	**02**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	**25**	**15**	**05**	**05**	**05**

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.

Reference Books:

1. Polymer Extrusion by Rauwendaal
2. Extrusion of Plastics by Fisher
3. Twin Screw Extrusion by White
4. Plastics Extrusion technology by Allan Griff
5. Plastics Extrusion Technology by Hensen

Course Outcomes:

After learning the course the students should be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Understand the basic extrusion process and its applications.	10
CO-2	Explain the constructional feature of extruder.	25
CO-3	Compare single and twin screw extruder.	15
CO-4	Draw and explain various extruder dies and extruder lines.	30
CO-5	Troubleshoot the extrusion defects.	20

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

Major Equipment:

List of Open Source Software/learning website:

1. **https://pslc.ws/**
2. **https://nptel.ac.in**