



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Plastic Engineering

Subject Code: ME02084021

Subject Name: Plastic Processing Techniques-2

| | |
|-------------------------|---------|
| w.e.f. Academic Year: | 2024-25 |
| Semester: | 2 |
| Category of the Course: | PCC |

| | |
|----------------------|-----|
| Prerequisite: | Nil |
| Rationale: | Nil |

Course Outcome:

After Completion of the Course Student will able to:

| No | Course Outcomes |
|----|--|
| 01 | Understand the Plastic Processing and constructional feature of processing machines. |
| 02 | Apply the knowledge of processing steps for manufacturing various products |
| 03 | Operate Plastic Processing machinery and set the parameters |
| 04 | Trouble shoot the defects |

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/ CA (M) | PA/CA(I) | ESE (V) | |
| 3 | 0 | 2 | 4 | 70 | 30 | 20 | 30 | 150 |

Course Content:

| Unit No. | Content | No.of Hours | %of Weightage |
|----------|--|-------------|---------------|
| 1. | Extrusion : Definitions like Extrusion, Extrudate, Die Swell, Die, Thrust bearing, Reduction gear box, etc. History of Extrusion process, RAM Extruders and application, Parts of Single and Twin Screw extruders, operational differences and applications, Thrust bearing blocks of Single and Twin Screw Extruders, Differences, Calculations of B-10 Life of thrust bearing, Raw material Selection criteria for | 22 | 45 |



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|--------------|---|-----------|------------|
| | Extrusion process, Heaters in detail along with Mica and Ceramic element differences and applications, Induction heaters, Controls on Extrusion machines, Devolatilization in Extruders in detail, Grooved Barrel technology, Production lines like wires and Cables, Monofilaments, Films, sheets, etc. Thickness control techniques of films. | | |
| 2. | Calendering : Differences with extrusion, types of Calenders, Principle of Calendering, applications, process steps, troubleshooting, limitations of the process. | 5 | 15 |
| 3. | Thermoforming: Definitions, explanation of the process in detail, types of machines..manual semiauto, fully automatic, Raw materials used and in what form, film thickness needed for thermoforming, Characteristics of raw materials, like Tg, etc, required for the process, motors used, mould materials and various types used, industrial applications, etc. | 5 | 15 |
| 4. | Blow Moulding : Introduction to Blow moulding, Types of Blow moulding: Extrusion, Injection, Stretch blow moulding, Machines for extrusion Blow moulding –Single/Double Station, Output, Tonnage, Details and application of Injection blow moulding machines, Versatile applications of Stretch blow mould machines. Industrial and Domestic applications. | 10 | 25 |
| Total | | 45 | 100 |

Suggested Specification Table with Marks (Theory):

| Distribution of Theory Marks | | | | | |
|------------------------------|---------|---------|---------|---------|---------|
| R Level | U Level | A Level | N Level | E Level | C Level |
| 15 | 15 | 20 | 10 | 5 | 5 |

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

References/Suggested Learning Resources:

Books:

1. Plastic Extrusion Technology by Hensen
2. Polymer Extrusion by Rauweendaal
3. Plastics material and Processes by Schwartz and Goodman
4. Blow Moulding Handbook, Hanser
5. Thermoforming by Throne



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(b) Open source software and website:

1) <https://nptel.ac.in/>

2) <https://www.bpf.co.uk/>

Suggested Course Practical List: : As per the above syllabus topics
