

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V PLASTIC TECHNOLOGY

Subject Name: **Plastic Processing and Machinery (Institute Elective - II)**

Subject Code: **152304**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
4	0	2	6	70	30	50

Sr. No.	Course content
1.	Introduction: What is Plastic Processing - Introduction to various processing methods for thermoplastics and thermosets - Consideration for selection of particular method of processing - Flow behaviour of polymer melts. Principle of processing of Plastic.
2.	Compression Moulding: Introduction - Types of processes : Upstroking, downstroking, Materials used and selection criteria, Preheating, bulk factor, Performance, Process steps, Process advantages and disadvantages, Process variables, Moulding machine details, Mould types : Flash, semi positive, positive, charging, post curing, Cooling fixtures, Finishing, Moulding defects : causes and remedies.
3.	Transfer Moulding: Introduction, Transfer moulding process types, Techniques of transfer moulding, Pot and Plunger types, Advantages and disadvantages, Process variables, Moulding materials, Types of moulds, Pot dimensions and its effects, Trouble shooting, Comparison with compression moulding.
4.	Thermoforming: Introduction, Definition, Various process steps, Types of materials, Material selection criteria in detail with properties like melt stability, Plastic memory, etc., Sheet thickness in detail required by the process, Limitations as regards the types of sheets that can be used, etc., Advantage and disadvantage with the injection moulding process, Types of machine, Moulds and its Material in brief, Various process variables, Cold forming process with advantage and disadvantage, Trouble shooting for the process, Rheology, Its importance and applications, Types of thermoforming processes like plug assist, reverse draw forming, bubble type forming, twin sheet thermoforming, etc. Differences between pressure and vacuum forming techniques, Types of vacuum forming techniques in detail along with advantages and limitations of each in detail, Engineering applications of thermoformed articles in detail along with latest developments.

5.	Blow Moulding <ul style="list-style-type: none"> • Introduction, Basic process, Plastic materials for Blow moulding. • Extrusion Blow moulding, Continuous extrusion process, Intermittent extrusion process, Parison programming. • Injection Blow moulding, Basic process of IBM, Stretch / Orienting Blow moulding. • Processing parameters, Troubleshooting of Blow moulding, Advantages & Disadvantages of Blow moulding.
6.	Injection Moulding
7.	Reactive Injection Moulding
8.	Calendering: The Calendering Process. Mathematical Modeling of Calendering. Analysis of Calendering Using FEM.

Reference Books:

1. Thermosetting resins by J. F. Monk.
2. Plastics Processing Data Handbook by Rosato.
3. Thermoforming by Throne.
4. Plastic engineering by Crawford.
5. Injection moulding theory and practice by I. Rubin—Blow Moulding Handbook by Lee.
6. Plastics material and processes by Schwartz and Goodman.
7. Plastics Engg. Handbook by Joel Frados 5. “Heat transmission”: W. H. Mcadams, Mcgraw Hill, 3rd Edition.