



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**  
**Subject Code: 3142311**  
**Semester – IV**  
**Subject Name: Plastics Testing-1**

**Type of course:** Professional Core Course

**Prerequisite:** -

**Rationale:** Understand importance of standards and specification, identify different types of plastic materials and test various analytical, flow and mechanical properties of plastics materials.

**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	4	5	70	30	30	20	150

**Content:**

Sr. No.	Content	Total Hrs
1	<b>INTRODUCTION:</b> Basic concept, Purposes of testing, specification and standards, purpose of specifications, test conditioning, precautions required in plastic testing, quality control, list of applicable standards.	03
2	<b>SPECIMEN PREPARATION TECHNIQUE:</b> Introduction, specimen preparation from thermoplastic- Specimen preparation from rigid & soft plastic sheet, specimen preparation from films, specimen preparation from thermo-set materials.	04
3	<b>IDENTIFICATION ANALYSIS OF PLASTICS MATERIALS:</b> Plastic Identification chart, Identification of plastics materials- (i) thermoplastic (ii) thermosetting plastics. Miscellaneous observations - Visual, touch, copper wire test, Burning test, Solubility- Solvents and non solvents for plastics.	05
4	<b>ANALYTICAL TESTS:</b> Specific gravity, Density-by-Density Gradient Technique, Bulk Density, Water absorption.	05
5	<b>FLOW PROPERTIES</b> Introduction to Flow Properties, Melt Flow Index, Spiral Flow, Cup Flow.	05
6	<b>MECHANICAL PROPERTIES:</b> Introduction to stress-strain curves, Tensile properties, Flexural properties, Impact properties, Compressive properties, Burst Strength, Shear Strength, Hardness, Tear Strength, Abrasion, Creep and Stress relaxation	20



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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. Hand Book of Plastic Testing Technology- Vishu Shah
2. Identification and testing of plastics- A.S Athalye
3. Simple methods for identification of plastics- Dietrich Braun (Hanser publications)
4. Testing and evaluation of Plastics- A.B. Mathur & I.S Bhardwaj

### Course Outcomes:

After learning the course the students should be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Understand importance of testing, standards and specification.	05
CO-2	Prepare test specimens for different test methods.	10
CO-3	Identify Plastic material by performing identification tests.	15
CO-4	Calculate Specific gravity, density and water absorption of Plastic materials.	15
CO-5	Determine Melt flow index of various plastics.	15
CO-6	Test various mechanical properties of plastic samples.	40

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

### Major Equipment:

1. Specific gravity equipment,
2. Izod/Charpy Impact Tester,
3. Universal Testing Machine
4. Melt flow Index Tester

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

1. <https://pslc.ws/>
2. <https://nptel.ac.in>