



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**  
**Subject Code: 3152308**  
**Semester – V**  
**Subject Name: Plastics Testing-II**

**Type of course:** Professional Core Course

**Prerequisite:** -

**Rationale:** Student should be able to test the properties of plastic materials. This course helps in understanding the various test procedures to know the plastic material properties. At the end of the course the students will be able to operate various testing machines.

**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
<b>1</b>	<b>Thermal properties:</b> Introduction Heat Deflection Temperature (HDT), Vicat softening point (VSP) Torsion pendulum test Thermal conductivity, Thermal expansion test-coefficient of linear thermal expansion, Brittleness temperature	<b>07</b>
<b>2</b>	<b>Electrical properties:</b> Introduction Dielectric strength Dielectric constant-dissipation factor- Surface and volume resistivity Arc Resistance	<b>06</b>
<b>3</b>	<b>Optical and barrier properties:</b> Introduction Refractive index Color and Specular Gloss Luminous transmittance and Haze Gas barrier and Moisture barrier properties	<b>05</b>
<b>4</b>	<b>Weathering properties:</b> Introduction Accelerated weathering tests Outdoor weathering of plastics	<b>05</b>



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	Resistance of Plastic materials to Fungi and bacteria	
<b>5</b>	<b>Flammability tests:</b> Introduction Flammability test (non rigid plastics, Self supporting plastics in horizontal position and Solid plastics in vertical position) Oxygen index test	<b>05</b>
<b>6</b>	<b>Chemical properties:</b> Introduction Immersion Test Solvent stress cracking resistance and Environmental stress cracking resistance (ESCR)	<b>03</b>
<b>7</b>	<b>Material characterization tests:</b> Viscosity tests Gel Permeation Chromatography (GPC) Thermal analysis tech .like DSC, TGA, TMA ,DMA	<b>08</b>
<b>8</b>	<b>Non Destructive testing</b> Ultrasonic testing –Pulse echo and transmission technique, Application of Ultrasonic NDT in plastics	<b>03</b>

**Suggested Specification table with Marks (Theory):**

<b>Distribution of Theory Marks</b>					
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.

**Reference Books:**

1. Hand Book of Plastic Testing Technology- Vishu Shah
2. Identification and testing of plastics- A.S Athalye
3. Polymer Characterization- Laboratory Techniques and Analysis- Nicholas P. Cheremisinoff
4. Testing and evaluation of Plastics- A.B. Mathur & I.S Bhardwaj
5. Plastics Fundamentals, Properties, and Testing- Manas Chanda and Salil K.Roy (CRC Press)



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## Course Outcomes:

After learning the course the students should be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Understand the significance of different types of Plastics testing as per standards and their applications.	10
CO-2	Determine thermal, electrical, chemical and weathering properties of plastic materials.	40
CO-3	Understand the characterization test for plastics.	20
CO-4	Understand the significance of NDT in plastic Industry.	10
CO-5	Operate various plastics testing equipment.	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>
3. <https://www.bpf.co.uk/plastipedia/>