GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: Plastic Engineering
Subject Name: PLASTICS TESTING TECHNOLOGY

SUBJECT CODE: 3712409

Type of course: Program Elective- I

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE(E)	PA (M)	PA (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No	Content	Total Hrs	% Weightage
1	**Concepts of Testing & Identification of Plastics:** Basic concepts of testing - Specification and Standards - National and International Standards - Test specimen preparation - Pre-conditioning and test atmosphere. Identification of plastics by simple tests - Visual examination - Density - Melting point - Solubility test - Flame test - Chemical tests.	7	15%
2	**Mechanical Properties:** Long-term mechanical properties – Creep – stress relation.Short-term Mechanical Properties: Tensile properties - Flexural properties - Compressive properties - Shear properties - Impact properties - Tear resistance - Hardness tests - Abrasion resistance - Friction test. Specific gravity - Density by Density-gradient technique - Bulk density - Particle size by sieve analysis - Moisture analysis.	10	23%
3	**Thermal Properties:** Melt flow index - Heat deflection temperature - Vicat softening temperature - Marten's Heat resistance test - Brittleness temperature - Specific heat - Glass transition temperature - Thermal conductivity - Co-efficient of thermal expansion - Shrinkage - Thermal stability - Flammability. Characterization of plastics by IR, spectroscopy, light	10	23%

	microscopy. Thermal and rheological characterization of plastics.		
4	**Electrical and Optical Properties:** Dielectric strength - Dielectric constant and Dissipation factor - Insulation resistance – BDV- Volume and Surface resistivity - Arc resistance - Antistatic tests. Refractive index - Luminous transmittance - Clarity and Haze - Photo-elastic properties - Colour measurements and Specular Gloss.	**10**	**22%**
5	**Permanence Properties and Product Testing:** Gas and Moisture Vapour Permeability - Water absorption - Chemical Resistance - Environmental Stress Cracking Resistance - Crazing - UV Resistance - Ozone Resistance - Weathering Resistance - Salt spray and Straining Resistance - Irradiation Effects - Microbiological attack. Testing of Pipes and Fittings - Films & Sheets - Container - Foam - Laminates and FRPbasedproducts-FailureAnalysis	**8**	**17%**

Reference Books:

1. Vishu Shah, Hand Book of Plastics Testing Technology, John Wiley & Sons Inc., New York, 1998.
2 J. S. Anand, K. Ramamurthy, K. Palanivelu & C. Brahatheeswaran, How to Identify Plastics by Simple Methods, 1997.
3. R.P. Brown, Hand Book of Plastics Test Methods, George Godwin Ltd., London, 1981.
4 G. C. Ives, J. A. Mead, M. M. Riley, Hand Book of Plastics Test Methods, The Plastics Institute, London, 1971.
5. Frank T. Traceski, Specifications & Standards for Plastics & Composites, ASM International, Metals Park, OH, 1990.
6. J. Hasiam, H. A. Willis, Identification and Analysis of Plastics, London Iliffe Books Ltd., New Jersey, 1980.

Course Outcome:

1. **Students are clear about testing methods for plastic materials**
2. **Students get first hand experience on testing machines used in labs**
3. **Identification of Plastic Materials**

List of Experiments:

1. To perform Tensile Test

2. To Perform Flexural Test
3. To perform IZOD and Charpy Impact Test
4. To Perform identification of Plastic materials
5. To Perform Dielectric strength test
6. To perform HDT test
7. To perform MFI test
8. To determined density
9. To carry out RSCR TEST
10. To do Pipe testing