GUJARATTECHNOLOGICALUNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Plastics Engineering

Subject Code: ME02084011

Subject Name: Plastic Testing

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 Testing done on Plastic Raw materials and finished products
02	Apply the knowledge of Testing in Industry
03	Operate Plastic Testing Machines and set parameters
04	Interpret Test Data

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/ Practical		
L	T	PR	C	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.	Concepts of Testing & Identification of Plastics: Basic concepts of testing - Specification and Standards - National and International Standards - Test specimen preparation - Preconditioning 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 -	10	23%

	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.		
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 microscopy. Thermal and rheological characterization of plastics	10	23%
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%
	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

WhereR:Remember;U:Understanding;A:Application,N:AnalyzeandE:EvaluateC:Create(asper Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

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 BookLtd., New Jersey, 1980

(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

* * * * * **