5th Semester	RPL5C002	Plastics Testing Techniques	L-T-P 3-0-0	3 Credits

Module I: Standards, specifications and testing & Mechanical Properties(10 hours)

Standard and specification-National and International standards-Test specimen preparation preconditioning and test atmosphere.
Mechanical Properties: Hardness-tensile strength-compressive strength-shear strength-flexural strength-heat strength-impact strength-dynamic stress-strain properties-creep-relaxation and set tests friction and wear-abrasion test-fatigue-burst strength-and folding endurance.

Module II: Thermal Properties (8 hours)

Thermal Properties: Specific heat and thermal conductivity thermal dependent properties-thermal endurance-glass transition temperature-thermal yield tests-Heat deflection temperature- Vicat softening temperature- Marten's heat resistance test-low temperature brittle point and flexibility test-coefficient of thermal expansion-shrinkage-Thermal stability-Thermal ageing and flammability**.**

Module III:Optical and electrical properties(8 hours)

Optical Properties-Refractive index-light transmission-haze-clarity-gloss-colour guard and microscope.
Electrical Properties-Insulation resistance-power factor-permittivity – dielectric strength-tracking resistance-arc resistance and antistatic test.
Permeation properties: Water absorption-soluble and insoluble matter-chemical resistance
Environmental stress cracking resistance-ageing-gas permeability-water vapour permeability and weathering. Knowledge and exposure on Sectorial Testing Standards

Module IV: Product testing (7 hours)

Pipe and fittings-film and sheets-container testing and FRP based products. Factors for designing tests for newer products- Factors affecting the quality of materials and products analysis of failure and its measurements.

Module V: Techniques of characterization(7 hours)

Principles and application of DSC- TGA AND FTIR, Concepts of non-destructive testing. Preconditioning and test atmosphere - Testing of Mechanical, Thermal, Optical, Electrical properties, Permeability Properties and Rheological properties.

Books:

[1] Shah, Vishnu, John Wiley and Sons, Hand Book of Plastics Testing Technology,SPE Monograph(1984)
[2] Hand Book of Polymer Testing, Brown; Roger P (Ed.), Marcel Dekker, Inc, New York (1999)
[3] Hand Book of Plastics Technology 2 vol. By Allen, W.S & Baker P.N.