



**Master of Science – Nano Science & Nano Technology**  
(M.Sc.) (Nano Science & Nano Technology) Semester –II

Course Code	PS02ENST52	Title of the Course	Engineering Polymers and Nanocomposites
Total Credits of the Course	4	Hours per Week	4 hrs

Course Objectives:	1. Structure, synthesis, characterization, properties, application and processing parameters of polymer blends, engineering plastics, ion exchange resins, conducting polymers and bio-implants
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Course Content		
Unit	Description	Weightage* (%)
1.	Introduction, types and methods for preparation, characterization and applications of polyblends, alloys and IPN.	25%
2.	Adhesive bonding, theories of adhesion, requirements for a good bond, mechanism of bond failure, surface preparation, primers and adhesion promoters, role of surfactants and other additives in adhesives, coatings, paints, commercial adhesives based on casein, starch, polyvinyl alcohol, rubber based adhesives, high temperature adhesives, hot melt adhesive, pressure sensitive adhesives.	25%
3.	Structures, synthesis, properties and applications of selected engineering plastics such as, polyphenylene, poly (Phenylene oxide)s, poly (ether ketone)s, polyimides, polyamide-imide, poly(phenylenesulfide)s, polysulfones, poly ether-imides, Polycarbonates, Polybutylene terephthalates, Polyacetals, polymeric adsorbents, polymer electrolyte membrane	25%
4.	Nanoclays – preparation, structures, and properties; carbon nanomaterials as reinforcements, other inorganic nanomaterials, preparation techniques for nanocomposites, properties and applications of nanocomposites.	25%

Teaching-Learning Methodology	Group discussion/ Panel/Presentation
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Get thorough knowledge of engineering polymeric materials used in advanced applications

Suggested References:	
Sr. No.	References
1.	Brydson, J. A. (6 <sup>th</sup> Ed.) (2013). <i>Plastics Materials</i> . Elsevier Science.
2.	Pizzi, A., & Mittal, K. L. (Eds.). (2017). <i>Handbook of adhesive technology</i> . CRC press.
3.	<i>Functional Nanomaterials and Their Applications</i> . (2013). Trans Tech Publications Limited.

On-line resources to be used if available as reference material
On-line Resources
Introduction to Polymer Science, Prof. Dibakar Dhara, Department of Chemistry, IIT Kharagpur <a href="https://nptel.ac.in/courses/104/105/104105124/">https://nptel.ac.in/courses/104/105/104105124/</a>

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