

Programme: M. Sc. (Chemistry, Part-II)

Course Code: OCO-507

Title of the Course: Introduction to Polymer Chemistry-II: Synthesis of Polymers and Processing

Number of Credits: 3

Effective from AY: 2019-20

<u>Prerequisites for the course:</u>	Should have studied the course entitled- Introduction to polymer Chemistry-I: Basic Concepts	
<u>Course Objective:</u>	Introduction to various concepts involved in the synthesis and processing of organic monomers and polymers.	
<u>Course Outcome</u>	1. The students will be in a position to understand the synthetic methodology and applications of various monomers and polymers. 2. The students will be in a position to understand concepts involved in polymer processing.	
<u>Content:</u>	1. Resources for monomers, manufacture of some important monomers and reagents: Ethylene, propylene, butadiene, isoprene, styrene, divinyl benzene, acrylates, acrylonitrile, vinyl chloride, formaldehyde, adipic acid, urea, bisphenol-A, melamine, terephthalic acid, phthalic anhydride, dimethyl terephthalate, glycol, glycerol, ethylene oxide, epichlorohydrin, ϵ-caprolactum, di-isocyanates, pentaerythritol, allylic carbonate monomers. 2. Synthesis, properties and applications of certain polymers: Vinyl polymers- LDPE, HDPE, PVC, PVA, polyvinyl acetate, polyacrylates, methacrylates, polystyrene, teflon, ABS, SBR, SAN. Condensation polymers- Nylons, polyesters, polyurethanes, polycarbonates. Thermoset polycarbonates like CR-39 Cellulose esters- cellulose acetate, nitrates and acetate-butyrate. Natural rubber, Thermoset resins- phenol-formaldehyde, resols and novolacs, melamineformaldehyde, urea-formaldehyde, epoxy resins - their curing. 3. Polymer processing – Introduction to compounding, and processing techniques like calendaring, casting, moulding and spinning in polymer processing.	14 hours 14 hours 08 hours
<u>Pedagogy:</u>	lectures/ tutorials/ project work/ vocational training/viva/ seminars/ term papers/assignments/ presentations/ self-study/ Case Studies etc. or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.	

References/Readings	1. Von W. L. Faith, D. B. Keyes & R. L. Clark, <i>Industrial Chemicals</i>- John Wiley and Sons, 1965. 2. H. A. Wittcoff, B. G. Reuben, J. S. Plotkin, <i>Industrial Organic Chemicals</i>, Wiley-Interscience, 2004, 2nd Ed. 3. N. P. Cheremisinoff (Ed), <i>Handbook of Polymer Science and Technology</i>- Vol 1-4, 1989. 4. Finch, C. A., <i>Comprehensive Polymer Science—The Synthesis, Reactions and Applications of Polymers</i>, Sir Geoffrey Allen (Ed), Vol. 1-7, Pergamon Press, Oxford, 1989. 5. R. Sinha, <i>Outlines of Polymer Technology: Processing Polymers</i>, PHI Pvt. Ltd., 2003. 6. J. A. Brydson, <i>Plastic Materials</i>, Newnes-Butterworths, 1979, 3rd Ed. 7. J. Brandrup, E. H. Immergut, & E. A. Grulke, <i>Polymer Handbook</i>, Wiley, 1999.	
----------------------------	---	--