

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

Course Code: OCO-506

Title of the Course: Introduction to Polymer Chemistry-I: Basic Concepts

Number of Credits: 03

Effective from AY: 2019-20

<u>Prerequisites for the course:</u>	Should have studied the courses in Organic Chemistry at T. Y. B Sc. and M. Sc. Part-I levels.	
<u>Course Objective:</u>	Introduction to various concepts in organic polymer chemistry.	
<u>Course Outcome</u>	<ol style="list-style-type: none">1. The students will be in a position to understand the differences in structures and properties of small molecules and macromolecules.2. The students will be in a position to understand concepts involved in polymer synthesis and characterization.	
<u>Content:</u>	<ol style="list-style-type: none">1. Brief history of natural and synthetic polymers: Classification & nomenclature of polymers, Functionality concept- linear, branched and cross-linked polymers. Introduction to biodegradable polymers.2. Methods and Chemistry of polymerization: Bulk, solution, suspension, emulsion, addition, condensation polymerizations. Free-radical, Ionic and co-ordination polymerization reactions and copolymerization. Introduction to controlled free radical polymerization. Carothers equation in condensation polymerizations.3. Some properties of polymers: Number and weight average molecular weights, Molecular weight distribution, polydispersity, Glassy state and glass transition temperature, crystallinity in polymers. Introduction to characterization of polymers.4. Additives in polymers: Lubricants, plasticizers, stabilizers, antioxidant, fire retardants, blowing agents, fillers, colorants, crosslinking agents, UV-Vis degradants etc., (properties and examples)	<div>07 hours</div> <div>12 hours</div> <div>10 hours</div> <div>07 hours</div>
<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.	
<u>References/Readings</u>	<ol style="list-style-type: none">1 V. R. Gowarikar, N.V. Vishwanathan, Jayadev Sreedhar, <i>Polymer Science</i>, New Age International, 2015.2 P Bahadur & N V Sastry, <i>Principles of Polymer Science</i>-	

	<p>Narosa Publishing House, 2003.</p> <ol style="list-style-type: none"> 3. J R Fried, <i>Polymer Science and Technology</i>, PHI Pvt. Ltd., 2000. 4. R Sinha, <i>Outlines of Polymer Technology: Manufacture of Polymers</i>, PHI Pvt Ltd., 2000. 5. J A Brydson, <i>Plastic Materials</i>, Newnes-Butterworths, 1979, 3rd Ed. 6. J Urbansky, <i>Handbook of Analysis of Synthetic Polymers and Plastics</i>, John Wiley, 1977. 7. K Y Saunders, <i>Organic Polymer Chemistry</i>, Chapman and Hall, UK, 1976. 8. R W Lenz, <i>Organic Chemistry of Synthetic High Polymers</i>, Interscience, 1967. 9. Kircheldorf H R (Ed), <i>Handbook of Polymer Synthesis, PART A and B</i>, Marcel Dekkar Inc., 1992, 10. Brown R P, <i>Handbook of Plastic Test Methods</i> George Godwin Ltd., 1981, - 2nd Ed. 11. M P Stevens, <i>Polymer Chemistry- An Introduction</i>, Oxford Univ. Press, 1990, 2nd Ed. 12. W Y Mijs (Ed), <i>New Methods in Polymer Synthesis</i>, Pelnum Press Ltd., NY, 1992. 13. P C Hiemenz, <i>Polymer Chemistry- The Basic Concepts</i>, Marcell Dekkar Inc., 1984. 14. W R Moore, <i>Introduction to Polymer Chemistry</i>, Univ. of London Press, 1967. 	
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