

INSTITUTE	FACULTY OF SCIENCE
PROGRAM	BACHELOR OF SCIENCE (CHEMISTRY)
SEMESTER	3
COURSE TITLE	FUNDAMENTALS OF POLYMER SCIENCE
COURSE CODE	02OE0005
COURSE CREDITS	3

Objective:

- 1 To provide knowledge in the basic concepts of polymer science
- 2 To make the students familiar with the characterization techniques
- 3 To make them aware the structure property relations of polymers

Course Outcomes: After completion of this course, student will be able to:

- 1 Students will understand and appreciate the importance of the polymers as an important class of materials.
- 2 Students will be well equipped to study the advanced courses related to polymer science and technology included in the curriculum.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	Basic concepts: Molecular forces, chemical bonding, Molecular weight studies, molecular weight distribution, configuration, conformation, Tacticity, Transitions in polymers, viscoelasticity, types of macromolecules-classification of polymers, Homogeneous polymerization techniques, Bulk, Solution, Heterogeneous polymerization techniques, Emulsion, Suspension, solid phase polymerisation.	10
2	Industrial Polymers Production, properties and applications of industrial polymers; PP, PE, PVC, PS, polyamide, polyacrylates, polyester (PET, PBT). General purpose rubbers: NR, SBR, NPR, EPDM etc., Biodegradable polymers	10

Contents : Unit	Topics	Contact Hours
3	Characterization End group analysis, colligative property measurement, ultra centrifugation, light, scattering, gel permeation chromatography, Viscosity methods, IR, NMR etc. Thermal characterization	10
Total Hours		30

Textbook :

- 1 Textbook of Polymer Science, Fred W. Billmeyer , Wiley, 2007
- 2 A Textbook of Polymer Chemistry, MS Bhatnagar, S. Chand Publishing, 2004

References:

- 1 Textbook of polymer science, 3rd ed., , Textbook of polymer science, 3rd ed., , F. W. Billmeyer, John Wiley & Sons, 1994
- 2 Principles of Polymerization, 4th ed, Principles of Polymerization, 4th ed, G. Odian, Wiley-Interscience, 2004
- 3 Introduction to Polymers, 2nd ed, Introduction to Polymers, 2nd ed, R. J Young and P. A. Lovell, Wiley, 2004
- 4 Polymer Physics, Polymer Physics, M. Rubinstein, R.H. Colby, Oxford University Press, 2003
- 5 Polymer Science and Technology, Polymer Science and Technology, P. Ghosh, Mc Grew Hill, 2002

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
20.00	30.00	25.00	15.00	10.00	0.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- 2 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1 <https://www.youtube.com/watch?v=4IKVZpJI0Oo>

Supplementary Resources:

- 2 <https://www.youtube.com/watch?v=dXaBkrS1HaM>