

MULTIDISCIPLINARY COURSE

Paper Code: UCHEMDC12002

Paper Description: INTRODUCTION TO POLYMERS

Paper Type: TH

Credits: Theory-03

Total Marks: 75 [Theory (ESE – 60); CE – 10; Attendance – 05]

Theory: 45 Lectures [Each Lecture is one hour in duration]

INTRODUCTION TO POLYMERS

UNIT I: History of Polymeric Materials

Different schemes of classification of polymers with definitions and examples, Polymer nomenclature, Molecular forces and chemical bonding in polymers, and Texture of Polymers. Classifications including di-, tri-, and amphiphilic polymers. Recycling and chasing arrows.

(12 Lectures)

UNIT II: General applications of polymeric materials

Polymers in construction, automobile, transports, electronics, optics, medicines and medical consumables, textiles, and sports.

(08 lectures)

UNIT III: Functionality of monomers

Addition and Condensation polymerization.

The extent of reaction and degree of polymerization.

(08 lectures)

UNIT IV: Structure, Properties, and Application of the Polymers

Poly-olefins, polystyrene, styrene copolymers, poly(vinyl chloride) and poly(vinylacetate), acrylic polymers, fluoropolymers, polyamides, and related polymers.

Phenol formaldehyde resins (Bakelite, Novalac). Polyurethanes, silicone polymers, polydienes.

(12 Lectures)

UNIT V: Polymers and pollution

Issues related to polymer pollution, microplastic, polymer wastage, and recycling. (5 lectures)

Reference Books:

- Seymour, R.B. & Carraher, C.E., *Polymer Chemistry: An Introduction*, Marcel Dekker, Inc. New York, 1981.
- Odian, G. *Principles of Polymerization*, 4th Ed. Wiley, 2004.
- Billmeyer, F.W. *Textbook of Polymer Science*, 2nd Ed. Wiley Interscience, 1971.
- Ghosh, P. *Polymer Science & Technology*, Tata McGraw-Hill Education, 1991.
- Lenz, R.W. *Organic Chemistry of Synthetic High Polymers*, Interscience Publishers, New York, 1967.

End Semester Examination (ESE)

End Semester Examination (ESE) of 40 Marks:

At the end of the semester, an examination will be conducted, and the question pattern will be as follows:

Marks distribution:

Serial No.	Questions to be answered	Out of	Marks for each question	Total Marks
1	5	8	2	5 x 2 = 10
2	4	6	5	4 x 5 = 20
3	1	2	10	1 x 10 = 10

End Semester Examination (ESE) of 60 Marks:

At the end of the semester, an examination will be conducted, and the question pattern will be as follows:

Marks distribution: