Minor Programme for All Branches

Theme: Chemistry for Engineering Application

Course Code: CYOM1301/ CYOM1401/ CYOM1501/ CYOM1601	Advanced Polymer Materials	Credits:04 (L:T:P:3:1:0)

Prerequisites: -

Course Outcome

COs	Outcomes
CO1	Enabling the students to learn about the chemistry of high molecular weight polymers and macromolecules & relationship between their structures
CO2	Familiarizing the students with the properties of polymers.
CO3	Enabling the students to learn about determination of glass transition temperature and molecular weight of polymers.
CO4	Enabling the students to learn about swollen gels, soft matter and polymers containing hetero atoms in the chain.
CO5	Enabling the students to learn about the concepts related to dendrimers, hyper-branched polymers, functional polymers, polyelectrolytes & biopolymers
CO6	Enabling the students to learn about the fabrication and deterioration of polymers.
CO7	Enabling the students to learn about the advanced applications of polymers.

Module	Content	Lectures
1.	Contemporary chemistry of high molecular weight polymers and macromolecules & relationship between their structures.	3
2.	Properties of polymers (physical, thermal, flow and mechanical), polymer rheology	3
3.	Glass transition temperature (T_g) and measurement of T_g	2
4.	Nature and structure of polymers-structure-property relationships, molecular weight of polymers (M_n, M_w etc.), molecular weight distribution and determination of molecular weight.	5
5.	Swollen gels and soft matter; polymers containing hetero atoms in the chain.	3
6.	Controlled synthesis, architecture and self-assembly of polymers, dendrimers, hyper branched polymers, functional polymers, polyelectrolytes & biopolymers.	6
7.	Fabrication of polymers (using additives to obtain desired properties), deterioration of polymers	4
8.	Advanced applications of polymers in health care, energy production, green packaging, bio-based composites and surface coatings.	5

Books

1. Textbook of Polymer Science, Fred. W. Billmeyer, Wiley, 2007
2. Polymer Science, Vasant Gowerikar, N. V. Viswanathan, Jayadev Sreedhar, New Age Publication, 1987
3. Advanced Polymer Chemistry: A Problem Solving Guide, Manas Chandra, Marcel Dekker, 2000
4. Advanced Polymer Science and Engineering, Chuansheng Wang, Lianxiang Ma and Weiming Yang, Scientific Net, 2011
5. Principles of Polymers: An Advanced Book (Polymer Science and Technology) D. S. Bag, Nova Science Publishers, 2013
6. Advanced Polymer Nanocomposites: Science, Technology and Applications, Md. Enamul Hoque, R. Kumar, Ahmed Sharif, Woodhead Publishing in Materials, 2022