

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. SEMESTER : 3
CHEMICAL TECHNOLOGY

Subject name : **POLYMER CHEMISTRY**

Sr. No.	Course contents
01.	Historical developments in polymeric materials, end use sectors.
02.	Petroleum refining & raw materials for polymer & rubber industry.
03.	Synthesis of some important monomers & solvents such as; ethylene, propylene, butadiene, vinyl chloride, styrene, acrylic acid & its derivatives, methyl methacrylate, caprolactum, ethylene glycol, terephthalic acid, phenol, formaldehyde, urea, melamine, isocyanates etc.
04.	Polymer formation. Covalent bonds. Double bonds & functionality of monomers. Physical behavior of polymers in comparison to small molecular compounds in terms of molecular weight & distribution, glass transition temperature, solubility etc. Behavior of polymer solutions, LCST & UCST. Crystallinity & crystallization. Different methods of measuring molecular weight & distribution.
05.	Basic concepts of thermodynamics of chemical reactions. Rate of reaction. Kinetics of polymerization & its relevance to engineering aspects. Bulk, solution, suspension & emulsion polymerization processes & engineering problems associated with these techniques.
06.	Basic characteristics of addition & condensation polymerization, ionic polymerization, copolymerization.

Reference Books:

1. Raw Materials for Industrial Polymers , H Ulrich, Hanser Publication ,1989
2. Principles of Polymer Science, Bahadur & Sastry, Narosa Publishing Houses, 2002
3. Polymer Science , Gowarikar, John Wiley & Sons ,1986
4. Encyclopedia of Polymer Science & Technology, John Wiley & Sons, Inc ,1965
5. Encyclopedia of Polymer Science & Engineering, John Wiley & Sons, Inc, 1988

6. Petrochemicals the Rise of an Industry, Peter H. Spitz, John Wiley & sons, 1988
7. Polymer Chemistry, Malcolm P. Stevens, Oxford University Press Inc, 1990
8. Textbook of Polymer Science, Billmeyer, John Wiley & Sons, 1984
9. Polymer Science and Technology: Plastics, Rubbers, Blends and Composites, P Ghosh, McGraw Hill, 2nd ed., 1990
10. Principles of Polymer Systems, Rodriguez, Hemisphere Publishing Corp., 5th Ed., 2007
11. Textbook of Polymer Science, P Nayak and S Lenka, Kalyani Publishers, 1986
12. Polymer Chemistry, Seymour and Carraher, Marcel Dekker, 2003
13. Handbook of Rubber Technology, S Blow, Galgotia Publications Pvt. Ltd, 1998
14. Rubber Technology, Morell S H, Applied Science Publication, 1981
15. Plastics and Rubber, E W Duck, Butterworth, 1971
16. Tyre and Vehical Dynamics, Hans B Pacejka, SAE International, 2nd Ed, 2005
17. Introduction to Rubber Technology, Andrew Ciesielski, RAPRA Publications, 2000
18. Rubber Technology, Maurice Morton, Springer, 1st Ed, 1987
19. The Science and Technology of Rubber, Mark and Erman, Academic Press, 3rd Ed, 2005
20. Rubber Processing, Robert Johnson, Hanser Publications, 2001
21. Rubber Compounding, Barlow, CRC Press, 2nd Ed, 1993
22. Rubber Compounding : Chemistry and Applications, Brendan Rodgers, CRC, 1st Ed, 2004
23. Rubber Compounding 2E: Compounding and Testing for Performance, John Dick, Hanser Publications, 1st Ed., 2009
24. The Mixing of Rubber, R F Grossman, Springer, 1st Ed., 1997