

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

Subject Name: Compounding & Processing of Plastics & Rubbers- I
Subject Code: 163602

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam(E)	University Exam(P)	Mid Sem Exam(Theory) (M)	Practical (Internal)
4	0	3	7	70	0	30	50

Sr. No	Course contents
1.	Basic concepts of Rheology of polymers, solutions, rubber & the relevance of the same in processing & compounding.
2.	Basic Concept of Compounding & Processing; Concept of Master batches.
3.	One dimensional processes (Coating / paints).
4.	Extrusion process & making of fibers, films, blown films, sheets, raffia tapes, pipes & profiles etc. Twin screw extruders.
5.	Injection molding, compression molding, RTM, RIM, Blow molding & stretch blow molding, gas / water assisted injection molding & similar processes.
6.	Calendaring & thermoforming
7.	Classification & type of Additive for Plastic & Rubbers: Antioxidants, Light stabilizers, UV stabilizers, Lubricants & relative auxiliaries, Processing aids, Impact modifiers, Flame Retardants, antistatic agents. PVC stabilizers & Plasticizers.
8.	Coloration of Plastics & Rubbers: Chemistry, synthesis, properties & applications of - Inorganic Pigments such as Titanium dioxide, Zinc oxide, Lithophone, Carbon blacks, Metal oxide pigments, Chromium & Cadmium pigments, Ultra marine blue etc.

Reference Books:

1. Transport Phenomena, Bird & Steuart, John Wiley & Sons, Inc 1960.
2. Understanding Injection Molding Technology, Herbert Rees, Hanser Publishers, 1994.
3. Understanding Extrusion, Chris rauwendaal, Hanser Publishers, 1998
4. Rotational Molding, Glenn L. Beau, Hanser Publishers, 1998
5. Introduction to Polymer Science & Technology H. S. Kaufman & J. J. Falcetta,, Wiley –
 a. Interscience Publication, 1977
6. Understanding Compounding, R. H. Wildi & Maier, Hanser Publisher mc, 1998
7. Fundamentals of Polymer Processing, S. Middleman, Houghton Mifflin Company, 1997
8. Injection Molding of Plastics a User Guide, Klockner Windosor India Ltd. 1994
9. Fillers & Filled Polymers, J. F. Gerard, Wiley-VCH verlag GmbH, 2001
10. Handbook of Fillers, C. Wypych, Chem Tech Publishing 2000
11. Handbook of Fillers & Reinforcements for Plastics, H. S. Katz & J. V. Milewski, Van
12. Nostr & Zeinhold Co, 1978

13. Composite Polymeric Material, Applied Science Publishers, R. P. Sheldon ,1982
14. Composites: Design Guide, Industrial Press mc, 1987
15. Composite Material Handbook, M. M. Schwartz, McGraw-Hill company, 1984
16. Polymer Processing Fundamentals, Ossawald, A. Tim, Hanser Publishers, 1998
17. Fundamentals of Reaction Injection Molding, C. W. Macosko, Hanser Publishers,1989
18. Flow of High Polymers, S. Middleman, Interscience Publishers, 1968
19. Metalizing of Plastics, H. Narcus, Reinhold Publishing Corp. 1960
20. Decorating Plastics, I M Margolis, Hanser Publishers, 1986
21. Handbook of Plastics Joining, a Practical Guide, Plastics Design Library, 1997
22. Plastics Finishing & Decoration, D. Sastas, Van Nostrand Reinhold Co, 1986.
23. Cross linking & Network Formation in Polymers, F. R. Jones,The P & R Institute, 1982
24. Plastics Films, J. H. Briston, The Plastics Institute, 1974
25. Plastics process Engineering, Thorne, Marcel Dekker, 1979
26. Thermoforming ,J. L. Thorne, Hanser Publishers, 1988
27. Understanding Blow Molding, N. C. lee, Hanser Publishers, 2001
28. Raw Materials for Industrial Polymers , H Ulrich, Hanser Publication ,1989
29. Principles of Polymer Science, Bahadur & Sastry, Narosa Publishing Houses, 2002
30. Polymer Science , Gowarikar,John Wiley & Sons ,1986
31. Encyclopedia of Polymer Science & Technology, John Wiley & Sons, Inc ,1965
32. Encyclopedia of Polymer Science & Engineering, John Wiley & Sons, Inc, 1988
33. Petrochemicals the Rise of an Industry, Peter H.Spitz,John Wiley & sons,1988
34. Polymer Chemistry , Malcolm P. Stevens, Oxford University Press Inc ., 1990
35. Textbook of Polymer Science, Billmeyer,John Wiley & Sons, 1984.
36. Polymer Science and Technology: Plastics, Rubbers, Blends and Composites, P Ghosh, Mc Graw Hill, 2nd ed.,1990
37. Principles of Polymer Systems, Rodriguez, Hemisphere Publishing Corpn, 5th Ed., 2007
38. Textbook of Polymer Science, P Nayak and S Lenka, Kalyani Publishers, 1986
39. Polymer Chemistry, Seymour and Carraher, Marcel Dekker, 2003
40. Handbook of Rubber Technology, S Blow, Galgotia Publications Pvt. Ltd, 1998
41. Rubber Technology, Morell S H, Applied Science Publication, 1981
42. Plastics and Rubber, E W Duck, Butterworth, 1971
43. Tyre and Vehical Dynamics, Hans B Pacejka, SAE International, 2nd Ed, 2005
44. Introduction to Rubber Technology, Andrew Ciesielski,RAPRA Publications, 2000
45. Rubber Technology, Maurice Morton, Springer, 1st Ed, 1987
46. The Science and Technology of Rubber, Mark and Erman, Academic Press,3rd Ed,2005
47. Rubber Processing, Robert Johnson, Hanser Publications, 2001
48. Rubber Compounding, Barlow, CRC Press, 2nd Ed, 1993
49. Rubber Compounding : Chemistry and Applications , Brendan Rodgers, CRC, 1st Ed, 2004
50. Rubber Compounding 2E: Compounding and Testing for Performance, John Dick, Hanser Publications, 1st Ed.,2009
51. The Mixing of Rubber, R F Grossman, Springer, 1st Ed.,1997