

NORTH MAHARASHTRA UNIVERSITY, JALGAON

Faculty of Engineering and Technology (Chemical Engineering & Technology)
Pre PhD course No: 2 Syllabus
Recent Developments in Chemical Engineering and Technology

Unit 1 (Marks20)

Advances in Unit Operation: Distillation, Absorption, Membrane Separation Techniques (Ro only), Supercritical Fluid Chromatography and Supercritical Fluid extraction
Industrial Air Pollution Monitoring & Control Equipments/ Processes

Unit II (Marks20)

Oil – Enzymatic fat splitting and Transesterification
Edible Oil Refining – Alkali Refining, Physical Refining
Fermentation Technology – Production of wine, Beer, Industrial Alcohol, Citric Acid, yeast, Distilled Alcoholic Beverages, Oriental Fermented Soya food,
Pharmaceutical Formulations (Solid dosage):
Novel Drug Delivery System (NDDS): Factors to be considered in design Controlled release drug delivery (CRDD), Effects of system parameters, Classification of CRDD, Application, Advantages and disadvantages

Unit III (Marks 20)

Types of Polymer & Molecular weight, Techniques of Determination of Molecular weight
Electrodeposition Paint – Principle formulation and Application setup
Polymer Blends and Composites Physicals and Reactive Blends, Phase separation Synthetic and Natural Fiber composites
Powder coatings: Formations and Manufacturing of Thermo set powder coatings
Nano Technology: Classification of Nanostructures, top down and Bottom up Techniques of Synthesis of Nano particles/ Systems

Unit IV (Marks 20)

Instrumentation I: Constructions, working Principle and applications of UV visible Spectrophotometer, Gas chromatography, High Performance Liquid chromatography, FTIR Spectrophotometer, Gel Permeation chromatography.

Unit V (Marks 20)

Instrumentation II: Working Principle, construction & Applications of Scanning Electron Microscope, Transmission Electron Microscope, X-Ray Diffraction Spectrophotometer, Atomic Force Microscope, Particle size analyzer

Reference Books:

1. Bailey's Industrial Oils and fats- Vol. 1-6 (2005)
2. Richardson and Coulson- Chemical Engineering Vol. 1-6
3. Organic Coating- Science and Technology, Third Edition (2007)-Wicks, W., Jones, F. N., Pappas, S. P., John Wiley and Sons.
4. Braydson- Plastic Materials
5. Perry's Chemical Engineering Handbook
6. In addition, the Ph. D students must refer recent literature published in various International Journals and patents cited under different countries (US, Japan, Indian, and European etc.)
7. Michel Deleers, Nanoparticulate drug delivery systems.
8. Jean – Maurice Vergnaud, Controlled drug release of oral dosage form.
9. Philip J. Breen, Basic Pharmacokinetics.
10. Novel drug delivery systems by Yie W. Chien.
11. Biopharmaceutics and Pharmacokinetics by Brahmankar
12. Instrumental analysis by Skoog, & Holler.
13. Instrumental methods of analysis by Willard