GUJARAT TECHNOLOGICAL UNIVERSITY

B.PHARM SEMESTER-II
PHYSICAL PHARMACY
Subject code: 2220001
THEORY (3 Hours / Week; 3 Credits, 45 Hours)

Sr. No.	Course Contents	Hours
1.	**States of Matter:** Introduction, binding forces between molecules, states of matter-solids, liquids, gases, liquid crystals, glassy state, phase equilibrium and phase rule, condensed systems	5
2.	**Solubility and Distribution Phenomenon:** General principles, solvent-solute interactions, solubility of gases in liquids, solubility of liquids in liquids, solubility of solids in liquids, distribution of solutes between immiscible solvents.	6
3.	**Surface and Interfacial phenomenon:** Liquid interface, adsorption at liquid interfaces, adsorption at solid interface, applications of surface active agents, electrical properties of interfaces.	6
4.	**Complexation and protein binding** : Metal complexes, organic molecular complexes, protein binding, thermodynamic treatment of stability constants, applications of complexes in dosage forms.	5
5.	**Disperse systems:** a. Colloidal dispersions: Definition, types, properties of colloids, protective colloids, applications of colloids in pharmacy. b. Suspensions and Emulsions : Interfacial properties of suspended particles/globules, settling in suspensions, theory of sedimentation, effect of Brownian movement, sedimentation of flocculated particles, sedimentation parameters, wetting of particles, controlled flocculation, flocculation in structured vehicle, rheological considerations, emulsions ; types, theories, physical stability.	9
6.	**Micromeritics:** Particle size and distribution, methods for determining particle size, particle shape and surface area, methods for determining surface area, derived properties of powders,	6
7.	**Rheology :** a. Newtonian system, Non-Newtonian systems, thixotropy in formulation, determination of rheological properties, applications in pharmacy. b. Flow of Powders: Introduction, methods to determine, factors affecting powder flow, pharmacopeial specification of angle of repose, hausner's ratio, carr's index.	8

B.PHARM SEMESTER-II
PHYSICAL PHARMACY
Subject code: 22200P1
PACTICAL (3 Hours / Week; 3 Credits, 45 Hours)

Practical related to following topics should be covered:

Sr. No.	Course Contents	Hours
1.	Solubility of solids.	**45**
2.	Determination of phenol water coefficient.	
3.	Preparation of thymol salol eutectic system.	
4.	Preparation of ternary phase system with one pair of partially miscible liquid.	
5.	Determination of latent heat, vapor pressure, critical point.	
6.	To find out the distribution coefficient of given solid.	
7.	Determination of surface / interfacial tension, HLB value and CMC of surfactants	
8.	Determination of particle size and size distribution of powders by different methods.	
9.	Determination of derived properties of powder	
10.	Determination of particle shape and surface area	
11.	Determination of viscosity of Newtonian and Non-newtonian systems	
12.	Effect of temperature on viscosity of liquids.	
13.	Effect of particle size, porosity, moisture, lubricants, glidants on flow property of powder.	
14.	Studies on different types of complexes and determination of their stability constants	
15.	Determination of sedimentation parameters for suspensions and emulsions.	

Books Recommended (Latest Editions):

1. Martin's Physical pharmacy by Patrick J. Sinko, 5th edition, Lippincott Williams & Wilkins, New York, 2006.
2. Pharmaceutics: The Science of Dosage Form Design, 2nd edition, Aulton, Michael E., Chrchill Livingstone, London, 2002.
3. Remington: The Science and Practice of Pharmacy, Vol-I & II, 20th edition, Gennaro, Alfonso R.,Lippincott Williams & Wilkins, New York, 2002.
4. Physicochemical Principles of Pharmacy, 3rd edition, Florence, A. T. Atwood, D. Macmillan Press Ltd., London 1998.
5. Pharmaceutical Dosage Forms and Drug Delivery Systems, Ansel, Howard. C., Allen, Loyd V., Popovich, Nicholas G. Lippincott Williams & Wilkins, New York, 2002.
6. Cooper and Gunn's Tutorial Pharmacy, ed. Carter, S. J., 6th edition, CBS Publishers & Distributors, Delhi, 2000.
7. Bentley's textbook of Pharmaceutics by E. A. Rawlins