SYLLABUS

SEMESTER - I

PS 1101 PHARMACEUTICS – I (Physical Pharmacy)

1. Matter, Properties of Matter: State of matter, change in the state of matter, latent heats and vapor pressure, sublimation-critical point, Eutectic mixtures, gases, aerosols-inhalers, relative humidity, liquid, complexes, liquid crystals, glassy state, solids-crystalline, amorphous and polymorphism.
2. Micromeretic and Powder Rheology: Particle size and distribution, average particle size, number and weight distribution, particle number, methods for determining particle volume, optical microscopy, Asieving, sedimentation, measurement, particle shape, specific surface, methods for determining surface area; permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties.
3. Surface and Interfacial Phenomenon: Liquid interface, surface and interfacial tensions, surface free energy, measurement of surface and interfacial tensions, Spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB classification, solubilization, detergency, adsorption at solid interfaces, solid-gas and Solid - liquid interfaces, complex films and electrical properties of interface.
4. Viscosity and Rheology: Newtonian systems, Law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling ball, rotational viscometers.
5. Dispersion Systems: Colloidal Dispersions: Definition, types, properties of colloids, protective colloids, applications of colloids in pharmacy; Suspensions and Emulsions: Interfacial properties of suspended particles, settling in suspensions, theory of sedimentation, effect of Brownian movement" sedimentation of flocculated articles, sedimentation parameters, wetting of particles, controlled flocculation, flocculation in structured vehicles, rheological considerations; Emulsions-types, theories, physical stability.
6. Complexation: Classification of complexes, methods of preparation and analysis, applications.
7. Kinetics and Drug Stability: General considerations & concepts, half-life determination, Influence of temperature, light, solvent, catalytic species and other factors, Accelerated stability study, expiration dating.
8. Buffers: Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.

PS 1101P PHARMACEUTICS – I (LAB)

1. Determination of latent heat, vapor pressure, critical point.
2. Studies on polymorphs, their identification and properties.
3. Determination of particle size, particle size distribution and surface area using various methods of particle size analysis.

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4. Determination of derived properties of powders like density, porosity, compressibility, angle of repose etc.
5. Determination of surface/interfacial tension, HLB value and critical micellar concentration of surfactants.
6. Study of rheological properties of various types of systems using different Viscometers.
7. Studies of different types of colloids and their properties.
8. Preparation of various types of suspensions and determination of their sedimentation parameters.
9. Preparation and stability studies of emulsions.
10. Studies on different types of complexes and determination of their stability constants.
11. Determination of half-life, rate constant and order of reaction.
12. To study the influence of various factors on the rate of reaction.
13. Accelerated stability testing, shelf-life determination and expiration dating of pharmaceuticals.
14. Preparation of pharmaceutical buffers and determination of buffer capacity.
15. Experiments involving tonicity adjustments.

Recommended Books:

1. Martin's Physical Pharmaceutical Sciences by P. J. Sinko (Lippincott William and Wilkins, Baltimore).
2. Cooper and Gunn's Tutorial Pharmacy edited by S.J. Carter.
3. Bently's Textbook of Pharmaceutics edited by E.A. Rawlins.
4. Bahl & Tuli: "Essentials of Physical Chemistry," S. Chand & Co.
5. Gennaro et al., "Remington's The Science & Practice of Pharmacy" (Lippincott William and Wilkins, Baltimore).
6. Banker & Rhodes,. "Modern Pharmaceutics"
7. Aulton, "Pharmaceutics – The Science of Dosage Form Design"