

Branch Name:	Bachelor of Pharmacy
Program Code:	PH101
Course Name:	Physical Pharmaceutics (Practical)
Course Code:	1BP211P

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)		
Lecture	Tutorial	Practical	Credit	Theory (T)		Total Marks
				Continuous Assessment	University Assessment	
NA	-	3	1	20	30	50

Course Objectives:

The objectives of this course are to:

1. Introduce basic laboratory techniques for determining physicochemical properties such as surface tension, viscosity, and density in pharmaceutical systems.
2. Develop understanding of interfacial phenomena and surfactant behavior, including micelles, critical micellar concentration (CMC), and HLB in formulation design.
3. Train students in evaluating disperse systems through sedimentation studies and the effect of suspending agents.
4. Provide practical experience in powder characterization, including particle size distribution, density, flow properties, porosity, and the role of glidants.
5. Develop skills in determining solubility, partition coefficient, buffer capacity, and related equilibria relevant to drug formulation.

Course Outcomes (CO):

CO No.	Upon successful completion of this course, the students will be able to:
1	Demonstrate practical knowledge of principles and procedures involved in measuring surface tension, viscosity, density, and related physical properties using standard laboratory apparatus.
2	Determine and interpret surfactant-related parameters such as CMC and HLB and explain their significance in formulation stability and performance.
3	Conduct experiments and analyze results related to sedimentation volume and evaluate the influence of type and concentration of suspending agents on dispersion stability.
4	Evaluate micromeritic and flow properties of powders by determining particle size distribution, bulk density, tapped density, Hausner ratio, Carr's index, angle of repose, true density, and porosity, and interpret the effect of glidants.
5	Perform and assess experiments on solubility, partition coefficient, critical solution temperature, adsorption studies, and buffer capacity, and apply findings to formulation decisions.

Subject Contents:**List of Practical**

(Minimum 12 experiments must be performed)

1. Determination of surface tension of given liquids by drop count method and drop weight method.
2. Determination of critical micellar concentration (CMC) of surfactants.
3. Determination of viscosity of liquids using Ostwald's viscometer and Brookfield viscometer.
4. Determination of HLB value of a surfactant.
5. Calculation of isotonicity by different methods (Sodium Chloride Equivalent Method).
6. Determination of particle size and particle size distribution using sieving method.
7. Determination of particle size and particle size distribution using microscopic method.
8. Determination of densities and derived properties of powders (bulk density, tapped density, Hausner ratio, Carr's compressibility index), true density, and porosity.
9. Determination of angle of repose and influence of glidants on angle of repose.
10. Determination of solubility of a drug at different pH/buffer systems at room temperature.
11. Determination of partition coefficient of a drug in n-octanol and water system.
12. Determination of partition coefficient of a drug in benzene and water system.
13. Determination of critical solution temperature and composition of phenol–water system.
14. Determination of specific surface area of charcoal by adsorption of acetic acid on activated charcoal.
15. Determination of buffer capacity at various stages of titration of a weak acid against a strong base and determination of pKa.

Note:

Compare the values of various physicochemical properties with marketed formulations wherever possible.

References:

1. Sinko, P. J. *Martin's Physical Pharmacy and Pharmaceutical Sciences*. Lippincott Williams & Wilkins.
2. Aulton, M. E. and Taylor, K. M. G. *Aulton's Pharmaceutics: The Design and manufacture of Medicines*. Elsevier.
3. Lachman, L., Lieberman, H. A. and Kanig, J. L. *The Theory and Practice of Industrial Pharmacy*. CBS Publishers & Distributors.
4. Allen, L. V., Popovich, N. G. and Ansel, H. C. *Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems*. Lippincott Williams & Wilkins.
5. Cooper, S. J. and Gunn, C. *Cooper and Gunn's Tutorial Pharmacy*. CBS Publishers & Distributors.

List of Open Source Software/learning website: Nil