

INSTITUTE	FACULTY OF PHARMACY
PROGRAM	BACHELOR OF PHARMACY
SEMESTER	3
COURSE TITLE	PHYSICAL PHARMACEUTICS-I
COURSE CODE	13PH0302
COURSE CREDITS	6

Objective:

- 1 The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Course Outcomes: After completion of this course, student will be able to:

- 1 Understand various physicochemical properties of drug molecules in the designing the dosage forms
- 2 Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
- 3 Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Pre-requisite of course: The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	1	4	75	15	10	35	15

Contents : Unit	Topics	Contact Hours
1	Solubility of drugs Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications	10

Contents : Unit	Topics	Contact Hours
2	States of Matter and properties of matter State of matter, changes in the state of matter, latent heats, vapor pressure, sublimation critical point, eutectic mixtures, gases, aerosols– inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid-crystalline, amorphous & polymorphism., Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications	10
3	Surface and interfacial phenomenon Liquid interface, surface & interfacial tensions, surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, Solubilization, detergency, adsorption at solid interface.	8
4	Complexation and protein binding Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.	8
5	pH, buffers and Isotonic solutions Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.	7
Total Hours		43

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Practical Experiment-1, Experiment-2, Experiment-3, Experiment-4, Experiment-5, Experiment-6, Experiment-7, Experiment-8, Experiment-9, Experiment-10, Experiment-11, Experiment-12, Experiment-13, Experiment-14, Experiment-15	44
2	Tutorial Workshop-1, Workshop-2, Workshop-3, Workshop-4, Workshop-5, Workshop-6, Workshop-7, Workshop-8, Workshop-9, Workshop-10, Workshop-11, Workshop-12, Workshop-13, Workshop-14, Workshop-15	15
Total Hours		59

Textbook :

- 1 Textbook of Physical Pharmaceutics, C.V.S. Subramanyam, Vallabh Prakashan, 2017

References:

- 1 Physical Pharmacy, Physical Pharmacy, Alfred Martin, Lippincott Williams and Wilkins, 1993
- 2 Experimental pharmaceuticals Paperback, Experimental pharmaceuticals Paperback, Eugene, Parott., Burgess Pub. Co, 1977
- 3 Cooper and Gunn's Tutorial pharmacy, Cooper and Gunn's Tutorial pharmacy, Cooper and Gunn., CBS PUBLISHERS AND DISTRIBUTORS , 2008
- 4 Pharmaceutical Calculations Hardcover, Pharmaceutical Calculations Hardcover, Stocklosam J. , Lea &Febiger, 1986
- 5 Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Liberman H.A, Lachman C., MarcelDekkar Inc., 1989
- 6 Pharmaceutical Dosage forms. Dispersesystems, volume 1, 2, 3., Pharmaceutical Dosage forms. Dispersesystems, volume 1, 2, 3., Liberman H.A, Lachman C, , Marcel Dekkar Inc, 2019
- 7 Physical Pharmaceutics, Physical Pharmaceutics, Ramasamy C and Manavalan R., PharmaMed Press/BSP Books, 2015
- 8 Laboratory Manual of Physical Pharmaceutics, , Laboratory Manual of Physical Pharmaceutics, , C.V.S. Subramanyam, Vallabh Prakashan, 2014
- 9 Theory and Practice of Physical Pharmacy, Theory and Practice of Physical Pharmacy, Gaurav Jain & Roop K. Khar, Elsevier India, 2011

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
20.00	30.00	25.00	15.00	10.00	0.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and the need of students. The teacher in addition to the conventional teaching method by the blackboard may also use any tools such as demonstration, role play, quiz, brainstorming, MOOCs etc.
- 2 The internal evaluation will be done based on continuous evaluation of students in the laboratory and classroom.
- 3 Students will use supplementary resources such as online videos, NPTEL videos, MOOCs/ e-courses, virtual laboratories.