



Program	Bachelor of Pharmacy (BPharm)	Semester - 4
Type of Course	-	
Prerequisite		
Course Objective	-	
Effective From A.Y.	2023-24	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				External Marks (T)	Internal Marks (T)	External Marks (P)	Internal Marks (P)	
3	1	4	6	75	25	35	15	150

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content		T - Teaching Hours W - Weightage	
Sr.	Topics	T	W
1	UNIT-I 1. Colloidal dispersions: Classification of dispersed systems & their general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization & protective action.	7	16
2	UNIT-II 2. 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 Sphere, rotational viscometers 3. Deformation of solids: Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus	8	18
3	UNIT-III 4. Coarse dispersion: Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method.	10	22
4	UNIT-IV 5. Micromeritics: Particle size and distribution, mean particle size, number and weight distribution, particle number, methods for determining particle size by different methods, counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties.	10	22
5	UNIT-V 6. Drug stability: Reaction kinetics: zero, pseudo-zero, first & second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention.	10	22
Total		45	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy					
Level	Remembrance	Understanding	Application	Analyze	Evaluate
Weightage	20	15	20	15	30

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.



Course Outcomes

At the end of this course, students will be able to:

C01	Understanding about the properties, stability and applications of dispersed systems.
C02	Knowledge and skills of applying basic principles of rheology in formulation development.
C03	Knowledge and skills of applying principles of micromeritics in dosage form development.
C04	Knowledge about the principles of chemical kinetics & skills to use them for stability testing and determination of expiry date of formulations.
C05	Ability to use physicochemical properties in formulation development and to carry out evaluation of selected dosage forms.

Reference Books

1.	Physical Pharmacy By Alfred Martin, PILAR BUSTAMANTE, A. H. C. CHUN Sixth edition
2.	Experimental pharmaceutics By Eugene, Parott.
3.	Stocklosam J. Pharmaceutical calculations By Lea & Febiger, Philadelphia.
4.	Tutorial Pharmacy By Cooper and Gunn's CBS Publishers and Distribution
5.	PHYSICAL PHARMACEUTICS (TextBook) By CVS SUBRAMANYAM VALLABH PRAKASHAN 2, Pub. Year 2014
6.	Pharmaceutical Dosage forms, Tablets, . By LACHMEN/LIBERMAN'S Marcel Dekkar Inc. volume 1-3
7.	Pharmaceutical Dosage forms. Disperse systems, By Liberman H.A, Lachman C, Marcel Dekkar Inc volume 1-3

List of Practical

1.	To determine particle size and particle size distribution of given sample of granules by sieving method.
2.	To determine the particle size and particle size distribution of a powder by microscopy method.
3.	To determine globule size and size distribution of emulsion by microscopy method.
4.	To determine bulk density, tapped density and angle of repose of given sample of powder or granules.
5.	To determine bulk density, true density, porosity, Carr's index and Hausner ratio.
6.	To determine angle of repose and influence of lubricant on angle of repose.
7.	To determine viscosity of given sample by Ostwald viscometer.
8.	Demonstration of Brookfield viscometer.
9.	To determine effect of different suspending agent on sedimentation volume of zinc oxide suspension.
10.	To determine effect of different concentration of suspending agent on sedimentation volume of zinc oxide suspension.
11.	To determine reaction rate constant for first order reaction.
12.	To determine reaction rate constant of second order reaction.
13.	To determine effect of different concentration of emulsifying agent on the rate of creaming.
14.	To study the influence of temperature on the stability of ascorbic acid.
15.	Mid Practical Exam



List of Tutorial

1.	Tutorial 1
2.	Tutorial 2
3.	Tutorial 3
4.	Tutorial 4
5.	Tutorial 5
6.	Tutorial 6
7.	Tutorial 7
8.	Tutorial 8
9.	Tutorial 9
10.	Tutorial 10
11.	Tutorial 11
12.	Tutorial 12
13.	Tutorial 13
14.	Tutorial 14
15.	Tutorial 15