

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**  
**HYDERABAD CAMPUS**  
**FIRST SEMESTER 2019-2020**  
**COURSE HANDOUT (Part-II)**

01/08/2019

In addition to part-I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

**Course No.** : PHA F244  
**Course Title** : Physical Pharmacy  
**Instructor-in-charge** : V. Vamsi Krishna Venuganti  
**Instructors** : Girdhari Roy, B. Sony Priyanka

**1. Course description:**

This course is designed to make the students conversant with the applications of physico-chemical principles to the study of the drug stability behaviour of drug powders and of other pharmaceutical systems; it includes the discussion of drug degradation, micromeritics, rheology and interactions of drugs.

**2. Scope and objective of the course:**

This course deals with the applications of physico-chemical principles to the study of drug stability, behavior of drug powders and their pharmaceutical systems. It also includes the discussions on surface properties, kinetics and rheology.

**3. Learning outcomes:**

- The student should be able to understand the importance of physical and chemical properties of compounds and their role in formulation development
- The student should be able to differentiate different solid compounds into crystalline and amorphous substance
- The student should be able to understand and apply the concept of solubility and perform solubility determination study
- The students should be able to determine average particle size of powders and dispersions and relate to their performance
- The student should be able to understand different stability problems of pharmaceuticals and perform simple stability tests
- The student should be able to understand stabilizing multi-phase systems by altering surface tension using amphipathic substances
- The student should be able to measure the viscosity and understand its relation to different pharmaceutical product performance
- The students should know the concept of diffusion and dissolution

**4. Text Book:**

a) Sinko, Patrick J Martin's Physical Pharmacy & Pharm, SC B.I./Lippincott, 5<sup>th</sup> ed, 2006.

**Reference Books:**

- (i) Gennaro, A.R., Remington Pharmaceutical Sciences, Hack Pubs. Pennsylvania, 17th Ed. (1995)
- (ii) Liberman, H and Lachman, L, Theory and Practice of Industrial Pharmacy. Verghese Pubs., Bombay., 1994, 3rd Edn.
- (iii) Liberman, H and Lachman, L, Pharmaceutical dosage forms: Tablets Vol.2, Marcel Dekker, New York, 1980.
- (iv) Liberman, H and Lachman, L, Pharmaceutical dosage forms: Disperse systems Vol.1, Marcel Dekker, New York, 1987.

**5. Course Plan:**

<b>L. No.</b>	<b>Learning objectives</b>	<b>Topics to be covered</b>	<b>Chapter in the Text Book</b>
1, 2	Application of Physical Pharmacy	Introduction to Physical Pharmacy, states of matter, phase distribution	3(a) ch 2
3, 4	Crystallinity, amorphous compounds and polymorphism, characterization of polymorphs	Solid state pharmaceuticals	3(a) ch 4 and class notes
5, 6	Solubility terminology, factors influencing aqueous solubility, determination of solubility, solubility enhancement	Solubility	3(a) ch 10
7-10	Kinetics and order of reactions & its determination, rate expressions, determination of shelf life of pharmaceuticals	Stability of drugs	3(a) ch 15
11, 12	Knowledge of various methods for determining surface tension	Determination of surface tension	3(a) ch 16
13-15	Applications of adsorption at solid/liquid interfaces	Adsorption at interfaces	3(a) ch 16
16-19	Applications of colloids & molecular weight determination	Colloids	3(a) ch 17
20, 21	Factors influencing properties of suspensions	Suspensions	3(a) ch 18
22	Factors influencing properties of emulsions	Emulsions	3(a) ch 18
23-25	Concept of viscosity, viscosity measurement & pharmaceutical applications	Rheology	3(a) ch 20
26, 27	Particle size characterization, measurement & analysis	Micrometrics	3(a) ch 19
28-30	Principles of diffusion & dissolution, mathematical models & applications	Diffusion & Dissolution	3(a) ch 13

**6. Evaluation Schedule:**

<b>Component</b>	<b>Duration</b>	<b>Weightage (%)</b>	<b>Date &amp; Time</b>	<b>Nature of Component</b>
Mid-semester test	90 mins	25	3/10, 1.30 -- 3.00 PM	Closed Book
Surprise Quiz #		10		Closed Book
Laboratory component	Weekly lab	10	Continuous	
	Lab Quiz	5		
	Lab Comprehensi	10		

	ve			
Comprehensive Exam	3 hrs	40	10/12 FN	Closed Book (20%) + Open book (20%)

# - 3 quizzes will be conducted during the lecture hours and the average will be taken for final total.

**Mid-semester evaluation:** Will be announced after mid-semester test

7. (i) Laboratory attendance is must and no make-up will be given.

(ii) Make-up's for tests will be granted only on genuine grounds.

8. **Chamber consultation hour:** To be announced in the class.

9. **Notices:** All notices regarding this Course will be displayed on CMS.

**Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-charge  
PHA F244