BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE-PILANI, HYDERABAD CAMPUS

SECOND SEMESTER 2021 – 2022

Course Handout (Part II)

Date: 15/01/2022

In-addition to Part – I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course

Course No : **PHA F414**
Course Title : **Biopharmaceutics & Pharmacokinetics**
Instructor-in-charge : **Dr. Nirmal J**

1. Scope and objective of the course :

The prime objective of this course is to impart knowledge of biopharmaceutical process based on fundamental concepts. The primary focus will be on mechanisms and factors influencing drug absorption, distribution, biotransformation and excretion as well as bioavailability. In order to develop basic background knowledge in pharmacokinetics, a brief discussion about basic considerations in pharmacokinetics, compartment modeling and design of dosage regimen is also included. It is at the key interface of pharmaceutics and pharmacokinetics that the discipline of biopharmaceutics has emerged. The knowledge of this branch of pharmacy is very essential for a professional pharmaceutical scientist, working in every branch of pharmacy, be it pharmaceutics, pharmacology or medicinal chemistry. Therefore, it is essential for every graduate student in pharmacy to be familiar with the outlines of these concepts and that is what this course aims to achieve.

Learning Outcome :

By the end of this course, students will be able to understand the

- Fate of drug in the body after its administration
- Importance of drug physicochemical properties in the drug absorption and disposition
- Basics of pharmacokinetics

2. Text Book (T):

Brahmankar, D M and Jaiswal, S N, Biopharmaceutics and Pharmacokinetics - A treatise 2nd edition Vallabh Prakashan 2009

3. Reference Book (R):

Gibaldi M., Biopharmaceutics and Clinical Pharmacokinetics, 4th ed.

4. Course Plan:

Lect. No.	Learning Objectives	Topics to Covered	Chapter in the Text Book
1-2	**Introduction to Biopharmaceutics**	Significance of biopharmaceutics and its application in drug development	T:Ch. 1
3-8	**Absorption of Drugs**	Drug absorption process, mechanisms involved	T:Ch. 2

		and factors influencing the absorption of drug	
9-13	**Distribution of Drugs**	Tissue Permeability of drugs, Volume of Distribution, Protein binding of drugs, Tissue binding of drugs	T:Ch. 3,5
14-17	**Biotransformation of Drugs**	Why biotransformation of drug is needed ? Drug metabolizing organs and enzymes, Chemical Pathways, Phase I and Phase II reactions, Factors affecting Biotransformation of Drugs	T:Ch. 5
18-23	**Excretion of Drugs**	Renal Excretion, Glomerular Filtration, Active tubular secretion, Tubular reabsorption Concept of Clearance, Factors affecting Renal Excretion, Dose adjustment in renal failure Non-renal routes of drug excretion	T:Ch. 6
24-26.	**Pharmacokinetic Drug Interactions**	Mechanisms of Drug Interactions Interactions affecting Absorption and Distribution Interactions affecting Metabolism and Excretion	T:Ch. 7
27-31	**Drug Transporters**	Fundamentals and functional role of transporters in absorption, distribution, metabolism, excretion and drug delivery	Class notes
32-33	**Bioavailability and Bioequivalence**	Objective and Considerations in bioavailability studies, Measurement of Bioavailability, Methods for enhancement of bioavailability	T:Ch. 11
34-39	**Pharmacokinetics**	Basic considerations and compartment models	T:Ch. 8 & 9 R
40-42	**Application of Pharmacokinetic Principles**	Design of Dosage regimen	T:Ch. 12

5. Evaluation Scheme:

Component	**Duration**	**Weightage (%)**	**Date & Time**	**Nature of Component**
Midsem	1.5 hr	30	10/03 11.00am to12.30pm	As announced in the timetable (100% CB if conducted offline/ 100% OB if conducted online or hybrid mode)
Surprise Quiz (1-2 Nos)	15 min	10		CB
Seminars / Assignments	--	20	--	OB

Comprehensive exam	2 hr	40	06/05 AN	As announced in the timetable (80% CB if conducted offline/ 100% OB if conducted online or hybrid mode)

*OB – Open Book ; *CB – Close Book

6. **Notices**: All the notices pertaining to this course will be displayed on CMS.

7. **Chamber Consultation Hour:** To be announced in the class.

8. **Make-up Policy:** Prior approval or intimation to take a make-up is mandatory. It is solely at the discretion of the instructor-in-charge, depending upon the genuineness of the circumstances, to allow or disallow a student to appear for a make-up evaluation component. No makeup will be granted for Assignments/Quizzes under any circumstances.

9. **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 F414