

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE-PILANI, HYDERABAD CAMPUS
SECOND SEMESTER 2023 – 2024
Course Handout (Part II)

Date: 09/01/2024

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**
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.

Rajesh Krishna and Lawrence Yu. Biopharmaceutics Applications in Drug Development, Springer.

4. Course Plan:

Lect. No.	Learning Objectives	Topics to Covered	Chapter in the Text Book
1-2	Introduction to	Significance of biopharmaceutics and its	T:Ch. 1

	Biopharmaceutics	application in drug development	
3-8	Absorption of Drugs	Drug absorption process, mechanisms involved and factors influencing the absorption of drug	T:Ch. 2
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	25	12/03 - 4.00 - 5.30PM	CB
Surprise Quiz (1-2 Nos)	15 min	15		CB
Seminars / Assignments	--	20	--	OB
Comprehensive exam	3 hr	40	09/05 AN	CB

*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. Only students who have attended minimum of 75% classes are eligible for makeup request. 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