BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus

INSTRUCTION DIVISION
FIRST SEMESTER 2014-2015
Course Handout (Part II)

Date:12/01/2016

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. Anil Jindal**

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 of and factors influencing drug absorption as well as bioavailability. This course also deals with Distribution, Biotransformation and Excretion of Drugs. In order to develop a background knowledge in the up-coming field like pharmacokinetics, a brief discussion about basic considerations in pharmacokinetics such as rates and orders of reactions, compartment modeling, bioequivalance and design of dosage regimen is also included. The knowledge of this branch of pharmacy is very essential for a professional pharmaceutical scientist, as concepts regarding plasma drug concentration profile, Bioavailability and Bioequivalance as well as Dosage Regimen is resourceful working tool 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.

2. **Text Book:**

   1. Brahmankar, D M and Jaiswal, S N Biopharmaceutics and Pharmacokinetcs a treatise 2nd edition Vallabh prakashan 2009

3. **Reference Book:**

   1. Gibaldi, M and Perrier, D, Pharmacokinetics, 2nd edition Revised and Expanded vol 15 Marcel Dekker Inc.
   2. Gibaldi, M and Perrier, D, Pharmacokinetics, 3rd edition Revised and Expanded Marcel Dekker Inc.
   3. Hassan, Williams E Hospital Pharmacy 4th edition phil Lea & febiger 1981
   4. Remington: The Science and Practice of Pharmacy, Alfanso R Genero, 19th edition, 1996

4. Course Plan:

Lect. No.	Learning Objectives	Topics to Covered	Ref. Chap/Sc # (Book)
1-2	**Introduction**	Definition, Scope, Term used, Processes involved in drug therapeutics, BMR, BMI, BP	**1**
3-8	**Absorption of Drugs**	Gastrointestinal Absorption of Drugs Cell Membrane- Structure and Physiology Mechanisms and Factors Influencing drug absorption and Bioavailability pH-Partition hypothesis Theories of drug dissolution and dissolution rate Absorption of Drugs from Non *per Os* Extravascular Routes	**2**
9-14	**Distribution of Drugs**	Tissue Permeability of drugs Volume of Distribution Protein binding of drugs Tissue binding Kinetics of protein-Drug binding	**3, 4**
15-18	**Biotransformation of Drugs**	Drug metabolizing organs and enzymes Chemical Pathways Phase I and Phase II reactions Factors affecting Biotransformation of Drugs	**5**
19-20	**Prodrugs**	Application of prodrug design Limitations of prodrug design	**Class notes**
21-26	**Excretion of Drugs**	Renal Excretion Glomerular Filtration, Active tubular secretion, Tubular reabsorption Concept of Clearance Factors affecting Renal Excretion Dose adjustment in renal failure Nonrenal routes of drug excretion	**6**

27-29	**Pharmacokinetic Drug Interactions**	Mechanisms of Drug Interactions Interactions affecting Absorption and Distribution Interactions affecting Metabolism and Excretion	**7**
30-33	**Pharmacokinetics: Basic Consideration**	Plasma Drug Concentration-time profile Rates, Rate constants and orders of reaction Pharmacokinetic Models Compartment Models Noncompartmental Analysis Physiologic models	**8**
34-36	**Introduction to Compartment Modeling and pharmacokinetic software**	One-Compartment open Model Urinary Excretion data Two-Compartment open Model Multi Compartment Models, An introduction to various pharmacokinetic software	**9 and class notes**
37-38	**Bioavailability and Bioequivalence**	Objective and Considerations in bioavailability studies Measurement of Bioavailability Methods for enhancement of bioavailability	**11**
39-40	**Application of Pharmacokinetic Principles**	Design of Dosage regimen	**12**

5. Evaluation Scheme:

Component	Duration	Weightage (%)	Remarks	Date
Mid-term test	90 min	30	CB	-
Surprize Quizzes		20	CB	
Assignments/Seminar		10		
Comprehensive Exam	180 min	40	OB+CB	9/5 FN

6. **Mid semester evaluation:** Will be announced after the mid-term test.

7. **Attendance:** Regularity in attendance will be one of the criteria in deciding borderline cases at the time of final grading.

8. **Notices**: Pharmacy Notice Board.

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

10. **Make-up Policy:** Make-ups are not given as a routine. It is solely dependent on the "genuineness" of the circumstances under which a student fails to appear in a scheduled evaluation component. Prior permission should be sought from the instructor-in-charge in advance.

Instructor-in-charge
PHA F414