Jadara University

جامعة جدارا

ref# FR/P1/P1/1/v1

COURSE DESCRIPTIONS

Faculty	**Pharmacy**				
Department	**Pharmacy**			**NQF level**	7
Course Title	Biopharmaceutics & Pharmacokinetics	**Code**	901423	**Prerequisite**	901444
Credit Hours	3	**Theory**	3	**Practical**	0
Course Leader	Prof. Dr. Ahmed Gardouh	**email**	Ahmed.ga@jadara.edu.jo		
Lecturers	Prof. Dr. Ahmed Gardouh	**emails**	Ahmed.ga@jadara.edu.jo		
Lecture time	Sunday, Thursday: 08:30 am-10:00am	**Classroom**	D301		
Semester	2024/2025 first	**Production**		**Updated**	2025
Awards				**Attendance**	Fulltime
Type of Teaching	☐ Face to Face ■ Blended ☐ Online				

Short Description
This course is designed to introduce the student to pharmacokinetics terminology and mathematical as well as conceptual aspects of basic pharmacokinetics. Particular emphasis will be placed on obtaining, understanding, and utilizing terms such as, clearance, apparent volume of distribution, elimination rate constant, and elimination half-life. Prediction of plasma and urine drug concentration based upon pharmacokinetic parameters after single and multiple intravenous and oral doses, as well as after intravenous infusion well be stressed. The course will also cover the general handling of drugs by the kidney and liver as well as distributional aspects and pharmacokinetic drug-drug interactions.
Course Objectives

On successfully completing the course, the student expected to develop:

- Describe different Pharmacokinetic parameters
- Explain the plasma and urine drug concentration based upon pharmacokinetic parameters after single and multiple intravenous and oral doses, as well as after intravenous infusion well be stressed
- Explain the handling of drugs by the kidney and liver as well as distributional aspects and pharmacokinetic drug-drug interactions.
- Understand the compartmental modelling and its significance.
- Understand drug clearance including (total, renal and hepatic clearance).
- Understand the concept of bioavailability, and factors affecting bioavailability for medications such as onset and extent of drug reaching the blood circulation.
- Understand the concept of bio-equivalence
- Encourage critical thinking, the understanding of scientific methodology, and the application of scientific principles.

Learning Outcomes
A. Knowledge - Theoretical Understanding
a1. Define the concept of Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs in the body and distinguish between bioavailability and bioequivalence.
B. Knowledge - Practical Application
C. Skills - Generic Problem Solving and Analytical Skills
b1. Analyze potential clinical pharmacokinetic problems and apply basic pharmacokinetic concepts to solve them.
D. Skills - Communication, ICT, and Numeracy
b2. Take part in dosage adjustment with physicians and patients.
E. Competence: Autonomy, Responsibility, and Context
c1. Mark basic principles of drug pharmacokinetics and recognize disease conditions and other factors that interfere with safety and efficacy of medicines. c2. Improve the ability to perform pharmacokinetics, bioavailability and bioequivalence calculations.
Teaching and Learning Methods
■ Face to Face Lectures ■ Brain Storming ■ Synchronous remote ■ Asynchronous remote ■ Using Video ■ Discussions ☐ Research Project ☐ Case Study ☐ Field visit ■ Problem solving
Assessment Methods
☐ Formative Assessment ■ Quiz ☐ Lab Exam ■ Homework ☐ Project Assessment ☐ Oral Presentation ■ Midterm ■ Final Exam

Course Contents					
Week	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1.	3	a1	Introduction to Biopharmaceutics and Pharmacokinetics	Advanced Lecture (Presentations)	Short quizzes, Exams
2.	3	a1, c1	Plasma Level – Time Curve	Discussion Brainstorming	Short quizzes,

3.	3	b1, c1	Pharmacokinetics Models	Advanced Lecture (Presentations) Discussion Brainstorming	Quizzes, exams
4.	3	b2, b1	Mathematical Fundamentals in Pharmacokinetics	Advanced Lecture (Presentations) Brainstorming	Exams
5.	3	b2, c1	Intravenous Bolus Administration: one-compartment Models	Advanced Lecture (Presentations) Using instructional technologies	Exams
6.	3	c2	Intravenous Bolus Administration: Multi-compartment Models	Advanced Lecture (Presentations) Using instructional technologies	Exams
7.	3	b2, c1	**Midterm Assessment Exam** Drug kinetics after intravenous infusion	Advanced Lecture (Presentations) Using instructional technologies	exams
8.	3	c2	Drug kinetics after intravenous infusion	Advanced Lecture (Presentations) Using instructional technologies	quizzes – exams
9.	3	b2, c1	Drug kinetics after oral administration	Advanced Lecture (Presentations) Using instructional technologies	Exams
10.	3	c2	Drug kinetics after oral administration	Advanced Lecture (Presentations) Using instructional technologies	Exams
11.	3	b2, c1	Multiple-Dosage Regimens	Advanced Lecture (Presentations) Using instructional technologies	Exams
12.	3	c2	Multiple-Dosage Regimens	Advanced Lecture (Presentations) Using instructional technologies	quizzes – exams
13.	3	b2, c1	Nonlinear Pharmacokinetics, Drug distribution, Drug Excretion, Hepatic clearance.	Advanced Lecture (Presentations) Discussion	Exams
14.	3	a1	Bioavailability & Bioequivalence.	Advanced Lecture (Presentations) Discussion, Using instructional technologies	Exams
15.	3	c2	Bioavailability & Bioequivalence.	Advanced Lecture (Presentations) Discussion, Using instructional technologies	quizzes - exams
16.	**Start of the Final Assessment Exams**				

Infrastructure

Textbook	3rd Edition, Basic Pharmacokinetics, By Mohsen A. Hedaya, 2023
References	Shargel and A.B.C. Yu., *Applied Biopharmaceutics and Pharmacokinetics*, 7th edition 2018. Appleton & Lange/MacGraw-Hill, New York.
Required reading	V. Venkateswarlu, *Biopharmaceutics and Pharmacokinetics*, 6th Ed. , 2015., PharmaMed Book Press
Electronic materials	✓ *https://www.e-pharmacokinetics.com/epharma/index.php*
Other	*In addition to the above, the students will be provided with handouts by the lecturer.*

Course Assessment Plan							
Assessment Method		**Grade**	**CLOs**				
			a	**b**		**c**	
			1	**1**	**2**	**1**	**2**
First (Midterm)		30	10	2	5	7	6
Second (if applicable)							
Final Exam		40	10	5	5	10	10
Coursework							
Coursework assessment methods	Assignments	10			2	8	
	Case study						
	Discussion and interaction						
	Group work activities						
	Lab tests and assignments						
	Presentations						
	Quizzes	20		4			16
Total		100 %	20	9	12	30	29

Plagiarism

Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code).
Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.