

**University of Jordan-Faculty of Pharmacy**  
**Department of Biopharmaceutics and Clinical Pharmacy**

**Semester:** First  
**Course Title:** Case studies in pharmacokinetics  
**Course Code:** 1203476  
**Pre- or co-requisite (s):** Pharmacokinetics (1203475)  
**Level:** 4<sup>th</sup> year

Instructor	E - mail
Ola Diab	olaaldiab@gmail.com
Lina Alsous	lina_alsous@yahoo.com
Dr. Mariam Abdel Jalil Course coordinator	m.abdeljalil01@ju.edu.jo (Coordinator)
Dr. Mohamed Issa	moh.saleh@ju.edu.jo

### **Course description**

This practical course in addition to the co-requisite course (1203476) provides students with a basic intuitive understanding of the pharmacokinetic principles, terminology, models, equations and factors affecting drug absorption, distribution, metabolism and excretion and its importance in drug therapeutic or toxic effects. Emphasis will be placed upon the prediction of plasma levels of drugs under varying conditions applying different pharmacokinetic parameters. Handling pharmacokinetic parameters of drugs in the body and solving problems

### **Course Objectives :**

- 1) Mathematical background for modeling of the concentration time relationships for the different routes of administration.
- 2) Designing dosing regimens by relating plasma concentration of drugs to their pharmacological and toxicological action,
- 3) Individualization of therapy for patients.
- 4) Designing therapeutic drug monitoring plans for drugs with narrow therapeutic index or high toxicity.

### **Learning Outcomes :**

#### **A) Knowledge and understanding**

- A1) Understanding mathematics of the time course of Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs in the body.
- A2) Individualization of therapy and therapeutic drug monitoring for each patient.

#### **B) Intellectual skills (cognitive and analytical)**

- B1) Utilization of mathematics of the time course of Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs in the body for dosage optimization.
- B2) Developing dosing regimens for the individualization of therapy for the patient
- C) Subject specific skills**
  - C1) Fitting concentration time profiles and estimating pharmacokinetic parameters.
  - C3) Designing dosing regimens in case of renal and hepatic dysfunction.
- D) Transferable Skills**
  - D1) Communicating the dosage adjustment with physicians.
  - D2) Suggesting therapeutic monitoring plans for physicians.

### **Exams :**

Midterm exam	30%
Quizzes and reports	30%
Final exam	40%

### **Course contents**

1. Introduction
2. The one-compartment open model with an intravenous bolus dose: calculating pharmacokinetic parameters from plasma data
3. The one-compartment open model with an intravenous bolus dose: calculating pharmacokinetic parameters from urinary data
4. The one-compartment open model with an intravenous infusion: calculating pharmacokinetic parameters from continuous infusion, infusion with a bolus dose, post infusion data
5. The one-compartment open model with absorption and elimination: calculating pharmacokinetic parameters from plasma data
6. The one-compartment open model with absorption and elimination: calculating pharmacokinetic parameters from plasma data
7. The one-compartment open model with multiple dosing kinetics: multiple dosing IV
8. The one-compartment open model with multiple dosing kinetics: multiple dosing oral
9. Designing dosing regimens
10. The two-compartment open model with intravenous administration.

### **Textbooks and resources**

- 1) Applied biopharmaceutics and pharmacokinetics, Shargel and Yu, 6<sup>th</sup> edition, 2012, McGraw-Hill Medical, **ISBN-13: 978-0071603935**.
- 2) Basic pharmacokinetics, Sunil Jambhekar, Philip J. Breen, 2<sup>nd</sup> edition, 2012. Pharmaceutical Press. **ISBN-13: 978-0853699804**
- 3) Basic pharmacokinetics, Mohsen A. Hedaya, 2<sup>nd</sup> edition, 2012. CRC Press. **ISBN-13: 978-1-4398-5073-2**

4) **Handbook of Basic Pharmacokinetics**, Wolfgang A. Ritschel, Gregory L. Kearns, 7<sup>th</sup> edition, 2009, American Pharmacists Association. **ISBN-13: 9781582121260**

5) **Clinical Pharmacokinetics and Pharmacodynamics**, Rowland and Tozer, 4<sup>rd</sup> edition, 2011, Wolters Kluwer Health/Lippincott William & Wilkins. **ISBN-13: 9780781750097**

6) **A First Course in Pharmacokinetics and Biopharmaceutics**  
<http://www.boomer.org/c/p1/>

### **Useful Web Sites**

**A First Course in Pharmacokinetics and Biopharmaceutics**  
<http://www.boomer.org/c/p1/>