Detailed Course Description - Course Plan Development and Updating Procedures/ Pharmacy Department	QF02/0408-3.0E

Faculty	Pharmacy	Department	Pharmacy
Course number	0201421	Course title	Biopharmaceutics & Pharmacokinetics
Number of credit hours	3	Pre-requisite/co-requisite	(0201321) Pharmaceutics-3-

Brief course description
This course is intended to equip the students with the necessary knowledge about how the body deals with the medications via the ADME processes. And how a dosage regimen is designed based on the pharmacokinetics of medications. Also it sheds the light on the physiological aspects of drug elimination.

	Course goals and learning outcomes
Goal 1	To provide understanding of the ADME processes, and the different pharmacokinetic models
Learning outcomes	The student should be able to 1.1 Illustrate the ADME processes with their details 1.2 deal with, and solve the equations of the one compartment open model, two compartment open model, Oral absorption model and continuous IV infusion model 1.3 solve the corresponding mathematical problems
Goal 2	To equip the student with the science necessary to understand and design a multiple dosage regimen of a medication
Learning outcomes	The student should be able to: 2.1 understand the concept of drug accumulation 2.2 calculate the concentration at any time after multiple dosage administration 2.3 design a safe and effective dosage regimen based on the pharmacokinetics of the medications
Goal 3	To provide the necessary knowledge of the elimination process, bioavailability and bioequivalence
Learning outcomes	The student should be able to: 3.1 illustrate both renal and hepatic clearance based on the pharmacokinetic and physiologic approaches 3.2 determine the absolute and relative bioavailability of medications using the necessary data. 3.3 show good understanding of the term bioequivalence, and judge whether two formulations of the same drug are bioequivalent.
Textbook	1.- Biopharmacokinetics and Pharmacokinetics by Shargel. 2.- Pharmacokinetics by Gibaldi.

Detailed Course Description - Course Plan Development and Updating Procedures/ Pharmacy Department	QF02/0408-3.0E

Supplementary references	1.- www.boomer.org

Course timeline				
Week	**Number of hours**	**Course topics**	**Pages (textbook)**	**Notes**
01	1 1 1	**Introduction to Biopharmaceutics and Pharmacokinetics** -Pharmacokinetics Introduction & Concepts -Plasma Level-Time curve - Pharmacokinetic models	Chapter 1	
02	1 1 1	-Review of rates and orders of reactions **One compartment open model(IV bolus):** -calculation of volume of distribution -calculation of Elimination half-life and AUC	Chapter 3	
03	1 1 1	-calculation of k from plasma data - calculation of k from urinary excretion data - Learning questions	Chapter 3	
04	1 1 1	**Two compartment open model (IVbolus):** -Define the pharmacokinetic terms used in a two- and three-compartment model. -equations and graph to simulate plasma drug concentration -Estimate two-compartment model parameters by using the method of residuals.	Chapter 4	
05	1 1 1	-types of Volumes of distribution -Learning questions **Intravenous Infusion:** -the concept of steady state and how it relates to continuous dosing.	Chapter 4 Chapter 5	
06	1 1 1	- time needed to reach Css -loading dose plus IV infusion -calculating elimination half-life & K -estimation of drug clearance and Vd from infusion data	Chapter 5	

07	1 1 1	- Learning Questions for IV infusion **Pharmacokinetics of oral absorption:** - first order absorption models -calculation of plasma concentration, calculation of t max	Chapter 7	
08	1 1 1	-determination of absorption rate constant by method of residuals -Lag time and flip-flop of ka and k -determination of excretion rate constant from urine data	Chapter 7	
09	1 1 1	-Learning Questions in single oral dose **Multiple dosage regimens:** -drug accumulation & superposition principle -Repetitive intravenous bolus injections	Chapter 8	
10	1 1 1	- Calculation of Missed dose -Early or Late Dose Administration during Multiple Dosing - Intermittent IV infusion	Chapter 8	
11	1 1 1	-Multiple oral dose regimen -Loading dose plus maintenance dose -Determination of bioavailability in multiple dose regimen	Chapter 8	
12	1 1 1	-Learning Questions in multiple dosage regimens **Drug Elimination and Renal Clearance:** Drug Elimination :metabolism &excretion -Total body clearance, clearance models	Chapter 6	
13	1 1 1	-Physiological processes of kidneys -1st order elimination, fraction of drug excreted and renal clearance -Learning Questions	Chapter 6	
14	1 1 1	**Drug Elimination and Hepatic Clearance:** -hepatic elimination of drugs, pathways for drug metabolism -1st order elimination, fraction of drug metabolized, hepatic clearance -1st pass effect,liver extraction ratio, intrinsic clearance	Chapter 6	
15	1 1 1	-**Bioavailability & Bioequivalence**: -definitions -Relative & Absolute availability -Methods for assessing bioavailability	Chapter 15	
16	**1** **1** **1**			

Detailed Course Description - Course Plan Development and Updating Procedures/ Pharmacy Department	QF02/0408-3.0E

Theoretical course evaluation methods and weight	First exam 25% Second exam 25% Final exam 50%	**Practical (clinical) course evaluation methods**	Semester students' work = 50% (Reports, research, quizzes, etc.) Final exam = 50%

Approved by head of department	Dr. Abdel Qader Al Bawab	**Date of approval**	

Extra information (to be updated every semester by corresponding faculty member)

Name of teacher	Dr. Abdel Qader Al Bawab	Office Number	**418**
Phone number (extension)	471	Email	abdelqader.albawab@zug.edu.jo
Office hours	12-2 p.m. daily		