



**The University of Jordan**

**Accreditation & Quality Assurance Center**

**COURSE Syllabus**

1	Course title	Clinical Pharmacokinetics
2	Course number	1203577
3	<b>Credit hours (theory, practical)</b>	2 hrs / theoretical
	<b>Contact hours (theory, practical)</b>	2 hrs / theoretical
4	Prerequisites/corequisites	Pharmacokinetics (1203475)
5	Program title	PharmD
6	Program code	PharmD
7	Awarding institution	The University of Jordan
8	Faculty	Pharmacy
9	Department	Biopharmaceutics & Clinical Pharmacy
10	Level of course	Undergraduate
11	Year of study and semester (s)	First semester of the 5 <sup>th</sup> year
12	Final Qualification	PharmD
13	Other department (s) involved in teaching the course	Pharmaceutical Sciences & Pharmaceutics
14	Language of Instruction	English
15	Date of production/revision	1 September 2015

**16. Course Coordinator:**

Dr. Maysa Suyagh  
 Faculty of Pharmacy / Dept of Biopharmaceutics and Clinical Pharmacy  
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 Office hours: to be arranged

**17. Other instructors:**

N/A

**18. Course Description:**

This course aims to involve the clinically-oriented PharmD student in the process of clinical pharmacokinetic and pharmacodynamic monitoring of drug therapy. It is mainly concerned with the application of concepts and techniques of pharmacokinetics and pharmacodynamics to the rational design of individualized drug dosage regimens in the total clinical context, taking into account such special problems as hepatic and renal functional impairment, and the effects of disease, immaturity of drug metabolizing enzymes, and drug interactions

**19. Course aims and outcomes:****A- Aims:**

This course aims to involve the clinically-oriented PharmD student in the process of clinical pharmacokinetic and pharmacodynamic monitoring of drug therapy. It is mainly concerned with the application of concepts and techniques of pharmacokinetics and pharmacodynamics to the rational design of individualized drug dosage regimens in the total clinical context, taking into account such special problems as hepatic and renal functional impairment, and the effects of disease, immaturity of drug metabolizing enzymes, and drug interactions

The overall objectives of this course are to:

1. Discuss Disease states and factors that are responsible for altering the pharmacokinetics of specific drugs.
2. Initiate therapy by designing a dosing regimen based on 1) population-specific information or 2) estimated patient-specific information for drugs discussed in this course
3. Modify/adjust a dosing regimen based on monitored blood concentrations, patient-specific information, physiologic changes associated with special populations, drug interactions, and switching of dosage forms for drugs discussed in this course
4. Value the importance of pharmacokinetic and pharmacodynamic principles in different pharmacy setting.
5. Locate and evaluate the literature related to the pharmacokinetics of specific drugs.

**B- Intended Learning Outcomes (ILOs):****A- Knowledge and Understanding:**

Student is expected to

- A1. Discuss and understand the basic pharmacokinetic principles and key pharmacokinetic parameters.
- A2. Discuss and understand various aspects of a drug's pharmacokinetic properties and factors affecting them.
- A3. Discuss the effect of different disease states on the pharmacokinetics and pharmacodynamics of drugs
- A4. Understand the theoretical basis of therapeutic drug monitoring.

**B- Intellectual, Analytical and Cognitive Skills:**

Student is expected to

- B1. Perform calculations to predict drug concentration after drug administration.
- B2. Given a pharmacokinetic data set, determine the value of pharmacokinetic parameters after different modes of drug administration.
- B3. Be able to develop a strategy for therapeutic drug monitoring for a range of narrow therapeutic window drugs.
- B4. Identify the problems associated with dosage regimens through analyzing patient data.
- B5. Gain therapeutic problem-solving skills.

**C- Subject-Specific Skills:**

Student should be able to

- C1. Recommend initial dosage regimen, or adjust dosage and recommend monitoring strategy to ensure safe and effective drug therapy.
- C2. Identify clinical manifestations of potential toxicities associated with patient's medication and recommend the appropriate course of action.
- C3. Apply the pharmacokinetic principles to specific problems commonly encountered in practice setting.
- C4. Identify patients who are likely to get maximal benefit from clinical pharmacokinetic monitoring.

**D- Transferable Key Skills:**

Students is expected to

- D1. Use different information sources to solve pharmacokinetics problems.
- D2. Develop the theoretical ability to communicate scientific principles to other healthcare professionals.

**Competencies achieved upon completion of the course.**

- 1.3 Characterize different dosage forms of medicines and their proper usage
- 1.4 Identify different routes of administration of medicines
- 1.10 Accurately interpret prescriptions' instructions including medicine's type, strength, dosage form and route of administration
- 1.13 Advise patients on proper storage, usage and adherence of dispensed medicines
- 2.8 Identify indications, side effects and contraindications of medicines
- 2.9 Identify drug-drug and drug-food interactions of medicines
- 2.10 Identify basic principles of drug pharmacokinetics and recognize disease conditions and other factors that

interfere with safety and efficacy of medicines  
 2.17 Advise patients and other health professionals on proper usage of medicines including their strength, frequency, dosage form and route of administration  
 2.18 Identify any medicament-related problems and take appropriate actions to resolve them  
 2.19 Recommend necessary modifications to patient therapy to optimize its safety and efficacy  
 2.20 Able to interpret patient biochemical laboratory results  
 2.23 Recognize the principles of drug safety and efficacy evaluation  
 3.4 Demonstrate the ability to perform pharmaceutical calculations  
 5.1 Communicate effectively with patients and other healthcare professionals

## 20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Introduction to Clinical Pharmacokinetics: Concepts, Equations and Calculations	1	Dr. Maysa Suyagh	A1, A2, A4	Exams & Quiz	General references provided below
Drug Therapy Individualization in Patients with Hepatic Disease	2	Dr. Maysa Suyagh	A3	Exams & Quiz	General references provided below
Drug Therapy Individualization for Patients with Chronic Kidney Disease	3	Dr. Maysa Suyagh	A3	Exams & Quiz	General references provided below
TDM of Aminoglycosides	4	Dr. Maysa Suyagh	A3, B1-5, C1-4, D1-2	Exams & Quiz	General references provided below
Drug Dosage Regimen Design in Dialytic Patients	5	Dr. Maysa Suyagh	A3	Exams & Quiz	General references provided below
TDM of Vancomycin	6	Dr. Maysa Suyagh	A3, B1-5, C1-4, D1-2	Exams & Quiz	General references provided below
Clinical Pharmacokinetics in Special Populations	7	Dr. Maysa Suyagh	A3	Exams & Quiz	General references provided below
Clinical Pharmacokinetics in Special Populations	8	Dr. Maysa Suyagh	A3	Exams & Quiz	General references provided below
TDM of Digoxin	9	Dr. Maysa Suyagh	A3, B1-5, C1-4, D1-2	Exams & Quiz	General references provided below
TDM of Phenytoin	10	Dr. Maysa Suyagh	A3, B1-5, C1-4, D1-2	Exams & Quiz	General references provided below
TDM of Other AEDs	11	Dr. Maysa Suyagh	A3, B1-5, C1-4, D1-2	Exams & Quiz	General references provided below
TDM of Immunosuppressants	12	Dr. Maysa Suyagh	A3, B1-5, C1-4, D1-2	Exams & Quiz	General references provided below
Case Discussions	13	Dr. Maysa Suyagh	All ILOs	Exams & Quiz	General references provided below
Case Discussions	14	Dr. Maysa Suyagh	All ILOs	Exams & Quiz	General references provided below

## 21. Teaching Methods and Assignments:

*Development of ILOs is promoted through the following teaching and learning methods:*

ILOs	Learning Methods	Evaluation Methods
A1, A2, A3, A4	Lectures and Homeworks	Quizzes, Exams and Assignments
B1, B2, B3, B4, B5 C1, C2, C3, C4	Lectures and in-class case discussions	Quizzes, Exams and Assignments
D1, D2	in-class case discussions	Assignments

### Learning skills:

- Critical thinking
- Digital literacy
- Problem-solving skills
- Self-directed learning

## 22. Evaluation Methods and Course Requirements:

*Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:*

1. Exams
2. Quizzes
3. Students participation in homeworks and class case discussion

## 23. Course Policies:

### A- Attendance policies:

- Attendance: Mandatory.
- First warning – with 4 absences
- Last warning – with 5 absences
- Failing in the subject – with 6 absences

### B- Absences from exams and handing in assignments on time:

- Will result in zero achievement unless health report or other significant excuse is documented.

### C- Health and safety procedures:

- NA

### D- Honesty policy regarding cheating, plagiarism, misbehavior:

The participation, the commitment of cheating will lead to applying all following penalties together

- Failing the subject he/she cheated at
- Failing the other subjects taken in the same course
- Not allowed to register for the next semester. The summer semester is not considered as a semester

### E- Grading policy:

Exams and Quizzes.

- Mid Exam: 40 points
- Quiz: 10 points
- Final Exam: 50 points
- Total 100 points

### F- Available university services that support achievement in the course:

- Teaching halls equipped with data show, computer and white board.

**24. Required equipment:**

Data show, Computer and White Board

**25. References:****A- Required book (s), assigned reading and audio-visuels:**

1. **Basic clinical pharmacokinetics**, By Michael E. Winter. Edition: 5 – 2009 (ISBN-13: 978-0781779036)
2. **Applied clinical pharmacokinetics**, By Larry Bauer. 3rd Edition – 2014 (ISBN-13: 9780071794589)
3. **Applied pharmacokinetics & pharmacodynamics: principles of therapeutic drug monitoring**, By Michael E. Burton. Edition: 4 – 2006 (ISBN-13: 978-0071603935)
4. **Casebook in Clinical Pharmacokinetics and Drug Dosing**, 1st Edition – By Henry Cohen (ISBN-13: 9780071628358)
5. **Pharmacotherapy: A Pathophysiological Approach**, ed. DiPiro *et al*, 9<sup>th</sup> edition, 2014. (ISBN-13: 978-0071800532)

**B- Recommended books, materials, and media:**

1. **Clinical pharmacokinetics: concepts and applications**, By Malcolm Rowland, Thomas N. Tozer. Edition: 4 – 2010
2. **Handbook of drug monitoring methods: Therapeutics and Drugs of Abuse**, By Amitava Dasgupta. Edition: 1 – 2008
3. **Concepts in Clinical Pharmacokinetics**, By William Spruill and William Wade. Edition:6 – 2014
4. **Applied Biopharmaceutics & Pharmacokinetics**, 7th Edition, By Leon Shargel and Andrew YuSee – 2016 (ISBN-13: 9780071829649)
5. **Introduction to pharmacokinetics and pharmacodynamics: the quantitative basis of drug therapy**, By Thomas N. Tozer, Malcolm Rowland. Edition 1: 2006
6. **Relevant original and review articles from scientific journals**

**26. Additional information:**

N/A

Name of Course Coordinator: **Dr, Maysa Suyagh**      Signature: -----      Date: Feb, 16, 2016

Head of curriculum committee/Department: -----      Signature: -----

Head of Department: -----      Signature: -----

Head of curriculum committee/Faculty: -----      Signature: -----

Dean: -----      Signature: -----

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Head of Department  
Assistant Dean for Quality Assurance  
Course File