

The University of Jordan Accreditation & Quality Assurance Center



**COURSE Syllabus**

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| **1** | Course title | Clinical Pharmacokinetics |
| **2** | Course number | 1203577 |
| **3** | ***Credit hours (theory, practical)*** | 2 hrs / theoretical |
| ***Contact hours (theory, practical)*** | 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 5th 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 | 2 October 2021 |

# Course Coordinator:

Dr. Mariam Abdel Jalil

Faculty of Pharmacy / Dept of Biopharmaceutics and Clinical Pharmacy Office No.: 105

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1. **Other instructors**:

N/A

1. **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

1. **Course aims and outcomes:**

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| ***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. Characterize different dosage forms of medicines and their proper usage   2. 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   * 1. Identify indications, side effects and contraindications of medicines   2. Identify drug-drug and drug-food interactions of medicines   3. Identify basic principles of drug pharmacokinetics and recognize disease conditions and other factors that |

interfere with safety and efficacy of medicines

* 1. Advise patients and other health professionals on proper usage of medicines including their strength, frequency, dosage form and route of administration
  2. Identify any medicament-related problems and take appropriate actions to resolve them
  3. Recommend necessary modifications to patient therapy to optimize its safety and efficacy
  4. 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

1. **Topic Outline and Schedule:**

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

1. **Teaching Methods and Assignments:**

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

**Learning skills:**

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

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| **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 |

1. **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
4. **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:
* Quiz:
* Case discussions
* Final Exam:
* Total

30 points

10 points

10 points

50 points

100 points

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

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

1. **Required equipment:**

Data show, Computer and White Board

1. **References:**

**A- Required book (s), assigned reading and audio-visuals:**

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*, 9th 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**
7. **Additional information:**

N/A

Name of Course Coordinator: **Dr. Mariam Abdel Jalil** Signature: Date: OCT, 2, 2021

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

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

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

Dean: ------------------------------------------- - Signature: --------------------------------

Copy to: Head of Department

Assistant Dean for Quality Assurance Course File