


<b>Philadelphia University</b>	 <b>PHILADELPHIA UNIVERSITY</b> THE WAY TO THE FUTURE	<b>Approved Date:</b>
<b>Faculty: Pharmacy</b>		<b>Issue:</b>
<b>Department: Pharmacy</b>		<b>Credit Hours: 2</b>
<b>Academic Year: 2021-2022</b>		<b>Course Syllabus</b>

### Course Information

Course No.	Course Title	Prerequisite
052043100	Clinical Pharmacokinetics	0520431 Biopharmaceutics and Pharmacokinetics
Course Type		Class Time
<input type="checkbox"/> University Requirement <input checked="" type="checkbox"/> Faculty Requirement <input checked="" type="checkbox"/> Major Requirement <input type="checkbox"/> Elective <input type="checkbox"/> Compulsory		Sec1: Mon, Wed: 12:45- 13:35
		Room No.
		5508

### Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
<b>Dr. Yazan Batineh</b>	530	2281	Sun, Tue: 8:00-11:00 Mon, Wed: 11:30-15:00	ybatineh@philadelphia.edu.jo

### Course Delivery Method

<input type="checkbox"/> Blended <input type="checkbox"/> Online <input checked="" type="checkbox"/> Physical			
Learning Model			
Percentage	Synchronous	Asynchronous	Physical
			100%

### Course Description

This course 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 Learning Outcomes

Number	Outcome	Corresponding Program Outcomes	Corresponding Competencies
<b>Knowledge</b>			
<b>K1</b>	Understanding mathematics of the time course of Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs in the body	<b>Kp1,</b>	<b>C1</b>
<b>K2</b>	Understand drug absorption, distribution and elimination	<b>Kp1</b>	<b>C1</b>
<b>K3</b>	Understand pharmacokinetics and biopharmaceutics after I.V bolus, I.V infusion, and oral administration of drugs.	<b>Kp1, Kp2, Kp3</b>	<b>C1, C2, C3</b>
<b>K4</b>	Understand protein binding and its effects	<b>Kp1, Kp2, Kp3</b>	<b>C1, C2, C3</b>
<b>K5</b>	Understand Pharmacokinetic variability in case of renal and hepatic diseases, geriatrics, pediatrics, obesity, pregnancy and change in plasma protein binding	<b>Kp1, Kp2, Kp3</b>	<b>C1, C2, C3</b>
<b>K6</b>	Individualization of therapy and therapeutic drug monitoring.	<b>Kp1, Kp2, Kp3</b>	<b>C1, C2, C3</b>
<b>Skills</b>			
<b>S1</b>	Use raw data and derive the pharmacokinetic models and parameters that best describe the process of drug absorption, distribution and elimination.	<b>Sp1, Sp2</b>	<b>C7. C8</b>
<b>S2</b>	Communicating dosage adjustment with physicians and patients.	<b>Sp1, Sp2</b>	<b>C7. C8</b>
<b>S3</b>	Suggesting therapeutic monitoring plans for clinicians.	<b>Sp1, Sp2</b>	<b>C7. C8</b>

## Learning Resources

<b>Course Textbook</b>	<ul style="list-style-type: none"> <li>• Applied Biopharmaceutics and Pharmacokinetics., Shargel and A.B.C. Yu., Appleton &amp; Lange/MacGraw-Hill, New York., 7th edition 2016. ISBN: 978-0-07-182964-9</li> <li>• Applies clinical pharmacokinetics, Bauer, Larry A. Appleton &amp; Lange/MacGraw-Hill, New York., 2nd edition 2008. 10.1036/0071476288</li> <li>• Clinical Pharmacokinetics Concepts and Applications. MALCOLM ROWLAND and THOMAS N. TOZER., 1994, 3rd edition. LIPPINCOTT WILLIAMS &amp; WILKINS</li> </ul>
<b>Supporting References</b>	<ol style="list-style-type: none"> <li>1. Specialized softwares as WinNonlin® standard and PowerPoint presentations.</li> <li>2. Merck Index: An Encyclopedia of Chemicals, Drugs, &amp; Biologicals by Merck,</li> </ol>

	<p>Co, Maryadele J. Oneil (Editor), Ann Smith (Editor) 13th edition (October 2001), Merck &amp; Co; ISBN: 0911910131</p> <p>3. Physical Pharmacy: Physical Chemical Principles in the Pharmaceutical Sciences by Alfred Martin, Pilar Bustamante, A.H.C. Chun (Illustrator) 622 pages 4th edition (January 15, 1993), Lea &amp; Febiger; ISBN: 0812114388</p> <p>4. Remington: The Science and Practice of Pharmacy by Alfonso R. Gennaro (Editor) 20th edition (December 15, 2000), Lippincott, Williams &amp; Wilkins; ISBN: 0683306472</p>
<b>Supporting Websites</b>	<ul style="list-style-type: none"> <li>• PHARMACOKINETICS – CALCULATORS, TOOLS, ETC. <a href="HTTPS://GLOBALRPH.COM/PHARMACOKINETICS/">HTTPS://GLOBALRPH.COM/PHARMACOKINETICS/</a></li> <li>• Drug Half Life Calculator</li> <li>• <a href="HTTPS://WWW.OMNICALCULATOR.COM/HEALTH/DRUG-HALF-LIFE">HTTPS://WWW.OMNICALCULATOR.COM/HEALTH/DRUG-HALF-LIFE</a></li> <li>• COMPUTERISED BAYESIAN DOSE CALCULATION</li> </ul>
<b>Teaching Environment</b>	<input checked="" type="checkbox"/> Classroom <input type="checkbox"/> laboratory <input type="checkbox"/> Learning Platform <input type="checkbox"/> Other

### Meetings and Subjects Time Table

Week	Topic	Learning Method*	Task	Learning Material
1	<ul style="list-style-type: none"> <li>• Vision and Mission of Faculty of Pharmacy</li> <li>• Course Syllabus</li> <li>• Introduction</li> </ul>	Lecture		Vision and Mission of Faculty of Pharmacy  Course Syllabus  Text book, Chapter 1
2	<ul style="list-style-type: none"> <li>• IN Infusion: Intravenous Bolus Administration: One-Compartment Model: Pharmacokinetics Parameters: Half-Life, Rate Constants, Volume Of Distribution, Area Under The Curve, Practice Problems</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>		Text book, part 1, Chapter 6
3	<ul style="list-style-type: none"> <li>• IN Infusion: Intravenous Bolus Administration: Two-Compartment Model: Pharmacokinetics Parameters: Half-Life, Rate Constants, Volume Of Distribution, Area Under The Curve, Practice Problems</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>		Text book, part 2, Chapter 6

4	<ul style="list-style-type: none"> <li>• Oral Administration: Two-Compartment Model: Pharmacokinetics Parameters: Half-Life, Rate Constants</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>	Case study	Text book, part 1, Chapter 8
5	<ul style="list-style-type: none"> <li>• Oral Administration: Two-Compartment Model: Pharmacokinetics Parameters: Volume Of Distribution, Area Under The Curve</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>	Case study	Text book, part 2, Chapter 8
6	<ul style="list-style-type: none"> <li>• Oral Administration: Two-Compartment Model: Practice Problems</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>		Text book, part 3, Chapter 8
7	<ul style="list-style-type: none"> <li>• Physiologic Factors Related To Drug Absorption</li> <li>1) Renal Drug Excretion</li> <li>2) Drug Clearance</li> <li>I) Determination Of Renal Clearance</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>	Case study	Text book, part 1, Chapter 11
8	<ul style="list-style-type: none"> <li>• Physiologic Factors Related To Drug Absorption</li> <li>ii) Determination Of Hepatic Clearance</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>		Text book, part 2, Chapter 11
9	<ul style="list-style-type: none"> <li>• Renal drug elimination and clearance: Practice problems</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>		Text book, part 1, Chapter 12
10	<ul style="list-style-type: none"> <li>• Hepatic drug elimination and clearance: Practice problems</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> <li>• Collaborative learning</li> </ul>		Text book, part 2, Chapter 12
11 Mid exam	<ul style="list-style-type: none"> <li>• Measurement Of Glomerular Filtration Rate</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> <li>• Collaborative learning</li> </ul>		Text book, part 1, Chapter 7
12	<ul style="list-style-type: none"> <li>• Fraction Of Drug Excreted Unchanged (Fe) Methods</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> <li>• Collaborative learning</li> </ul>	Case study	Text book, part 2, Chapter 7

13	<ul style="list-style-type: none"> <li>• Dosing in renal impairment</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>	Pharmacokinetics – Calculators, Tools	Text book, part 1, Chapter 24
14	<ul style="list-style-type: none"> <li>• Effect of hepatic disease on pharmacokinetics</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>		Text book, part 2, Chapter 24
15	<ul style="list-style-type: none"> <li>• Dosing of drugs in elderly, obese patients and infants</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> </ul>		Text book, Chapter 23
16	<b>Final Exam</b>			

- Case Study: Prepared by the lecturer, adapted from the text book and other references.
- Includes: lecture, flipped Class, project based learning, problem solving based learning, collaboration learning.

### Course Contributing to Learner Skill Development

Using Technology
<ul style="list-style-type: none"> <li>• Using powerpoint or any relevant program for preparing presentations</li> <li>• Using smart application for dosing regimens</li> <li>• Using online application for dosing regimens for pharmacokinetic calculations</li> </ul>
Communication Skills
<ul style="list-style-type: none"> <li>• Interaction in class while solving case-study</li> </ul>
Application of Concept Learnt
<ul style="list-style-type: none"> <li>• Apply the knowledge obtained from this course to evaluate individualization of the dose</li> <li>• Apply the knowledge obtained from this course to solve problems disease state, drug-drug interaction and different dosage form</li> </ul>

### Assessment Methods and Grade Distribution

Assessment Methods	Grade	Assessment Time (Week No.)	Course Outcomes to be Assessed
Mid Term Exam	30%	11 <sup>th</sup> Week	K1, K2, K3,
Term Works*	30%	Continous	K1, K2, K4, K5, S1, S2
Final Exam	40%	16 <sup>th</sup> Week	K1, K2, K3, K4, K5, K6, K7, S1, S2
<b>Total</b>	<b>100%</b>		

\* Include: quizzes, in-class and out of class assignment, presentations, reports, videotaped assignment, group or individual project.

## Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Corresponding Competencies	Learning Method*	Assessment Method**
<b>Knowledge</b>				
<b>K1</b>	Understanding mathematics of the time course of Absorption, Distribution, Metabolism, and Excretion (ADME) of drugs in the body	<b>C1</b>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Problem solving based learning</li> </ul>	Subjective quiz  Exam/Objective questions
<b>K2</b>	Understand drug absorption, distribution and elimination	<b>C1</b>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Problem solving based learning</li> </ul>	Subjective quiz  Exam/Objective questions
<b>K3</b>	Understand pharmacokinetics and biopharmaceutics after I.V bolus, I.V infusion, and oral administration of drugs.	<b>C1, C2, C3</b>	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Problem solving based learning</li> <li>• Collaborative learning</li> </ul>	Case Study  Exam/Objective questions
<b>K4</b>	Understand protein binding and its effects	<b>C1, C2, C3</b>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Problem solving based learning</li> </ul>	Case Study  Subjective quiz  Exam/Objective questions
<b>K5</b>	Understand Pharmacokinetic variability in case of renal and hepatic diseases, geriatrics, pediatrics, obesity, pregnancy and change in plasma protein binding	<b>C1, C2, C3</b>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Problem solving based learning</li> </ul>	Case Study  Subjective quiz  Exam/Objective questions
<b>K6</b>	Individualization of therapy and therapeutic drug monitoring.	<b>C1, C2, C3</b>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Problem solving based learning</li> </ul>	Case Study  Subjective quiz  Exam/Objective questions
<b>Skills</b>				
<b>S1</b>	Use raw data and derive the pharmacokinetic	<b>C7. C8</b>	Lecture  Problem	Case Study  Subjective quiz

	models and parameters that best describe the process of drug absorption, distribution and elimination.		solving based learning	Exam/Objective questions
<b>S2</b>	Communicating dosage adjustment with physicians and patients.	<b>C7. C8</b>	Lecture  Problem solving based learning	Case Study  Subjective quiz  Exam/Objective questions
<b>S3</b>	Suggesting therapeutic monitoring plans for clinicians.	<b>C7. C8</b>	Lecture  Problem solving based learning	Case Study  Subjective quiz  Exam/Objective questions  Pharmacokinetics – Calculators, Tools

\*Include: lecture, flipped class, project based learning, problem solving based learning, collaboration learning.

\*\* Include: quizzes, in-class and out of class assignments, presentations, reports, videotaped assignments, group or individual projects.

### Course Polices

Policy	Policy Requirements
<b>Passing Grade</b>	The minimum pass for the course is (50%) and the minimum final mark is (35%).
<b>Missing Exams</b>	<ul style="list-style-type: none"> <li>• Anyone absent from a declared semester exam without a sick or compulsive excuse accepted by the dean of the college that proposes the course, a zero mark shall be placed on that exam and calculated in his final mark.</li> <li>• Anyone absent from a declared semester exam with a sick or compulsive excuse accepted by the dean of the college that proposes the course must submit proof of his excuse within a week from the date of the excuse's disappearance, and in this case, the subject teacher must hold a compensation exam for the student.</li> <li>• Anyone absent from a final exam with a sick excuse or a compulsive excuse accepted by the dean of the college that proposes the material must submit proof of his excuse within three days from the date of holding that exam.</li> </ul>
<b>Attendance</b>	The student is not allowed to be absent more than (15%) of the total hours prescribed for the course, which equates to six lecture days (n t) and seven lectures (days). If the student misses more than (15%) of the total hours prescribed for the course without a satisfactory or compulsive excuse accepted by the dean of the faculty, he is prohibited from taking the final exam and his result in that subject is considered (zero), but if the absence is due to illness or a compulsive excuse accepted by the dean of the college that The article is introduced, it is considered withdrawn from that article, and the provisions of withdrawal shall apply to it.

**Academic Integrity**

Philadelphia University pays special attention to the issue of academic integrity, and the penalties stipulated in the university's instructions are applied to those who are proven to have committed an act that violates academic integrity, such as cheating, plagiarism (academic theft), collusion, intellectual property rights.

**Program Learning Outcomes to be Assessed in this Course**

Number	Learning Outcome	Course Title	Assessment Method	Targeted Performance level

**Description of Program learning Outcomes Assessment Method**

Number	Detailed Description of Assessment

**Assessment Rubric of the Program Learning Outcomes**

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