

# Principles of Pharmacokinetics and Biopharmaceutics

## PHAR 7302

Fall Semester 2021

### Course Description

Qualitative and quantitative understanding and application of pharmacokinetics focusing on the processes of drug absorption, distribution, metabolism, and elimination.

### Additional Course Information

This course provides the theoretical building blocks necessary to design patient- and population-specific drug dosing regimens. The interrelationship between physiologic and biochemical processes and physicochemical drug properties influence drug disposition and pharmacologic response. A major component of this course includes mathematical modeling.

**Course Credit:** 3 credit hours

**Pre-Requisites:** PHAR 7402 – Pharmaceutics

### Foundational Knowledge

1. Mathematical calculations including solving algebraic and calculus-based problems.
2. Chemistry fundamentals, including pH and pKa
3. Human anatomy and physiology

**Co-Requisites:** None

### Class Meeting Days, Time & Location

Mondays, 9:30 am – 11:00 am; WTB 136

Fridays, 8:30 am – 10:00 am; WTB 136

Recommended Supplemental Instruction Session, Thursdays 1:00 pm – 2:00 pm; WTB 136

### Course Coordinator

Lane J. Brunner, Ph.D.

Office: WTB 327

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Office hours: Wednesdays; 11:00 am – 2:00 pm, or by appointment

Preferred method of contact: Email

### Fisch College of Pharmacy (FCOP) and UT Tyler Policies

This is part 1 of the syllabus. Part 2 contains UT Tyler and the FCOP course policies and procedures. These are available as a PDF at <https://www.uttyler.edu/pharmacy/academic-affairs/files/fcop-syllabus-policies.pdf>. For experiential courses (i.e., IPPE and/or APPE), the Experiential Manual contains additional policies and instructions that supplement the Syllabus Part 1 and 2. Please note, the experiential manual may contain policies with different deadlines and/or instructions. The manual should be followed in these cases.

### Required Materials

Most course required materials are available through the Robert R. Muntz Library. These materials are available either online (<http://library.uttyler.edu/>) or on reserve.

1. Required materials will be posted on the classes' Canvas site at: [uttyler.edu/canvas](http://uttyler.edu/canvas).

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### Course Format

The course may include, but is not limited to, the following activities:

1. Independent study of selected readings
2. Individual examinations
3. Individual application of content and concepts
4. Team examinations

### Course Learning Outcomes (CLOs)

CLOs	Related PLO(s)	EPA	Assessment Methods	Grading Method <sup>4</sup>	PPCP Skill(s) Assessed	ACPE Std. 11 & 12
1. Demonstrates understanding of the qualitative and quantitative factors affecting the absorption, distribution, metabolism, and excretion of drugs.	1	1.1, 1.2	1, 2	ES RUB	1, 2	NA
2. Demonstrates proficiency in numeric calculations and graphical interpretations related to drug concentrations and pharmacokinetic processes and their clinical implications.	1, 2, 6	1.1, 1.2, 1.5, 3.2, 4.1	1, 2	ES	NA	NA
3. Selects specific drug products based on pharmaceutical, therapeutic, or bioequivalent parameters.	1, 2, 6	3.2, 4.1	1, 2	ES	NA	NA

### Course Assessment Methods

	Assessment Method	Description
1	Final Exam Multiple Choice or Multiple Selection Question(s)	<i>Standard MCQ and Select All that apply questions.</i>
2	Final Exam Open Ended Question(s)	<i>Handwritten calculations using a rubric on paper and/or in ExamSoft.</i>

### Grading Policy & Grade Calculation

Grades will be determined based on evaluation of individual and team readiness assessment tests (iRATs, tRATs), individual and team cumulative assessment tests (iCATs, tCATs), midterm examinations, final written examinations, skills assessments, graded application assignments, participation in team-based projects, peer evaluations and other assessment methods that may include, but not limited to, Objective Structured Clinical Examinations (OSCE). Examinations, RATs and CATs may consist of, but not limited to, multiple-choice, true/false, fill in the blank, short-answer, essay, and problem-based questions.

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During the time the course is in progress, students whose cumulative course percentage falls below 70.0% may receive an academic alert and be subject to periodic course content review in special sessions with the course instructor(s). The student's faculty advisor may receive an academic alert to act upon on the student's behalf.

All examinations, tests, and assignments, including the final examination, may be **cumulative**. Students are responsible for material presented during prior courses. The grading scale for all graded material is below. The final course grade will be assigned according to the calculated percentage and the percentages will not be rounded upward or downward. For additional information, see examination/assessment policy below.

#### Standard Grade Calculation\*

##### Individual Grades (95%)

###### Individual Examinations

Exam 1 (Sep 24)	20%
Exam 2 (Oct 15)	20%
Exam 3 (Nov 5)	20%
Final Exam (Dec 7)	35%

##### Team Grades (5%)

Team Examinations	5%
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<b>Total</b>	<b>100%</b>
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**\*The final course letter grade will be determined according to the following grading scheme:**

A	90 - 100 %
B	80 - < 90 %
C	70 - < 80 %
D	65.0 - < 70 %
F	< 65.0 %

**Team Examinations:** Team exams will be given each Friday, unless another activity is planned. Check the course schedule on the following page for specific dates. **All** students will take the team exam as individuals. The average of the team's individual scores will be calculated and will serve as the team's grade for the exam. Teams are highly encouraged to study together prior to the team exam so all team members are well prepared.

If a student misses the exam with an **unexcused absence** for the class, their individual exam score will be 0 and will be used in calculating the team's grade for the exam.

**Remediation:** Students who earn a course grade of 'D' or 'F' may be given the opportunity to remediate this course during the summer. Remediation will be held in person **only** and will **not** be offered remotely. Students should make plans accordingly.

**Top 200 Medications:** The medications covered during this course include, but are not limited to:  
Check here if this section does not apply:

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### Case Studies

Case Studies is a longitudinal supplement intended to reinforce and integrate concepts and skills from the P2 fall curriculum. **Content and concepts from Case Studies will be integrated into summative exams for the P2 fall courses.**

#### Case Studies Format

Case days may include, but are not limited to, the following activities:

1. Guided discussions
2. Individual and team active learning strategies
  - a. Individual and team case application of content and concepts
  - b. Individual and team case presentation of content and concepts
  - c. Individual and team SOAP note(s)

**Case Studies Expectations:** Attendance and full participation are a student obligation and expectation. Failure to attend each Case Studies session will result in an 2% deduction from the final course grade to which the session is assigned. To ensure equitable distribution among P2 fall courses, each session will have an “Assigned Course” that will house the 2% deduction in the final course grade in the event of an unapproved absence. Failure to attend all Case Studies sessions would result in a 2% deduction from the final grade of each of the following courses: PHAR 7193, 7302, 7481, 7582, and 7219. At the discretion of the session’s assigned course coordinator, absences from a case session may be either approved or unapproved. Students are expected to notify the session’s assigned course coordinator *as soon as possible, and no later than 9 AM the morning of the requested absence, with supporting documentation of the absence provided within 3 days of the absence per the College of Pharmacy Policies available in Part 2 of the Syllabus.*

*Example.* Unapproved absences for sessions 2 and 4, would result in 2% final course grade deduction for both PHAR 7302 and PHAR 7582. At the end of the semester if the student’s course grades for PHAR 7302 were 91% and 71% respectively, their final grade would be reduced to 89% and 69% respectively because of their Case Studies’ absences.

**Case Study Schedule:** Case Studies will be held over five sessions on Fridays from 2-5 PM. Although each session’s attendance deduction is assigned to a specific course, case content is not limited to that course and will be integrated into summative exams for the P2 fall courses.

P2 Fall 2021 Case Study Schedule					
Session	Date	Assigned Course	Assigned Course Coordinator	Topic	Instructors
1	9/17	PHAR 7193	Dr. Vega	Case Studies Introduction Case Modeling	Drs. Brazill and Rice
2	10/1	PHAR 7302	Dr. Brunner	Case 1	TBD
3	10/8	PHAR 7481	Dr. Dunn	Case 1	TBD
4	11/5	PHAR 7582	Dr. Wilder	Case 2	TBD
5	11/19	PHAR 7219	Dr. Smith	Case 2 Individual Presentation	TBD

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### PHAR 7302 Course Schedule

WEEK	DAY	DATE	TOPIC	CLO <sup>1</sup>	WSOP Category <sup>7</sup>
1	M	8/23	Fundamental Pharmacokinetic Principles	1, 2, 3	S18.04, S18.09, S20.01
	F	8/27	Team Exam – Introduction		
2	M	8/30	IV Bolus Dosing	1, 2	S01.11, S02.04, S15.16
	F	9/3	Team Exam – IV Bolus Dosing		
3	M	9/6	Labor Day Holiday		
	F	9/10	Art and Patient Care – Critical Thinking		
4	M	9/13	IV Infusion	1, 2	S01.11, S02.04, S18.14
	F	9/17	Team Exam – IV Infusion		
5	M	9/20	Exam 1 Review (IV Bolus and IV Infusion)		
	F	9/24	Exam 1 (IV Bolus and IV Infusion)		
6	M	9/27	Multiple Dosing	1, 2	S01.11, S15.16, S18.14
	F	10/1	Team Exam – Multiple Dosing		
7	M	10/4	Distribution Kinetics	1, 2	S01.11, S02.04, S15.16
	F	10/8	Team Exam – Distribution Kinetics		
8	M	10/11	Exam 2 Review (Multiple Dosing / Distribution)		
	F	10/15	Exam 2 (Multiple Dosing and Distribution Kinetics)		
9	M	10/18	Extravascular Dosing	1, 2, 3	S01.11, S10.03, S18.04
	F	10/22	Team Exam – Extravascular Dosing		
10	M	10/25	Bioavailability and Bioequivalence	1, 2	S01.11, S05.08, S18.14
	F	10/29	Team Exam – Bioavailability and Bioequivalence		
11	M	11/1	Exam 3 Review (Extravascular Dosing and BA/BE)		
	F	11/5	Exam 3 (Extravascular Dosing and BA/BE)		
12	M	11/8	Clearance Concepts	1, 2, 3	S01.11, S10.03, S18.14
	F	11/12	Team Exam – Clearance Concepts		
13	M	11/15	Nonlinearity	1, 2, 3	S01.11, S10.03, S18.14
	F	11/19	Team Exam – Nonlinearity		
14	M	11/22	Thanksgiving Break		
	F	11/27	Thanksgiving Break		
15	M	11/29	Model-Independent Kinetics		
	F	12/3	Final Exam Review		
16	T	12/7	Final Exam (9 am – 12:00 pm)		

***Please note that dates, topics, and assignments are subject to change. In the event of a change, you will be given ample notification of the change.***