USCMann
Alfred E. Mann School of Pharmacy and Pharmaceutical Sciences

PHRD 559 - Therapeutics: Pharmacokinetics
3 Units
Fall 2024 Friday 10:00 AM - 12:00 PM
Location: PSC 112

Course Coordinator(s):

Paul Beringer: beringer@usc.edu
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John Andrew MacKay: jamackay@usc.edu
Office: PSC 306A Phone: (323) 442-4118

Office Hours:

MacKay: Tuesdays at noon; Beringer: Fridays at noon.

Office hours may be held in an office, in a classroom, or on Zoom. Contact Drs. MacKay or Beringer to determine.

Additional TA office hours will be provided to help with homework. These will be announced through Brightspace, but will generally fall on Thursday at noon. The TAs for 2024 are:

Cynthia Dharmawan (cdharmaw@usc.edu)
Xiaohui Yu (yuxiaohu@usc.edu)
Amani Alqahtani (amanialq@usc.edu)

Instructors:

Paul Beringer: beringer@usc.edu
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Irving Steinberg: isteinbe@usc.edu
Emily Han: eehan@usc.edu
Patrick K Tabon: tabon@usc.edu

Communication:

Course communications will be made through announcements in brightspace, which will be emailed to the entire class about once weekly. If you have a question about course content, first consider posting it in the discussion forum. In this way, instructor answers will be available to the entire class. If you require a small group or one-on-one meeting, first attend scheduled weekly office hours. If that does not resolve your question, you may then request a one-on-one meeting. We answer emails as possible; however, we prefer to meet you in person through office hours.

IT Help:

Brightspace is the Learning Management System (LMS) used at the USC Mann School of Pharmacy and Pharmaceutical Sciences. For 24/7 help with Brightspace

- Call (213) 740-5555 and select Option 1.
- Send an e-mail to brightspace@usc.edu.
- Visit USC's Brightspace Online Help site for how-to videos and guides: https://www.brightspacehelp.usc.edu/
- **Zoom and Panopto may be used for lecture capture and delivery, Zoom and Poll Everywhere may be used as an audience response system, and Brightspace and ExamSoft may be used to administer quizzes and examinations.**
- For help with Zoom, visit https://itservices.usc.edu/zoom/.
- For help with Panopto, call the 24/7 Panopto support team at (855) 765-2341 or e-mail support@panopto.com
- For help with ExamSoft, call the 24/7 ExamSoft support team at (866) 429-8889, e-mail support@examsoft.com, or visit https://help.examsoft.com/.
- You may also visit our Technical Support Specialists in PSC 302B, M- F from 8:00 AM-5:00 PM, call (323) 442-0002, or e-mail mannit@usc.edu
- **For all other technology-related questions, call USC Information Technology Services at (213) 740-5555**

Course Description

Therapeutics: Pharmacokinetics (PHRD 559) presents the principles, computation, and application of pharmacokinetics and pharmacodynamics. The course prepares learners for clinical situations where they will make drug therapy decisions or collaborate with the health care team to optimize drug therapy. Students will learn mathematics and clinical considerations required to calculate, communicate and revise drug dosing regimens.

Program Outcomes

- **Optimize health outcomes as the medication specialist**
- **Improve health and wellness for individuals and communities**
- Promote equity in healthcare
- Advocate for optimal technological, regulatory, financial and medication use policies and systems
- **Solve problems and make decisions using the innovation/scientific process**
- Develop and foster collaboration to meet shared goals
- **Lead and communicate professionally and ethically**
- Commit to personal and professional development to meet life goals

Course Learning Objectives

By the end of this course on Pharmacokinetics (PK), learners will master:

- OBJECTIVE 1: Model Derivation. Use mass balances to derive analytical solutions for common PK profiles following a single dose. These include one and two compartment models of an intravenous bolus, during and after short and long intravenous infusions, and absorption of an extravascular/oral dose. Differentiate between compartmental and model-independent PK.
- OBJECTIVE 2: Understanding Parameters. Describe, calculate, and interpret common parameters and outputs involved with PK, which include volume of distribution, clearance, half-life, area under the curve, bioavailability, protein-binding, loading dose, and maintenance dose.
- OBJECTIVE 3: Therapeutic Dose Monitoring. Understand and make calculations according to physiologic, genomic, and statistical models used to interpret linear and nonlinear pharmacokinetics after single or multiple doses. Demonstrate how to use clinical samples to revise regimens for individual patients as a part of therapeutic dose monitoring.
- OBJECTIVE 4: Clinical Applications. Analyze and discuss clinical examples of pharmacokinetic problems in a professional context. Identify physiological factors (e.g. renal/hepatic dysfunction, age) affecting ADME. Solve patient, case management problems that involve physiological disorders and/or drug

interactions.

Course Notes

Brightspace: This is the learning management system for this course. Lecture slides, lecture videos, assignments, solutions, and grades will be posted on Brightspace. Assignments will be submitted for grading through Brightspace. Instructions related to examinations and discussion activities will be provided through Brightspace.

ZOOM: Accessed via Brightspace, Zoom may be used on computers for office hours and possibly other content as needed. In general, zoom office hours will not be recorded for this course.

POLLEVERYWHERE: Active-learning discussions will be used to provide feedback on homework assignments; furthermore, participation and preparation for these activities will be assessed through PollEverywhere. It is the learner's responsibility to bring a device capable of providing feedback through PollEverywhere to every class. Please note that your account on polleverywhere must be setup using the same email address that is registered in Brightspace. If you use another account, your participation grades from polling will not be transferred to the grading sheet in Brightspace.

EXAMSOFT: Examinations will be administered and returned to students using softest/examsoft. It is the learner's responsibility to ensure that they have a tablet/laptop during scheduled examinations ready and capable of running examsoft.

Required Readings and Supplementary Materials

- Rowland and Tozer's Clinical Pharmacokinetics and Pharmacodynamics: Concepts and Applications, 5e Hartmut Derendorf, Stephan Schmidt (2020), https://premiumpharmacy-lwwhealthlibrary-com.libproxy1.usc.edu/book.aspx?bookid=2695 (https://tinyurl.com/mddrxbxf)
- Winter's Basic Clinical Pharmacokinetics, 7e Beringer (2025), https://premiumpharmacy-lwwhealthlibrary-com.libproxy2.usc.edu/book.aspx?bookid=3288 (https://tinyurl.com/2p9ma2wd)

Description and Assessment of Assignments

Participation in active-learning discussions will be scored and weighted separately from each HW assignment.

Participation in active learning activities will be recorded using polling software. The purpose is to provide feedback to the class and instructor, and to promote student engagement during discussion and problem solving sessions. A rubric will be posted explaining the grading of participation. There will be approximately 12 participation scores; furthermore, the two lowest scores will be automatically dropped from the calculation of your grade. Do not need email us to request this. The purpose is to provide you with flexibility to balance family/academic obligations.

Homework will be assigned via Brightspace; however, some questions may be assigned through Examsoft to provide practice with same format used in examinations. Completed assignments should be uploaded into Brightspace before the posted deadline. Assignment solutions will be posted within one week of the due date. Assignments are graded by course teaching assistants according to a rubric, which will be distributed. No credit will be offered for late assignments. There will be approximately 11 homework scores; furthermore, the two lowest scores will be automatically dropped from the calculation of your grade. Do not email us to request this.

Assessment methods used in this course:
Multiple guess questions

Fill-in-the-blank/Short answer questions
Hand-written essay questions
Examsoft-based quizzes and examinations
Homework assignments
PollEverywhere questions

Methods

Teaching Methods

Before Event

- Online lecture
- Assigned reading/writing (texts)
- Online activity

During Event

- Classroom lecture
- Small group discussion
- Polling questions

After Event

- Recorded lecture

Assessment Methods

Examination

- Multiple choice
- Short answer
- Computer-based
- Essay

In Class

- Attendance and Participation
- Quiz

Grading Breakdown

Assignment	Percent
Homework (lowest 2 dropped automatically)	15
Participation for Discussions (lowest 2 dropped automatically)	10
Exam 1	25
Exam 2	25
Exam 3 (finals week)	25

Grading Scale

A 94.00 - 100.00
A- 90.00 - 93.99
B+ 86.00 - 89.99
B 82.00 - 85.99
B- 78.00 - 81.99
C+ 74.00 - 77.99
C 66.00 - 73.99
C- 62.00 - 65.99
D+ 58.00 - 61.99
D 54.00 - 57.99
D- 50.00 - 53.99
F 49.99 and below

Additional USC Mann School Policies

Policy on Learning & Assessment Feedback (LAF)

Feedback on examinations/assessments will be provided using the following methods.

- Complete examination will be returned and a key will be made available

Policy Regarding Assignments and Examinations

The following actions are all violations of academic integrity and subject to disciplinary action:

a. Any use or attempted use of external assistance in the completion of an academic assignment and/or during an examination, or any behavior that defeats the intent of an examination or other classwork or assignment, unless expressly permitted by the instructor.
b. The following are examples of unacceptable behaviors: communicating with fellow students during an exam, copying or attempting to copy material from another student's exam; allowing another student to copy from an exam or assignment; possession or use of unauthorized notes, calculator, or other materials during exams and/or unauthorized removal of exam materials.
c. Other examples of academic misconduct have been and will be considered.

Policy Regarding Missed Examinations

The policy for this course will follow the policy contained within the Academic Policies and Procedures section of the Student Handbook located on the USC Mann School of Pharmacy and Pharmaceutical Sciences Intranet. Students who miss an examination are referred to this policy.

Policy on Absences

University policy grants students excused absences from class for observance of religious holy days. Faculty are asked to be responsive to requests when students contact them IN ADVANCE to request such an excused absence. The student should be given an opportunity to make up missed work because of religious observance. Students are advised to scan their syllabi at the beginning of each course to detect potential conflicts with their religious observances. Please note that this applies only to the sort of holy day that necessitates absence from class and/or whose religious requirements clearly conflict with aspects of academic performance. For additional program specific absence policies, please refer to the Student Handbook on the USC Mann School of Pharmacy and Pharmaceutical Sciences Intranet.

Policy for Written Assignments Regarding Citation Style

All written assignments in the course should use the uniform style of the USC Mann School of Pharmacy and Pharmaceutical Sciences for formatting in-text citations and reference lists. This style corresponds to the AMA (American Medical Association) format and can be found through this following guide https://libguides.usc.edu/ama11 and handout https://libguides.usc.edu/ld.php?content_id=54130825. The complete AMA Manual of Style is also available as an e-book at tinyurl.com/bdh8amka .

Technological Requirements and Software Updates

Students may be required to bring an internet-enabled device with browser capabilities, such as a cell phone, tablet, or laptop to class. During class time, it is expected that students will use their devices only to participate in activities guided by the instructor. Use of devices for other purposes is not permitted during class time.

The USC Mann School of Pharmacy and Pharmaceutical Sciences recommends that students purchase a computer that meets, at minimum, the "medium" level hardware requirements that are also recommended for faculty and staff: https://itservices.usc.edu/recommendations/

Students who use Zoom should be running the latest version of Zoom available at https://zoom.us/download.

Students who use ExamSoft will also be required to have the latest version of Examplify installed on their laptops at all times compatible with their operating system. Occasional updates to the software may be asked of you throughout the year. It is your responsibility to read your USC e-mails regarding Examplify and follow the instructions as listed.

Learning Experience Evaluation Notes:

We value your input, which we review to improve the course. Extra credit may be provided for completion of the online course evaluation during the last week of classes.

Statement on Academic Conduct and Support Systems

Academic Integrity:

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Course Content Distribution and Synchronous Session Recordings Policies

All class recordings (Zoom, Panopto, etc.) are accessible only to students currently enrolled in the class, instructors, and TAs. These recordings may not be shared or used for purposes outside of this course. Students are also not permitted to record or distribute any course materials or activities on their own without the instructor's permission.

About Your Instructor(s)

Paul Beringer, Pharm.D.
Office: CHP 236E
Contact Info: beringer@usc.edu

J. Andrew MacKay, Ph.D.
Office: 306A
Contact Info: jamackay@usc.edu

Attempts will be made to respond to emails within one week; however, students are urged to first make use of scheduled office hours, recorded lectures, solutions to assignments, and in-person discussions/lectures.

Summary of Course Schedule

Date	Lecturer	Event
Friday 08/30/24 10:00 AM - 12:00 PM	John MacKay Paul Beringer	Module 1: Course Overview, Topics in PK, ADME, graphing
Friday 09/06/24 10:00 AM - 12:00 PM	John MacKay	Module 2: rate constants, compartmental models, Clearance, Volume of Distribution, Half-life
Friday 09/13/24 10:00 AM - 12:00 PM	John MacKay	Module 3: AUC, Bioavailability, IV Infusion Model, IV Short Infusion vs. Bolus model, Protein Binding, Model independent PK
Friday 09/20/24 10:00 AM - 12:00 PM	John MacKay	Module 4: Extravascular (Oral) Model, Time Maximum Concentration, Method of Residuals, Model Independent PK
Tuesday 09/24/24	Paul Beringer	Exam 1

1:00 PM - 3:00 PM	John MacKay	
Friday 09/27/24 10:00 AM - 12:00 PM	John MacKay	Module 5: Two-compartment IV Bolus Model, Macroconstants, Microconstants, Volume at Steady State
Friday 10/04/24 10:00 AM - 12:00 PM	John MacKay	Module 6: Hepatic Physiological Clearance Equation, Intrinsic Clearance, Nonlinear PK: ADME
Friday 10/18/24 10:00 AM - 12:00 PM	Paul Beringer	Module 7: Assessment of Renal & Hepatic Function; Drug Dosing in Renal & Hepatic Disease
Friday 10/25/24 10:00 AM - 12:00 PM	Paul Beringer	Module 8: Multiple Dose: IV Bolus, IV Short Infusion, Oral Rapid and Controlled Release, Time to Steady-State, Loading Doses
Tuesday 10/29/24 1:00 PM - 3:00 PM	Paul Beringer John MacKay	Exam 2
Friday 11/01/24 10:00 AM - 12:00 PM	Paul Beringer	Module 9: Determination of Revised Dosing Regimens (1 comp models), Therapeutic Drug Monitoring, Clinical Pharmacodynamics
Friday 11/08/24 10:00 AM - 11:50 AM	Emily Han	Module 10: Aminoglycosides: Initial and Revised Dosing Regimens, PD targets, Once daily dosing
Friday 11/15/24 10:00 AM - 12:00 PM	Emily Han	Module 11: Vancomycin: Initial and Revised Dosing Regimens, PD targets, AUC dosing
Friday 11/22/24 10:00 AM - 12:00 PM	Irving Steinberg Patrick Tabon	Module 12: Pediatric & Geriatric PK
Friday 12/06/24 10:00 AM - 12:00 PM	Paul Beringer Irving Steinberg	Module 13: PK in Obesity & Pregnancy
Friday 12/13/24 1:00 PM - 3:00 PM	Paul Beringer John MacKay	Exam 3 (during finals week)

Expanded Course Schedule

Date	Lecturer	Event
Friday 08/30/24 10:00 AM - 12:00 PM	John MacKay Paul Beringer	Module 1: Course Overview, Topics in PK, ADME, graphing MODULE DESCRIPTION: In this module, you will be introduced to common pharmacokinetic parameters required to solve and interpret clinical pharmacokinetics. LEARNING OBJECTIVES: - Compare and contrast pharmacokinetics and pharmacodynamics - List processes involved with ADME - Explain differences between blood, serum, plasma - List applications of PK from drug development to therapeutic dose monitoring - Use graphing paper to plot PK data TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read chapters 1,2,3 (Rowland & Tozer) - Prior to class review HW1 (need not complete)

		- Prior to class ensure you have an account on PollEverywhere and have installed the application on your device. IMPORTANT: YOUR ACCOUNT MUST USE THE SAME EMAIL ADDRESS USED IN BRIGHTSPACE. - During class be prepared to discuss asynchronous content, participate in small group discussions, solve problems, and report back using Poll Everywhere. - After class HW1 is not due until week 2
Friday 09/06/24 10:00 AM - 12:00 PM	John MacKay	Module 2: rate constants, compartmental models, Clearance, Volume of Distribution, Half-life MODULE DESCRIPTION: In this module, you will be introduced to additional pharmacokinetic parameters, as well as methods to use graphing to quantify pharmacokinetics. LEARNING OBJECTIVES: - Explain variables important to the solution of PK models - Use mass balances to setup equations for compartmental models - Describe how changes in clearance and volume of distribution influence the observed half-life of the drug TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read Chapter 4 (Rowland & Tozer) - Prior to class complete homework (HW1) - During class be prepared to discuss homework - During class be prepared to discuss asynchronous content, participate in small group discussions, solve problems, and report back using Poll Everywhere. - After class HW is due by 11:59pm
Friday 09/13/24 10:00 AM - 12:00 PM	John MacKay	Module 3: AUC, Bioavailability, IV Infusion Model, IV Short Infusion vs. Bolus model, Protein Binding, Model independent PK MODULE DESCRIPTION: In this module, you will learn how to solve and calculate drug concentration after IV administration. LEARNING OBJECTIVES: - Calculate AUC after a single IV bolus dose using the trapezoid method - Calculate bioavailability following single dose IV and PO - Solve the plasma concentration-time profile after a single bolus iv - Identify factors that affect the plasma concentration-time profile after a single bolus iv administration - Use IV infusion model to solve for the concentration after: -a long infusion, which reached steady state -a short infusion, which did not reach steady state - Calculate loading doses by infusion using -bolus model -short infusion model

		TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read chapters 4,10, Appendix A,C,D (Rowland & Tozer) - Prior to class complete homework (HW2) - After class HW is due by 11:59pm
Friday 09/20/24 10:00 AM - 12:00 PM	John MacKay	Module 4: Extravascular (Oral) Model, Time Maximum Concentration, Method of Residuals, Model Independent PK MODULE DESCRIPTION: In this module, you will be introduced to additional pharmacokinetic parameters, as well as methods to use graphing and model independent methods to quantify pharmacokinetics. LEARNING OBJECTIVES: - Use mass balance to model concentration after absorption of an extravascular dose - Explain and calculate parameters related to absorption - Explain and use method of residuals - Explain how bioavailability affects the estimation of clearance and volume of distribution TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read Chapter 6,7 Appendix F (Rowland & Tozer) - Prior to class complete homework (HW3) - During class be prepared to discuss homework - After class HW is due by 11:59pm
Tuesday 09/24/24 1:00 PM - 3:00 PM	Paul Beringer John MacKay	Exam 1 This ~2 hr exam tests your knowledge of modules 1 - 4. The exam will be administered using Examsoft.
Friday 09/27/24 10:00 AM - 12:00 PM	John MacKay	Module 5: Two-compartment IV Bolus Model, Macroconstants, Microconstants, Volume at Steady State MODULE DESCRIPTION: In this module, you will learn how to solve and interpret data for drugs that follow a 'two-compartment' model after IV administration. LEARNING OBJECTIVES: - Compare and contrast the 1-and 2-compartment PK models - Use method of residuals to determine distinct exponential terms relevant to PO, IV-infusion, 2-compartment drugs - Calculate the plasma concentration following a iv bolus that follows 2-compartment PK model - Explain/estimate the the difference between microconstants and macroconstants in the 2 compartment model - Describe volume of distribution and clearance as it relates to 2 compartment drugs - Analyze the effect of changing pk parameters on the

		plasma concentration-time profile after iv bolus of drugs that follow 2-compartment pk model TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read Chapter 19, Appendix E (Rowland & Tozer) - Prior to class complete homework (HW4) - During class be prepared to discuss homework - After class HW is due by 11:59pm
Friday 10/04/24 10:00 AM - 12:00 PM	John MacKay	Module 6: Hepatic Physiological Clearance Equation, Intrinsic Clearance, Nonlinear PK: ADME MODULE DESCRIPTION: In this module, you will learn how to apply models of physiological clearance in the context of the liver and also nonlinear effects of clearance. LEARNING OBJECTIVES: - Describe the physiological meaning of total body clearance in terms of organ blood flow, intrinsic clearance, fraction of unbound drug, and extraction ratio - Describe the effect of changing the hepatic intrinsic clearance and blood flow on the hepatic extraction ratio - Analyze the effect of changing either intrinsic clearance or liver blood flow on the plasma concentration-time profile after IV and oral administration - Describe the relationship between hepatic clearance and liver blood flow, enzyme activity and protein binding - Discuss biliary excretion and enterohepatic recycling - Define nonlinear pharmacokinetics - Compare the features of nonlinear and linear pharmacokinetic features and parameters. - Describe physiological and pharmacokinetic mechanisms of nonlinear drug absorption, distribution, protein binding, and secretory & metabolic elimination. TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read chapter 16 (Rowland & Tozer) - Prior to class complete homework (HW5) - During class be prepared to discuss homework - After class HW is due by 11:59pm
Friday 10/18/24 10:00 AM - 12:00 PM	Paul Beringer	Module 7: Assessment of Renal & Hepatic Function; Drug Dosing in Renal & Hepatic Disease MODULE DESCRIPTION: In this module, you will learn about renal and hepatic dysfunction and their clinical effect on PK. LEARNING OBJECTIVES: - Provide examples of pharmacodynamic and drug interactive effects as contributors to nonlinear disposition. - Calculate nonlinear pharmacokinetic parameters and

		dosage regimens given example data (e.g phenytoin). - Determine the factors that affect the change in drug pharmacokinetics in patients with kidney dysfunction during multiple drug administration. - Analyze the effect of changing the kidney function and the fraction of dose excreted unchanged in urine on drug pharmacokinetics. - Recommend an appropriate dosing regimen in patients with kidney failure. - Evaluate the appropriateness of dosing regimens in patients with kidney dysfunction. TASKS: - Prior to class review asynchronous lectures and slides -Prior to class read Chapter 3 (Beringer & Winter) - Prior to class complete homework (HW12) - During class be prepared to discuss homework - After class HW is due by 11:59pm
Friday 10/25/24 10:00 AM - 12:00 PM	Paul Beringer	Module 8: Multiple Dose: IV Bolus, IV Short Infusion, Oral Rapid and Controlled Release, Time to Steady-State, Loading Doses MODULE DESCRIPTION: In this module, you will learn how to apply multiple dosing models to estimate plasma concentrations after doses when a patient has been taking a regimen for some duration. LEARNING OBJECTIVES: - Define steady state during multiple dose administration. - Determine whether a loading dose is needed given a multiple dose regimen and pharmacokinetic parameters. - Calculate an appropriate loading dose to rapidly achieve target concentrations. - Choose the appropriate dosing model to predict steady-state concentrations following multiple dose administration. - Determine the steady state drug concentrations and patient pk parameters during multiple dose administration. - Analyze the effect of changing one or more of the pk parameters on the steady state plasma concentration during multiple dose administration. - Recommend a maintenance dosing regimen to achieve specific plasma concentrations in patients. TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read Chapter 2 (Beringer & Winter) - Prior to class complete homework (HW6) - During class be prepared to discuss homework - After class HW is due by 11:59pm
Tuesday 10/29/24 1:00 PM - 3:00 PM	Paul Beringer John MacKay	Exam 2 This ~2 hr exam tests your knowledge of modules 5 to 8. The exam will be administered using Examsoft.

Friday 11/01/24 10:00 AM - 12:00 PM	Paul Beringer	Module 9: Determination of Revised Dosing Regimens (1 comp models), Therapeutic Drug Monitoring, Clinical Pharmacodynamics MODULE DESCRIPTION: In this module, you will learn how to approach therapeutic drug monitoring and how to revise dosing regimens LEARNING OBJECTIVES: - Differentiate the characteristics of a narrow vs. wide therapeutic index drug. - Define optimal blood sampling times with respect to steady-state and within a dosing interval to maximally inform about clearance and volume of distribution (1-compartment model). - Evaluate the appropriateness of dosing regimens for patients. - Devise a revised dosing regimen for a drug given patient clinical data (e.g. laboratory data, measured drug concentrations, disease). TASKS: - Prior to class review asynchronous lectures and slides - Prior to class complete homework (HW7) - During class be prepared to discuss homework - After class HW is due by 11:59pm
Friday 11/08/24 10:00 AM - 11:50 AM	Emily Han	Module 10: Aminoglycosides: Initial and Revised Dosing Regimens, PD targets, Once daily dosing MODULE DESCRIPTION: In this module, you will learn how to adjust levels of aminoglycosides and vancomycin. LEARNING OBJECTIVES: - Apply appropriate PK equations for aminoglycoside (AG) and vancomycin dosing for different patient populations. - Determine the peak level to achieve optimal bactericidal activity of AG. - Recommend AG dosing regimen to achieve optimal plasma concentrations utilizing population kinetics. - Evaluate the appropriateness of dosing regimens for patients. - Determine the steady state drug concentrations and patient PK parameters during multiple dose administration. - Revise AG regimen based on actual serum concentrations. - Identify the factors that allow extended dosing of AG. - Identify the advantages of extended dosing interval AG over traditional dosing of AG. TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read Chapter 6 (Beringer & Winter) - Prior to class complete homework (HW8) - During class be prepared to discuss homework - After class HW is due by 11:59pm

Friday 11/15/24 10:00 AM - 12:00 PM	Emily Han	Module 11: Vancomycin: Initial and Revised Dosing Regimens, PD targets, AUC dosing MODULE DESCRIPTION: In this module, you will learn to adjust levels of vancomycin. LEARNING OBJECTIVES: - List the the pharmacodynamics / pharmacokinetics properties of vancomycin - Utilize PK/PD to develop a dosing regimen for a patient based on normal population data. - Calculate a revised dosing regimen based on patient specific parameters - Calculate vancomycin dose based on AUC24/MIC goal vs. trough goal TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read Chapter 16 (Beringer & Winter) - Prior to class complete homework (HW9) - During class be prepared to discuss homework - After class HW is due FRIDAY 11:59pm
Friday 11/22/24 10:00 AM - 12:00 PM	Irving Steinberg Patrick Tabon	Module 12: Pediatric & Geriatric PK MODULE DESCRIPTION: In this module, you will learn about differences in pharmacokinetics in pediatric and geriatric patient populations. LEARNING OBJECTIVES: - Describe relevant factors that create pharmacokinetic differences between adults and children. - Explain the differences in protein binding and organ system development and maturation of children in relation to drug pharmacokinetics. - Apply prior knowledge of model development in pediatric pharmacokinetics to devise appropriate dosage regimen design. - Discuss the physiological changes in older adults that lead to changes in absorption, distribution, metabolism, and excretion - Describe the alterations in half-life, clearance, and volume of distribution that are observed in geriatric patients - Calculate creatinine clearance using the Cockcroft-Gault (CG) Equation for an older adult at various decades in life TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read Chapter 4 (Beringer & Winter) - Prior to class complete homework (HW10) - During class be prepared to discuss homework - After class HW is due by 11:59pm
Friday 12/06/24 10:00 AM - 12:00 PM	Paul Beringer Irving Steinberg	Module 13: PK in Obesity & Pregnancy MODULE DESCRIPTION: In this module, you will learn

		about differences in pharmacokinetics in obesity and pregnancy. LEARNING OBJECTIVES: - Describe relevant factors that create pharmacokinetic differences in obesity and pregnancy. - Explain the differences in body size and composition and there effect on drug pharmacokinetics. - Apply prior knowledge of model development in obesity and pregnancy pharmacokinetics to devise appropriate dosage regimen design. - Discuss the physiological changes in pregnancy that lead to changes in absorption, distribution, metabolism, and excretion TASKS: - Prior to class review asynchronous lectures and slides - Prior to class read assigned readings - Prior to class complete homework (HW11) - During class be prepared to discuss homework - After class HW is due by 11:59pm
Friday 12/13/24 1:00 PM - 3:00 PM	Paul Beringer John MacKay	Exam 3 (during finals week) This ~2 hr exam tests your knowledge of modules 9 to 13. The exam will be administered using Examsoft.