

RXRS 200: Approaches to Pharmacology and Drug Development**Instructors:**

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Course Weight: 4 units

Days/Time: Tuesday, Thursday: 12:30-1:50pm

Location: THH 212

Office Hours: Check Blackboard for each instructor's office hour availability. If you are unable to attend the scheduled office hours, contact the instructor(s) directly to schedule an appointment to meet with them.

Catalogue description: Pharmacology and Drug Development explored through the lens of Clinical Pharmacy, Translational and Bench Research, and Regulatory Science.

Introduction

This introductory course in **Pharmacology and Drug Development** is designed to give students a sampling of the many facets of pharmacology, including drug discovery and development. It will also be of great interest to undergraduates seeking a basic understanding of the process of medication development as it spans from initial discovery to a final drug product. The material presented will give undergraduate students an introductory sampling of

basic pharmacological principles and their application in the research and clinical settings.

In addition, the course will introduce to the students to basic principles of drug action and pharmacodynamics, differences in drug sensitivity across the population and how inappropriate drug use can lead to addiction. Finally, students will have the opportunity to see how these processes are currently being applied to the development of therapeutic agents for the COVID-19 public health crisis.

Objectives

Upon successful completion of this course, the student should be able to participate in a thoughtful debate about the following topics:

- Describe and define the basic terms and concepts of pharmacology
- Explain the scientific principles of drug action and their pharmacological effect
- Explain the hallmarks of different drug classes and provide examples of specific drugs within each broad class
- Describe the biochemical reactions that result in drug metabolism
- Compare different patient populations and their relationships to drugs
- Describe and give examples of drug addiction as it relates to pharmacology
- Describe the regulatory workflow that new pharmaceuticals follow from discovery to market
- Develop therapeutic treatment plans to manage and treat complex disease states
- Evaluate the pharmacology of known therapeutics for their efficacy in treating or managing disease

Evaluation and Grading:

Evaluation will be based on class participation, quizzes, one midterm exam, one final exam, and one group presentation.

<i>Description</i>	Points	Weight
<i>Quizzes 3@ 10 pts each)</i>	30 pts	15%
<i>Therapeutics Battle</i>	50 pts	25%
<i>Discussion Board Participation</i>	10 pts	5%
<i>Midterm exam</i>	40 pts	20%
<i>Final Exam</i>	70 pts	30%
Total	200 pts	100%

Attendance at all classes is expected. It is expected that the students read the assigned papers prior to the lecture, prepare for group presentations and be prepared to discuss the background, current understanding, treatments, and gaps in knowledge for the topic in each lecture.

15% Quizzes: There will be 3 quizzes over the course of the semester to count towards the overall grade. The quizzes will be based on questions from the lecture and content discussed in class. Quizzes will include multiple-choice, T/F, and fill-in-the-blank questions. Quizzes may also be in the form of in-class writing assignments to assess the comprehension of topics presented in class.

20% Midterm: There will be 1 midterm for this course that will cover the first 5 weeks of course material. The midterms will also include multiple-choice questions T/F questions fill-in-the-blank questions and possibly short answers. This midterm exam will help students to generate a critical assessment of critical topics in this course, to develop a suitable argument, and to convey their ideas and interpretations through the written word.

30% Final: The final exam (70 points) will include multiple choice and T/F questions as well as a series of questions involving short answers. The final exam will be cumulative but will emphasize material covered after the 2nd midterm.

25% Therapeutics Battle: See Assignment Description on Blackboard for full details about this activity. All students will participate in this activity each week it is offered. An alternative assignment is available for students who are unable to participate in this activity. Contact the course coordinators for more information about this alternative assignment.

10% Discussion Board Participation: Each student will participate in Discussion Board posts during the semester or other deliverable assignments on Blackboard. The points will be allocated below

Assignment	Due Date	Points
Completing baseline assessment	08/25/2022 11:59 PM PDT	5
Submitting at minimum 1 question for our panelists	09/22/2022 11:59 PM PDT	5
Complete peer review for interactive assignment (2 pts each x 5)	By start of next class meeting following each activity	10

There are no make-up exams. If exceptional circumstances prevent you from attending an exam, your reason for missing it must be accompanied by a written statement from a third party (e.g., a note from a medical doctor).

Notes, books, calculators, electronic dictionaries, regular dictionaries, cell phones, or any other aids are not allowed during exams.

Students will be asked to complete an anonymous critical evaluation of the course at its completion.

Please note below is the “Approximate” grading scale breakdown. However, this scale is not set in stone and may slightly shift up or down based on overall scores.

Percent	Letter Grade
92-100%	A
90-91%	A-
88-89%	B+

82-87%	B
80-81%	B-
78-79%	C+
72-77%	C
70-71%	C-
60-69%	D
Below 60%	F

Class Policies Regarding Class Discussions and Etiquette

An overview of the class policies and how they relate to the discussions and interactions that will occur in this class can be found below. We expect each student to review, understand and adhere to these policies.

Respect

- Listen actively and attentively
- No name calling or other character attacks
- Always use a respectful tone
- Be aware of the fact that tone of voice and body language are powerful communicators. Some postures or facial expressions can silence, intimidate, or hurt your classmates (e.g. crossed arms, eye rolls). Other postures or facial expressions can show you are listening respectfully (e.g. making eye contact, staying quiet, nodding).

Constructiveness

- If you wish to challenge something that has been said, challenge the idea not the individual sharing it
- Ask for clarification if you are confused
- Commit to learning, not debating

Inclusivity

- Try not to silence yourself out of concern for what others will think about what you say
- Try not to let your question (or answer) run on. Give others the chance to speak, too.
- Do not remain silent. Make sure to contribute to the discussion
- Take responsibility for the quality of the discussion

Online learning Etiquette

- If it is not possible to have you webcam on during the entire class, do your best to have it on when speaking
- Turn off your microphone when not speaking
- If you need to step away from your computer during class (e.g. get a drink of

- water, use the bathroom, attend to a family member/pet) please do so quietly and without disturbing your classmates. Return to the class when you can.
- Be aware the contents of conversations typed into the chat box, even private conversations, are visible by the instructors

Course Readings

Textbook

Pharmacology: An Introduction, 7th Edition by Henry Hitner and Barbara Nagel. McGraw Hill

Short, selected chapters will be assigned to clarify and augment lecture materials.

Supplemental Readings

Supplemental readings are posted on the course website (<http://blackboard.usc.edu/>). These readings have been compiled from a variety of source materials to provide you with current evidence-based practices from the field of pharmacology and augment lecture materials.

Selected chapters from the textbook and supplemental readings should be read according to the course outline below; these materials are relevant for group presentations, quizzes, and exams.

Course Outline

This course will be in the format of a directed lecture under the guidance of the instructor for the specific session. During each biweekly session, the instructor will engage the students with questions and draw comments or interpretations primarily based on the assigned reading. Students are expected to ask questions and participate in an interactive fashion. Because this is an area of rapid change in policies, the readings may vary from one term to the next.

The course schedule is subject to change, but tentatively will follow the schedule below.

Week	Date	Topic	Presenter	Reading and Supplemental Resources
Week 1	8/23/2022	<ul style="list-style-type: none"> • Introduction: expectations and goals of this class. Practice BlackBoard features. • Assignment orientation • Assignment (5 pts): Complete course baseline knowledge assessment. Submitted to Blackboard by 08/25/2022 11:59 PM PDT 	T. Phan + A. Burkhardt + H. Gukasyan	<u>What is Pharmacology:</u>



Week 1	8/25/2022	<ul style="list-style-type: none"> History of the Pharmaceutical Industry Introductions to general concepts of pharmacology Deadline to complete Baseline Assessment on Blackboard 11:59 PM PDT 	H. Gukasyan	<u>Basics on Pharmacokinetics (PK)/ pharmacodynamics (PD):</u> <u>A very brief overview of P.K. and P.D.:</u>
Week 2	8/30/2022	<ul style="list-style-type: none"> Principles of Pharmacokinetics Introduction to Physiology and Systems of the Body and their correlation to PD/PK 	H. Gukasyan	Hitner and Nagel – Chapter 3-4
	9/1/2022	<ul style="list-style-type: none"> Principles of Drug Action and Pharmacodynamics Complete sign-up for Therapeutic Battles on Blackboard (under Wikis) 	H. Gukasyan	Hintner and Nagel – Chapter 5-8
Week 3	9/6/2022	<ul style="list-style-type: none"> Drug Discovery (candidate to animal models) 	H. Gukasyan	
	9/8/2022	<ul style="list-style-type: none"> Quiz 1 – Up to week 2 (Asynchronously on Blackboard) How drugs come to market (roles of FDA, USDA, EPA to ensure safety, clinical trials) 	H. Gukasyan	
Week 4	9/13/2022	<ul style="list-style-type: none"> Practical aspects of drug discoveries. 	D. Davies	
	9/15/2022	<ul style="list-style-type: none"> Pharmacology and Regulatory Science Regulations of Pharmaceuticals 	T. Church	
Week 5	9/20/2022	<ul style="list-style-type: none"> Pharmacoeconomics 	E. Trish?	
	9/22/2022	<ul style="list-style-type: none"> Biologics Discussion Board Assignment (5 pts): Submit 1 question for our panelists on Discussion board by 11:59 PM PDT 	H. Gukasyan	
Week 6	9/27/2022	<ul style="list-style-type: none"> Vaccines 	A. Burkhardt/	



	9/29/2022	<ul style="list-style-type: none"> Pharmacogenomics and Personalized Medicine 	Resident/T. Phan	
Week 7	10/4/2022	<ul style="list-style-type: none"> Clinical Pharmacy Practice 	Resident/T. Phan	
	10/6/2022	<ul style="list-style-type: none"> Seminar/ Panel: Pathways and Career Opportunities in PDD 	Phan, Burkhardt, Davies, Church, H. Gukasyan, E. Trish, Resident	
Week 8	10/11/2022	<ul style="list-style-type: none"> MIDTERM EXAM 	Students	
Week 8	10/13/2022	Fall Recess		
Week 9	10/18/2022	<ul style="list-style-type: none"> Disease state 1: Insomnia 	T. Phan	
Week 9	10/20/2022	<ul style="list-style-type: none"> Activity 		Complete peer review (2 pts)
Week 10	10/25/2022	<ul style="list-style-type: none"> Disease state 2: Mood (depression/anxiety) 	T. Phan	
Week 10	10/27/2022	<ul style="list-style-type: none"> Activity 		Complete peer review (2 pts)
Week 11	11/1/2022	<ul style="list-style-type: none"> Quiz 2 (Asynchronously on Blackboard) Disease state 3: Diabetes 	A. Burkhardt	
Week 11	11/3/2022	<ul style="list-style-type: none"> Activity 		Complete peer review (2 pts)
Week 12	11/8/2022	<ul style="list-style-type: none"> Disease state 4: Heart disease 	A. Burkhardt	
Week 12	11/10/2022	<ul style="list-style-type: none"> Activity 		Complete peer review (2 pts)
Week 13	11/15/2022	<ul style="list-style-type: none"> Quiz 3 (Asynchronously on Blackboard) Disease state 5: Immune health 	A. Burkhardt	
Week 13	11/17/2022	<ul style="list-style-type: none"> Activity 		Complete peer review (2 pts)
Week 14	11/22/2022	<ul style="list-style-type: none"> Complex therapeutics: HIV Overview 	T. Phan	
Week 14	11/24/2022	Thanksgiving Break		



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Week 15	11/29/2022	<ul style="list-style-type: none">• Complex therapeutics: Cancer Overview	A. Burkhardt	
Week 15	12/1/2022	<ul style="list-style-type: none">• Review session + QA	T. Phan & A. Burkhardt	
Finals Week	Final Exam Tuesday, December 13, 2022 4 - 11 AM to 1 PM			

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call

suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call

studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298

equity.usc.edu, titleix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776

dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710

campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.

Supplement: Zoom and Blackboard

Zoom

[Zoom](#) is a videoconferencing application that enables audio and video conferencing between multiple users on both desktop computers and mobile devices. It can allow faculty to host class lectures, discussions, share screens and files, and chat with students using a PC, tablet, or even a cell phone equipped with a camera. Zoom is available to all faculty and students at no cost.

- Instructors may host live class sessions on Zoom at the same day and time as their regular class.
- Instructors are required to [record all Zoom lectures](#) and discussions for ADA (Americans with Disabilities Act) compliance, but also to accommodate students who may not be able to keep to the original class schedule.

Links to the recordings of lectures will be posted and organized in Blackboard as soon as they are available.

1. Getting Started with Zoom:

- You might be required to use Zoom in this course, please familiarize yourself with it by thoroughly reading all of the materials and [the step-by-step instructions](#).
- You will access the Zoom meeting space in one of two ways:
 1. Log in via blackboard after you have followed the instructions to initially download, install, and login. Then enter the meeting by going to the link **USC Zoom Meetings** in the left-hand navigation pane. You will need to click the “Join” button next to the classroom for the time set for the meeting.
 2. Copy and paste the URL (or click on the web link) provided by your instructor at the time specified for the meeting. Launch the app (after initially downloading, installing, and logging in), and you will enter the meeting immediately.
- You may choose to use Zoom on your mobile device (phone or tablet).

2. Things to Know About Zoom:

- Because you sign in using your USC information, you have your own profile in Zoom.
- Attendance and participation can be tracked using your USC profile.

- You can find the privacy and accessibility policies for Zoom by clicking on the Learner Support tab in the left-hand navigation pane of your Blackboard course.

Blackboard

[Blackboard](#) is the University's Learning Management System (LMS) used by instructors across campus to distribute course materials, communicate with students in discussion boards, and to collect and assess student work through assignments, quizzes, and tests. A Blackboard course is created for every course at USC and should be the primary tool used for classroom management and communication.

Visit <https://blackboardhelp.usc.edu> to learn more about the various functions of Blackboard.

