

RXRS 302: Introduction to Pharmacology and Therapeutics Spring 2024

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Course Weight: 4 units

Days/Time/Location: Tuesday and Thursday: 2:00-3:20PM WPHB30

Catalogue description: Introductory course in pharmacology/drug development- Drug/Receptor interactions, pharmacodynamics, pharmacokinetics, toxicology, therapeutic interventions, biotransformation, pharmacogenomics, FDA, regulatory requirements and challenges, intellectual property, global challenges of drug development.

Introduction

Pharmacology is the study of substances that interact with living systems through chemical processes, especially by binding to regulatory molecules and activating or inhibiting normal body processes. These substances may be chemicals administered to achieve a beneficial therapeutic effect on some process within the patient or for their toxic effects on regulatory processes in parasites infecting the patient. "Introduction to Pharmacology and Drug Development," will provide students with an introduction to

the nature of drugs and drug development including: principles of drug receptors; how drugs interact with the body (PD); and potentially damage the body (toxicology); how the body alters the effects of the drug (PK); drug biotransformation; important drug interactions and their mechanisms of action and pharmacogenomics. The student will also learn about the regulatory challenges associated with the discovery and development of a new drug. The student will be introduced to the use of different types of pharmaceutical interventions, from the use of patented to generic to over-the counter drugs, the current approaches to dietary supplement and alternative medicines. Selected cases studies and emerging “hot” topics will be discussed. This course should have broad appeal to many science and non-science undergraduates including students interested in drug discovery research, chemistry, biology, pharmacology, biochemistry, toxicology, formulations, pharmaceutical industry, FDA, business analysts, entrepreneurs and venture capitalist interested in understanding the pharmaceuticals industry.

Chapters from the core textbook will be supplemented with a variety of source materials including online resources and articles from scientific journals.

Upon successful completion of this course, the student should be able to demonstrate a working knowledge to::

- Explain the nature of drugs and drug development
- Discuss the role and importance of different pharmacokinetic parameters (absorption, distribution, metabolism and elimination; ADME) that affect drug dosing in a patient.
- Define basic terminology used in characterizing a drug (e.g. potency, EC₅₀, IC₅₀, MTD, efficacy, selectivity, etc....).
- Analyze different drug-receptor interactions and the basic principles of pharmacodynamics (PD)
- Evaluate basic principles in the use of drugs to prevent and treat diseases (Pharmacotherapy).
- Discuss importance of pharmacogenomics.
- Conclude particular drugs are prescribed and how their effects are monitored (clinical pharmacology)
- Evaluate the importance of good laboratory practices (GLP), good manufacturing practices (GMP) and good clinical practices (GCP).
- Discuss and summarize processes involved in the discovery and development of new therapeutic agents.

Evaluation and Grading:

Evaluation will be based on two midterm examinations, a final examination and course quizzes.

Class/Group participation:	20 pts (10%)
1 group presentation	20 pts (10%)

4 quizzes @ 10 pts each:	40 pts (20%)
2 midterm exams @ 35 pts each:	70 pts (35%)
1 final exam (partially cumulative):	<u>50 pts</u> (25%)
Total:	200 pts (100%)

Attendance at all classes is expected. Participation will include asking and answering questions and being actively involved in the discussion as well as group assignments. It is expected that the students read the assigned papers prior to the lecture, prepare for group presentations and be prepared to discuss background, current understanding, treatments, and gaps in knowledge for the topic in each lecture.

There will be 1 group presentation, approximately 15 minutes and a 5 minutes Q&A. Students will be presenting in groups to discuss a content of peer-review paper, a disease state, a new drug recently approved (within last 3 years), or a new policy/legislation that would influence pharmacology and drug development. This will be 20 points contributed to the overall grade.

There will be 4 quizzes over the course of the semester that will be primarily based on questions pulled from the text book and lecture notes. The midterms (35 points each) will include multiple choice questions T/F questions fill-in the blank questions and possibly short answers.

The final exam (50 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.

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

Course Readings

Required Readings

The text is mandatory for this course as it will greatly improve your grasp on the course

content. There is a supplemental online student companion website for this course that can be accessed once the textbook is purchased. The chapters identified for your assigned reading in the in the text will support your learning process throughout the semester.

Pharmacology by Karen Whalen, Pharm.D., BCPS

Edition: 7th ISBN 978-1-4963-8413-3

Format: Paperback w/ Access Code

Pub. Date: 2019

Publisher(s): Wolters Kluwer

Prerequisites: Students should have at completed at least one year of undergraduate biology and/or chemistry (e.g., BISC 220/221 or CHEM 105A/B, etc).

Other topical materials including but not limited to the syllabus, supplemental reading assignments and additional handouts will be posted on <http://blackboard.usc.edu/>. Students will also be encouraged to use the online discussions sessions (via Blackboard) as an additional learning tool.

Course Outline

This course will be in the format of a directed seminar/lecture under the guidance of the instructor for the specific session. During each weekly 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. Additional readings for each section that may be of added use are listed in the table below.

Course schedule is as follows:

The schedule dates and lecturers are still being finalized. However, students can expect similar topics to be covered in this course, as it relates to introduction to systems pharmacology.

Week	Tu/Thur	Date	Topic	Lecturer
1	Tuesday	1/9/2024	Introductions, expectations and goals. Basic Principles of Pharmacology (Definitions) Assigned and Supplemental Reading (View Youtube Links below) What is Pharmacology Clinical Pharmacist in the ED The Drug Discovery Process	Dr. Asante
1	Thursday	1/11/2024	Principles of Pharmacokinetics 1 Assigned and Supplemental Reading (View Youtube Links below) Pharmacokinetics Youtube Textbook Reading Ch 1: Pharmacokineticsp1-22	Dr. Asante
2	Tuesday	1/16/2024	Principles of Pharmacokinetics 2 Assigned and Supplemental Reading (View Youtube Links below) Pharmacokinetics Clearance	Dr. Asante
2	Thursday	1/18/2024	QUIZ 1 Principles of Pharmacodynamics 1 Assigned and Supplemental Reading (View Youtube Links below) Pharmacodynamics Overview Textbook Reading Ch 2: Drug–Receptor Interactions and Pharmacodynamicsp23-36	Dr. Asante
3	Tuesday	1/23/2024	Principles of Pharmacology	Dr. Asante

			Implementation in Translational Research	
3	Thursday	1/25/2024	Principles of Pharmacology Implementation in Translational Research Drug Discovery and Development	Dr. Asante
4	Tuesday	1/30/2024	Drug Discovery and Development	Dr. Asante
4	Thursday	2/1/2024	EXAM 1	
5	Tuesday	2/6/2024	Introduction to Clinical Application of Pharmacogenetics	Dr. Tam Phan
5	Thursday	2/8/2024	Student Presentations x4 (15 minutes each)	Students
6	Tuesday	2/13/2024	Clinical Considerations for Geriatric Patients: PK and PD Changes Assigned and Supplemental Reading (View Youtube Links below) Issues in Geriatric Medicine 2: Medication Compliance	Dr. Tam Phan
6	Thursday	2/15/2024	CNS Stimulants Pharmacology Textbook Reading Ch 15: CNS Stimulantsp194-202	Dr. Tam Phan
7	Tuesday	2/20/2024	Clinical Management of ADHD	Dr. Monica Schubert
7	Thursday	2/22/2024	Antidepressants Pharmacology Textbook Reading Ch 10: Antidepressantsp128-138	Dr. Christine Kim
8	Tuesday	2/27/2024	QUIZ 2 Clinical Management of Major Depressive Disorder Assigned and Supplemental Reading (View Youtube Links below) Feeling Depressed vs Having Depression – How to Tell The Difference	Dr. Monica Schubert
8	Thursday	3/1/2024	Student Presentation (3 x15 minutes/ groups)	Students
9	Tuesday	3/5/2024	Anemia, Iron, EPO pharmacology Textbook Reading Ch 42: Drugs for Anemia p565-571	Dr. Luis Chan
9	Thursday	3/7/2024	EXAM 2	
10	Tuesday	3/12/2024	SPRING BREAK	
10	Thursday	3/14/2024	SPRING BREAK	
11	Tuesday	3/19/2024	Pharmacology of GI Agents + Clinical Management of GERD and PUD Textbook Reading Ch 40: Gastrointestinal and Antiemetic Drugsp540- 556	Dr. Ishani Panditha

			Assigned and Supplemental Reading (View Youtube Links below) Heartburn, Acid Reflux, GERD	
11	Thursday	3/21/2024	Estrogen, Progesterone, and Hormonal Contraceptives Textbook Reading Ch 25: Estrogens and Androgens p326-339	Dr. Tam Phan
12	Tuesday	3/26/2024	Pharmacists initiation of hormonal contraceptives and emergency contraceptives	Dr. Jasmine Hedvat
12	Thursday	3/28/2024	LGBTQ+ Care and Hormone Affirmation Pharmacotherapy	
			QUIZ 3 Principals of Antimicrobials Textbook Reading Ch 28: Principles of Antimicrobial Therapyp355-367	Dr. Tam Phan
			Assigned and Supplemental Reading (View Youtube Links below) How Antibiotics Work The Antibiotic Apocalypse Explained	
13	Thursday	4/4/2024	Applications of Antimicrobials and Intro to ASP	Dr. Keysi Ekmekciyan
			Introduction to Oncology	
14	Tuesday	4/9/2024	Textbook Reading Ch 35: Anticancer Drugsp454-480	Dr. Asante
14	Thursday	4/11/2024	Oncology Pharmacology	Dr. Asante
15	Tuesday	4/16/2024	Clinical Management of Patients with Cancer QUIZ 4	Dr. Tam Phan
15	Thursday	4/18/2024	Student Presentation (3 x15 minutes/ groups)	Students
16	Tuesday	4/23/2024	Adjunct and Supportive Therapies for Chemotherapeutics	Dr. Joy Ahn
16	Thursday	4/25/2024	Review Session	Dr. Phan
	FINALS	FINALS	Thursday, May 2 from 2-4 p.m.	

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment. Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Academic Integrity:

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university 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](#).

Statement on Academic Conduct and Support Systems

Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

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.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

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

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

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

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

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

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

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

[Diversity, Equity and Inclusion](#) - (213) 740-2101

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

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) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.