

USC School of Pharmacy

RXRS 402: Human Pharmacology: Challenge of Therapeutics in Society

Subject to change

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Office Location: HSC campus PSC 506; Office Hours (by appt).

Course Weight: 4 units

Days/Time/Location: Tuesday, Thursday: 9:30 am to 10:50 am, VKC 252

Introduction

Pharmacology combines pharmacy (the science of drug preparation) and therapeutics (the treatment of disease with drugs and other means). This course is designed for upper-level undergraduate students from science majors who want to gain a working knowledge of how drugs are administered, what happens to them once in the body (pharmacokinetics [PK]) how drugs alter disease (pharmacodynamics [PD]); and potentially damage the body (toxicology). Content also focuses on the use of prescription and over-the counter drugs to prevent and treat diseases (pharmacotherapeutics). The course should give you a basic understanding of many different classes of drugs that are commonly prescribed. It should be important for undergraduates in Pre Pharmacy, Pre Medicine and other health and life science majors as well as students in biomedical engineering. Chapters from the core textbook will be supplemented with a variety of source materials including online resources and articles from scientific journals.

Course Objectives: Upon successful completion of this course, you should be able to:

- Describe how drugs are administered
- Describe the important pharmacokinetic parameters (absorption, distribution, metabolism and elimination; ADME) that affect drug dosing in a patient.
- Describe different drug-receptor interactions and the basic principles of pharmacodynamics (PD)
- Understand the basic principles in the use of drugs to prevent and treat diseases (pharmacotherapy).
- Describe and understand the importance of pharmacogenomics.
- Describe why particular drugs are prescribed (selected by the clinician) and used in patients and the monitoring of their effects (clinical pharmacology)
- Describe and understand the importance of proper drug use in the treatment of a disease and its relationship to health, economy, and wellbeing of society.

- Describe and understand the societal challenges and perceptions related to the economics of drug availability.
- Describe and understand why some drugs are toxic to humans and why some individuals have different reactions to a drug (basic principles of toxicology).

Evaluation and Grading:

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

Class participation:	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>70 pts</u> (35%)
Total:	200 pts.

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

There will be 4 quizzes over the course of the semester that will primarily be based on questions pulled from the text book. The midterms (35 points each) will include multiple choice and T/F questions as well as a series of questions involving short answers.

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.

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.

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: 6th ISBN 978-1-4511-9177-6

Format: Paperback w/ Access Code

Pub. Date: 2015

Publisher(s): Wolters Kluwer

Prerequisites: Students should have 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:

Guest Speakers are highlighted in Yellow

Week & Date	Topic	Subtopics to be Included	Assigned and Supplemental Reading
Weeks 1-2. Aug. 22, 24 29, 31	Introduction: expectations and goals of this class. Basic principles of pharmacology. Pharmacodynamics Pharmacokinetics Biotransformation Pharmacogenomics PK/PD Dr. Ashutosh Kulkarni (Allergan)	Basic Principles; The who and why drugs are used to treat disease; Drug- Body interactions: Pharmacodynamics (PD); Pharmacokinetics (PK); ADME; Dose; potency; sex differences; zero vs first order kinetics; first pass metabolism What is Pharmacology: https://www.youtube.com/watch?v=PQ2m-nrf2z8&feature=youtu.be Utube presentation in class: “Addiction: learning to forget.” https://www.youtube.com/watch?feature=player_embedded&v=t7Dsg1ZObFo Clinical presentation: “How to effectively utilize PK/PD in the management of patients with XXX”	Pharmacology, Chapters 1-2 Required watching to prepare for week two lectures. Basics on Pharmacokinetics: what the body does to a drug https://www.youtube.com/watch?v=NKV5iaUVBUI Very brief overview of PD and PK: Utube: https://www.youtube.com/watch?v=tobx537kFaI PK: https://www.youtube.com/watch?v=mp93nPUzHqM followed by watching: Clearance: https://www.youtube.com/watch?v=hHUFJAsgqkY

Weeks 3-4. Sept. 5, 7, 12, 14	Quiz #1 Sept 5 Please take the time to review the UTube videos for cholinergic drugs. Introduction to Autonomic Pharmacology; Drugs affecting the autonomic nervous system	cholinergic drugs; anticholinergic drugs; adrenergic drugs; adrenergic blocking drugs. Cholinergic drug UTube: https://www.youtube.com/watch?v=-gJaMoMon0 Anti Cholinergic & Neuromuscular Blocking https://www.youtube.com/watch?v=cp_CZpCBVpk	Pharmacology, Chapters 3-7 Pharmacodynamics discussing protein targets: https://www.youtube.com/watch?v=tobx537kFaI UTube overview: https://www.youtube.com/watch?v=jA1NyCE4M2g
Week 5. Sept. 19 & 21.	Drugs with important actions on smooth muscle	Histamine; serotonin; vasoactive peptides; the eicosanoids; nitric oxide; drugs used in asthma	Pharmacology, Chapters 29; 30; 31
Week 6. Sept. 26	Midterm 1 Sept 26		
Weeks 6-7. Sept. 28, Oct. 3 Oct 5 Dennis Harris	Introduction to CARDIOVASCULAR-RENAL DRUGS	Antihypertensive agents; vasodilators & the treatment of angina pectoris; drugs used in heart failure; agents used in cardiac arrhythmias; diuretic agents "Clinical perspectives on the management of Hypertension"	Pharmacology, Chapters 17-23 Chapters 25; 26; 28 HYPERTENSION & ANTIHYPERTENSIVES (MADE EASY) UTube: https://www.youtube.com/watch?v=V2sEay-E-Ro Review for antiarrhythmic drugs: https://www.youtube.com/watch?v=9xSgezCMHnw
Weeks 8-9. Oct. 10, 12, 17 Oct. 19 Dennis Harris	Quiz #2 Oct 10 Drugs affecting the endocrine system	Pharmacology of Anorectic Agents & Stimulants; Drugs for Diabetes; "Clinical perspectives on the management of Diabetes"	Pharmacology, Chapters 25; 28 UTube: Exercise yes or no?? https://www.youtube.com/watch?v=eXTiiz99p9o
Weeks 10-11 Oct. 24, 26, 31 Nov 2	Quiz #3 Oct 24 Drugs that act on the CNS	Introduction to the pharmacology of CNS drugs General Principles; drug mechanisms; Case Histories, Energy drinks; caffeine; alcohol "Clinical perspectives on the management of Parkinson's Disease"	Pharmacology, Chapter 8 1): Pathophysiology of Parkinson's Disease -- https://youtu.be/WCrZvSFr-TM 2): Basic medications overview of PD. https://www.youtube.com/watch?v=zJBeHPEuIHs&index=10&list=PLUwPvKZhaW-EGXQELQQSAC5pHe8DaDbqY
Week 11. Nov. 2		Midterm 2 Nov 2	

Weeks 12-13. Nov. 7, 9, 14	Chemotherapeutic drugs Dr. Jennifer Cupo	Principles of Antimicrobial Therapy; Cell Wall Inhibitors; Antimycobacterial Drugs; anthelmintic drugs; antiviral drugs, anticancer drugs; "Infectious Disease Pharmacotherapy"	Pharmacology, Chapters 37-42; 44; 45; 46
Week 14. Nov 16, 21	Drugs for other disorders	Anti-inflammatory; antipyretic and analgesic agents "Common treatments utilized in managing patients with the Common Cold"	Pharmacology, Chapter 36
Week 15. Nov. 28, 30 (last day of class)	Quiz #4 Nov 28 Clinical toxicology Dr. Martiene Culty	Risk vs Hazard; routes of exposure for toxins; important targets of toxicity; what makes a drug toxic; management of the poisoned patient.	Pharmacology, Chapter 48 FRONTLINE: Supplements and Safety -- http://video.pbssocal.org/video/2365646371/
Final Exam Dec 7th 11:00 am to 1:00 pm VKC 252			

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 Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu> or to the *Department of Public Safety* <http://capsnet.usc.edu/departments/departments-public-safety/online-forms/contact-us>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Emergency Preparedness/Course Continuity:

In case of emergency, and travel to campus is difficult, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies. Instructors should be prepared to assign students a "Plan B" project that can be completed at a distance. For additional information about maintaining your classes in an emergency please access: <http://cst.usc.edu/services/emergencyprep.html>