

MEDCH 327/PCEUT 327

Spring 2023

1:30-2:20, MWF, Health Sciences Building T639 and Zoom

Title: The science of drugs

Course contact

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Course description: An undergraduate course that will introduce students to medicinal chemistry and pharmaceutical sciences. This course is geared towards junior and senior students majoring in chemistry, biochemistry, bioengineering, chemical engineering, public health and other health sciences, and related fields. Science elective for chemistry, biochemistry, biology, and related majors.

Pre-requisites: CHEM 223, CHEM 237, Chem 335, or instructor permission

Learning Objectives:

Students completing this course will be able to:

- 1- Briefly summarize the history of medicine and some of the drugs that changed the world
- 2- Apply Organic chemistry concepts to drug development process
- 3- Explain the drug discovery to drug approval processes
- 4- Describe various drug classes, and routes of drug interactions and toxicity
- 5- Understand how the body affects drug absorption, routes of metabolism, and factors affecting the duration of drug action
- 6- Describe how large molecule drugs, such as antibodies, work and are developed
- 7- Describe how genetic factors change individual response to drugs

Recommended references (but not required): *Drug-like Properties: Concepts, Structure Design and Methods* (Kerns and Di); *Drug Metabolism and Pharmacokinetics Quick Guide* (Khojasteh, Wong, Hop); *Pharmacological basis of therapeutics, Chapters 1 and 2* (Goodman and Gilman)

Assessment:

Allow Standard or Credit/No Credit grading.

7 online quizzes (70 points; 26%), an online midterm (100 points; 37%), and an online final exam (100 points; 37%). For students who register for Credit/No-Credit grading (S/NS), a grade of 2.0 or above will be converted to a final grade of "S" by the Registrar. For students who register for Standard Grade, University standard grading system applies: 70% is 2.0, 80% is 3.0, grades 90% or above are 4.0, and lowest passing grade is 0.7.

Class size: 100

Topics and Schedule:

Week	Lecture	Date	Topic
1	1	Mar 27, Mon	History of drugs and medicine
	2	Mar 29, Wed	Chemical and physical properties of drugs - I
	3	Mar 31, Fri	Chemical and physical properties of drugs - II (QUIZ 1)

2	4	Apr 3, Mon	Intro to drug design - I
	5	Apr 5, Wed	Intro to drug design - II
	6	Apr 7, Fri	Important drugs and how they were designed – I
3	7	Apr 10, Mon	Important drugs and how they were designed – II (QUIZ 2)
	8	Apr 12, Wed	Important drugs and how they were designed – III
	9	Apr 14, Fri	Important drugs and how they were designed – IV
4	10	Apr 17, Mon	Drug metabolism - I
	11	Apr 19, Wed	Drug metabolism – II (QUIZ 3)
	12	Apr 21, Fri	Metabolism horrors - I
5	13	Apr 24, Mon	Metabolism horrors – II
	14	Apr 26, Wed	Preclinical drug testing models (QUIZ 4)
		Apr 28, Fri	Midterm (up to lecture 14)
6	15	May 1, Mon	Pharmacokinetics - I
	16	May 3, Wed	Pharmacokinetics - II
	17	May 5, Fri	Pharmacokinetics - III
7	18	May 8, Mon	Drug interactions (QUIZ 5)
	19	May 10, Wed	Personalized medicine – I
	20	May 12, Fri	Personalized medicine - II
8	21	May 15, Mon	Empagliflozin: An SGLT-2 Inhibitor for Diabetic Patients (industrial guest speaker) (Quiz 4)
	22	May 17, Wed	Early Protein Engineering and Drug Design
	23	May 19, Fri	Large molecule drugs – I
9	24	May 22, Mon	Large molecule drugs – II (QUIZ 6)
	25	May 24, Wed	COVID vaccines
	26	May 26, Fri	COVID therapies
10		May 29, Mon	NO CLASS; Memorial Day
	27	May 31, Wed	Future of drugs (Quiz 7)

	28	June 2, Fri	Guest speaker from industry
		June 05, Mon	Final Exam; 2:30 – 4:20PM; T639

Course Policies and Values

Attendance and Participation

Students are expected to participate actively in their learning and as a member of the courses in which they are enrolled. Students should arrive on time for the beginning of class; entering the room late is a distraction to others and may cause you to miss key information. Students who miss classes are responsible for the information presented in their absence.

Academic Honesty, Conduct, and Behavior

In general each student must exhibit professional behavior throughout their time enrolled at the University which includes but is not limited to reliability; responsibility; adaptability; respect for the health, feelings, and needs of other individuals; maintaining appropriate boundaries with classmates, and professional boundaries with instructors; maintaining privacy of confidential academic information; resolving conflicts in a manner that respects the dignity of every individual involved; and contributing to an atmosphere conducive to learning.

The UW [Student Conduct Code](#) and the [Office of Community Standards and Student Conduct](#) describe the rights and obligations of students with regard to appropriate conduct and disciplinary procedures in the event of a breach of conduct. Faculty and students should be familiar with the entire contents of the UW Student Conduct Code.

In support of the high value placed on academic honesty and professional integrity, acts of misconduct will not be tolerated. Students are required to honor the obligations described in WAC 478-120-020 and WAC 478-120-025. They are also expected to report incidents of misconduct to the appropriate instructor.

Exams

All students must take exams at the time and date specified. Failure to take the exam at the time and date specified will result in a zero for that exam. Any pre-existing conflicts with exams must be communicated in person to the instructor within two weeks of the start of the quarter. Please make every possible attempt to arrange your schedule so that you can take the exams at the times listed on the syllabus. If this is not possible for any reason, the student must see the instructor for that section of the course in person within two weeks of the start of the quarter to make arrangements to reschedule the exam. The decision on granting a delay (or make-up) will be at the sole discretion of the instructor. Other acceptable reasons for missing an exam may include a death in the family, hospitalization, or some other unforeseen hardship. Students should make every attempt to contact the instructor prior to missing an exam. Make-up exams will only be accommodated in the event of a verifiable excused absence, for which the student must submit a written explanation and supporting evidence (such as a note from a physician). The format of a make-up exam may be different from the missed exam and is at the sole discretion of the instructor. Any unexcused absence from an exam or failure to document an absence within four days of the exam will result in a score of zero for the missed exam.

Use of Technology

We recognize that laptops, tablets, and personal devices may be used to take notes and access course resources. Personal devices must not be used in class to participate in non-course activities such as shopping, games, and other activities. Inappropriate use of devices impacts the learning experience of other students in

the class and is unbecoming of you as a student. Recording and/or disseminating instructional content without the permission of the instructor is prohibited (unless approved as a disability accommodation). During examinations all students are expected to have a standard calculator that does not have programmable memory. All other electronic devices including wearables such as Apple watches that have Wi-Fi and phone access are prohibited during examinations.

Campus Safety

Please visit the UW Campus Safety site (www.uw.edu/safety) for information regarding the University's emergency and safety policies and procedures. Additional helpful resources include SafeCampus (www.uw.edu/safecampus) and UW Alert (www.uw.edu/alert).

Diversity, Equity, and Inclusion

Based on the newly approved Strategic Plan for Diversity, Equity, and Inclusion states, one of our institutional goals is to “infuse the values of diversity, equity and inclusion throughout all teaching and learning.” To support this goal, we “reinforce openness and inclusion in group interactions in the classroom, study spaces and the School of Pharmacy communal spaces when discussing diversity, equity and inclusion to ensure an open, engaging and welcoming School community.” – *School of Pharmacy Strategic Plan for Diversity, Equity and Inclusion* (Approved by Faculty vote on October 26 2017)

Access and Accommodations

Your experience in this class is important to us. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability.uw.edu. DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

UW Religious Accommodations Policy

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities.

The UW's policy, including more information about how to request an accommodation, is available at:

Religious Accommodations Policy:

<https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/>

Accommodations must be requested within the first two weeks of the course using the

Religious Accommodations Request Form: <https://registrar.washington.edu/students/religious-accommodations-request/>