SYLLABUS - Fall 2024

The right to adjust the syllabus at any time is reserved.

Chemistry 130A: Pharmaceutical Chemistry

Instructor:
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Office Hours: Please schedule an appointment here:
https://calendly.com/jgervayhague/30min

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Course Description: **This is a four-week accelerated course** that provides an introduction to the bioorganic chemistry principles behind the design and production of pharmaceutical agents. The course content is focused on explaining and predicting how small organic molecules bind to biological receptors, inhibit enzymes, and are metabolized. This course will draw on and expand upon material covered in introductory organic chemistry such as proposing reasonable arrow-pushing mechanisms for organic reactions and predicting the reactivity of organic molecules with particular reagents.

Textbook: **Available on Canvas in Files folder**
"The Organic Chemistry of Drug Design and Drug Action, 3rd Edition" Richard B. Silverman and Mark W. Holladay

https://search.library.ucdavis.edu/discovery/fulldisplay?docid=cdi_askewsholts_vlebooks_9780123820310&context=PC&vid=01UCD_INST:UCD&lang=en&search_scope=DN_and_CI&adaptor=Primo Central&tab=UCSILSDefaultSearch&query=any,contains,"The Organic Chemistry of Drug Design and Drug Action_3rd Edition" Richard B. Silverman and Mark W. Holladay

Chemistry 130A will cover parts of Chapters 1 through 6.
Assigned reading pages and end of Chapter homework problems (in parenthesis):

Readings		Homework
Chapter 1:	1-15	(1-6)
Chapter 2:	17-35, 54-83	(8-10, 24-26)
Chapter 3:	123-157	(1, 3, 4, 7)
Chapter 4:	165-195	(1, 4, 6, 7, 10a, 11, 12, 14)
Chapter 5:	208-256	(1, 2, 4, 6, 8, 14a)
Chapter 6:	275-318	(2, 3, 6, 7, 11, 15)

Homework: Homework will be assigned weekly to reinforce lecture material.

Weekly Quiz: Four weekly quizzes will be given to test comprehension of lectures and book material.

Oral Presentation: Students will form research teams to develop a 20 minute oral presentation on a known pharmaceutical agent. Each research team will work together to report on specific topics on a weekly basis and the combined reports will be presented a final project.

Course Grading:

Homework	20%
Quizzes	40%
Weekly presentation reports	20%
Final Oral Presentation	20%

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Outline of Lecture Topics

Topic 1: Basic Organic Chemistry Principles and the Drug Discovery Process

Concepts to be covered -
- Basic Organic Chemistry Mechanisms
- Natural products
- Drug Discovery
- Clinical Trials
- Enzyme structure
- Lead compounds
- Pharmacophore
- Lead modification
- Prodrug
- Bioavailability and biodistribution
- Rule of five

Topic 2: Antivirals

Concepts to be covered -
- Viral protein targets
- SAR to achieve Enzyme inhibition
- Competitive inhibition
- Small molecule prophylactic
- Drug/protein interactions
- Viral replication
- Structure of RNA
- Mechanism of Action
- *Vaccines:* Immune response
- Antibody-based formulations

Topic 3: Antibiotics and Anti-inflammatories

Concepts to be covered - Bacterial replication
Resistance
Compliance
Enzyme inactivation, prodrugs
COX inhibition
NSAIDS

Topic 4: Anticancer Therapies

Concepts to be covered - ADME
Routes of Administration
Absorption
BBB

Topic 5: Progress in Addiction Medicine

Policies:

Strategies for success:

1. Attend all in-class lectures, take detailed notes, which should be primary study source. Reread notes and work problems after every lecture. Last minute cramming rarely works in any organic chemistry class. Quiz material will almost entirely come from the class notes and assigned homework problems. Group study is also highly recommended. The group can compare class notes and help each other understand the material.
2. View the assigned online lectures prior to each Tuesday in-class meeting.
3. Work homework problems prior to each Thursday in-class quiz.
4. Meet with your presentation partner to meet complete weekly presentation assignments.
5. Attend office hours regularly to test your understanding, get to know your instructors and practice scientific communication.

Final presentation: Students must participate in the final presentation in order to pass this class. Students who fail to present the final project will receive a grade of "incomplete" only if written documentation for a legitimate reason for their absence is provided and they have a passing grade going into the final exam.

R**egrades:** Legitimate questions about the grading of homework and quizzes (either the grading of a particular problem or an addition error in the score) can be submitted up to one day after the homework/quiz is handed back. The procedure for submitting a regarde request is to attach a separate piece of paper to the front of the homework/quiz with the question(s) to be regraded and a brief justification for the regrade. Do not write on the homework/quiz itself or it may not be accepted for a regrade.

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https://ossja.ucdavis.edu/code-academic-conduct