

Course Syllabus – CHBIO 550

Course Information

Course Number: CHBIO 550 WI24
Course Name: Medicinal Chemistry
Term: WI 2024
Start Date: 01/03/2024
End Date: 03/22/2024
Credits: 3.0

Meeting Days / Times

Mondays and Wednesdays, 9:00-10:30am PT / 12:00-1:30pm ET
(See Calendar in Canvas for the most up-to-date schedule.)

Locations

CA: Seminar Room (Hazen Theory Building)
FL: A116

Course Managers

Role	Last Name	First Name	Email Address
Course Director	Disney	Matthew	disney@scripps.edu
TA	Dobrotka	Cam	cdobrotka@scripps.edu
TA	Hansel	Althea	ahansel@scripps.edu

Course Description

The course will focus upon the "Organic Chemistry of Drug Design and Drug Action" and will use a textbook of the same name by Richard B. Silverman and will also be supplemented with literature and other resources. The course will cover drug design broadly.

The course will be a combination of lectures and student-led presentations. There will be a midterm and final exam. The student presentations will focus on drug design strategies that are aligned with the focus of the course. It is anticipated that each student will make two presentations.

Program Learning Outcomes

By the end of the program, students will have accomplished these objectives:
PLO1: Original Research – graduate students are expected to develop the skills critical for

generating high-quality research output. This would include absorbing, recalling, and contextualizing scientific knowledge, evaluating scientific information and data, creating testable hypotheses and investigating hypotheses, mastering scientific tools and techniques, displaying ethical behavior, and receiving and giving feedback.

PLO2: Communication – graduate students are expected to demonstrate the oral, written, and media skills to effectively communicate the impact of a study or a body of work to the greater scientific community and to the public at large using a number of methods.

PLO3: Critical Thinking – graduate students are expected to develop a self-directed process to analyze information, form opinions or judgments, and use this process to improve the quality of their scientific thoughts, navigate problems, and make informed decisions.

PLO4: Intellectual Curiosity – graduate students are expected to acquire the capacity to build their intellectual curiosity and demonstrate problem solving approaches that serve their professional growth and ability to impact a field.

PLO5: Career and Professional Development – graduate students are expected to develop a variety of transferable skillsets throughout their graduate experience, including management and leadership, inclusiveness, resilience, scientific rigor, collaboration, accountability, time management, teamwork, networking, and career planning.

Course Learning Outcomes

Upon completion of this course students will be able to:

CLO1: Analyze papers in the literature.

CLO2: Conduct critical analysis of contemporary basic research in drug design.

CLO3: Discuss essential concepts in validating and exploiting a drug target.

CLO4: Demonstrate proficient verbal communication skills that reflect scientific analysis of the literature (oral presentation rubric).

CLO5: Demonstrate proficient scientific writing skills that reflect scientific analysis of the literature (scientific writing rubric).

CLO6: Design experiments that provide interpretable information.

Background Preparation (Prerequisites)

Students will find it helpful to read relevant background material for each class from the Silverman textbook or from the provided supplementary materials. Students should have a working knowledge of organic, physical, and biochemistry.

Course Materials

Specific recent primary research papers will be chosen for each session, to be announced for each unit by the instructor of the class.

Required: Silverman & Holladay (2014) The Organic Chemistry of Drug Design and Drug Action, 3rd Edition. ISBN: 978-0123820303.

Expectations and Logistics

Class preparation: All students are required to read either the chapter in the Silverman book pertaining to the lecture material or the papers to be discussed that day.

Class format: The course will combine lectures and student-led presentations that cover a particular class of enzymes. At the beginning of a particular course topic, the instructor will give a detailed overview of the reaction mechanisms catalyzed by a particular family of enzymes. Subsequently, students will present a research article to the entire class. These presentations will focus on both classical and current literature articles on topics relevant to the focus of the course and building on material presented during the lectures. It is anticipated that each student will make two presentations.

Selection of Papers/Student Teams: The papers to be presented will be chosen by the instructor and will be posted in advance on the Enzyme Mechanisms website. Students will be allowed to choose the paper they wish to present, although final choices will be based on a first come/first served basis. Failure to sign up for a paper will result in the student being assigned a paper by the course director.

Attendance Statement

Students are expected to attend all classes. Students who are unable to attend class must seek permission for an excused absence from the course director or teaching assistant. Unapproved absences or late attendance for three or more classes may result in a lower grade or an "incomplete" for the course. If a student has to miss a class, he or she should arrange to get notes from a fellow student and is strongly encouraged to meet with the teaching assistant to obtain the missed material. Missed extra-credit quizzes will not be available for re-taking.

Scientific and Professional Ethics

The work you do in this course must be your own. Feel free to build on, react to, criticize, and analyze the ideas of others but, when you do, make it known whose ideas you are working with. You must explicitly acknowledge when your work builds on someone else's ideas, including ideas of classmates, professors, and authors you read. If you ever have questions about drawing the line between others' work and your own, ask the course professor who will give you clear guidance. Exams must be completed independently. Any collaboration on answers to exams, unless expressly permitted, may result in an automatic failing grade and possible expulsion from the Graduate Program.

Technology Requirements and Support

For issues related to Canvas, please contact the Graduate Office by email at: gradprgm@scripps.edu or by phone at: 858-784-8469.

Course Grading

Grading is in accordance with the academic policies of the Skaggs Graduate School. The breakdown of grading is as follows:

- Midterm Exam: 25%
- Final Exam: 25%
- Presentations: 40%
- Participation: 10%

Letter Grade	Percent	GPA	Description
A	93-100	4.00	Outstanding achievement. Student performance demonstrates full command of the course subject matter and evinces a high level of originality and/or creativity that far surpasses course expectations.
A-	90-92	3.67	Excellent achievement. Student performance demonstrates thorough knowledge of the course subject matter and exceeds course expectations by completing all requirements in a superior manner.
B+	87-89	3.33	Very good work. Student performance demonstrates above-average comprehension of the course subject matter and exceeds course expectations on all tasks as defined in the course syllabus. There is notable insight and originality.
B	83-86	3.00	Satisfactory work. Student performance meets designated course expectations and demonstrates understanding of the course subject matter at an acceptable level.
B-	80-82	2.67	Marginal work. Student performance demonstrates incomplete understanding of course subject matter. There is limited perception and originality.
C+	77-79	2.33	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.
C	73-76	2.00	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject

matter. There is severely limited or no perception or originality. Course will not count toward degree.

P	73-100	0.00	Satisfactory work. Student performance demonstrated complete and adequate understanding of course subject matter. Course will count toward degree.
F	0-72	0.00	Unacceptable work/Failure. Student performance is unacceptably low level of knowledge and understanding of course subject matter. Course will not count toward degree. Student may continue in program only with permission of the Dean.
I		0.00	Incomplete is assigned when work is of passing quality but is incomplete for a pre-approved reason. Once an incomplete grade is assigned, it remains on student's permanent record until a grade is awarded.
W		0.00	Withdrew from the course with Dean's permission beyond the second week of the term.

- All courses will be recorded and maintained in the student's permanent academic record; only courses that apply towards the degree will appear on the academic transcript. Non-credit or audited courses will not appear on the transcript.
- 4 core courses taken for a letter grade (pass = B- or higher for a core course)
- 2 elective courses taken pass/fail (pass = A, B, C for an elective)

Because students are encouraged to take electives outside their area of expertise, a "C" letter grade is passing.

Course Summary:

Date	Details
Mon Jan 1, 2024	No Class (New Year's Day)
Wed Jan 3, 2024	Introduction, Chapter 1 (The Practice of Medicinal Chemistry Chapter 1)
Mon Jan 8, 2024	Lead Discovery and lead modification (Chapter 2)
	Introduction, Chapter 1 (The Practice of Medicinal Chemistry Chapter 1)
Wed Jan 10, 2024	Lead Discovery and lead modification (Chapter 2)
Mon Jan 15, 2024	No Class (Martin Luther King Jr. Day)
Wed Jan 17, 2024	Talks set 1 Student Presentations
Mon Jan 22, 2024	Receptors (Chapter 3)
Wed Jan 24, 2024	Talks set 2 Student Presentations

Mon Jan 29, 2024	Receptors (Chapter 3) Student Presentations
Wed Jan 31, 2024	Enzymes (Chapter 4)
Mon Feb 5, 2024	Enzymes (Chapter 4) Student Presentations
Wed Feb 7, 2024	Midterm Exam
Mon Feb 12, 2024	Enzyme Inhibition and Inactivation (Chapter 5)
Wed Feb 14, 2024	Enzyme Inhibition and Inactivation (Chapter 5)
Mon Feb 19, 2024	No Class (Presidents' Day)
Wed Feb 21, 2024	Enzyme Inhibition and Inactivation (Chapter 5) Student Presentations
Mon Feb 26, 2024	DNA/RNA-Interactive Agents (Chapter 6)
Wed Feb 28, 2024	DNA/RNA-Interactive Agents (Chapter 6) Student Presentations
Mon Mar 4, 2024	Drug Resistance and Synergy (Chapter 7)
Wed Mar 6, 2024	Drug Resistance and Synergy (Chapter 7) Student Presentations
Mon Mar 11, 2024	Drug Metabolism (Chapter 8)
Wed Mar 13, 2024	Drug Metabolism (Chapter 8) Student Presentations
Mon Mar 18, 2024	Final Exam