Course Syllabus – CHBIO 510

Course Information

Course Number: CHBIO 510 SP24
Course Name: Chemical Biology II
Term: SP 2024
Start Date: 04/01/2024
End Date: 06/21/2024
Credits: 3.0

Meeting Days / Times

Mondays, Wednesdays, 11:30am-12:30pm PT / 2:30-3:30pm ET
Fridays, 12:30-1:30pm PT / 3:30-4:30pm ET
(See Calendar in Canvas for the most up-to-date schedule.)

Locations

CA: Graduate Office Dining Room (Hazen Theory Building)
EXCEPTION: Seminar Room (Hazen Theory Building) on 4/5/24
FL: B214

Course Managers

Role	Last Name	First Name	Email Address
Course Director	Kodadek	Thomas	kodadek@scripps.edu
Course Director	Parker	Christopher	cparker@scripps.edu
TA	Kuo	Tony	ktkuo@scripps.edu
TA	Ye	Elva	eye@scripps.edu

Course Description

This is a 3-credit course focused on the discovery and characterization of bioactive small molecules and their use as probes and drug leads. Some of the topics covered include high-throughput screening, chemical proteomics, biophysics of small molecule-biomolecule interactions, and the use of natural products in biology. Didactic lectures from the course instructors will be presented on Mondays and Wednesdays. Key papers dealing with the topics discussed that week will be presented by students on Fridays.

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.

For a detailed description of each outcome and specific success indicators, please refer to this web page: https://education.scripps.edu/graduate/doctoral-program/.

Course Learning Outcomes

Upon completion of this course students will be able to:
CLO1: Understand current methods for the discovery of biologically active small molecules.
CLO2: Understand how small molecules can be used to probe cellular function.
CLO3: Understand chemical methods to monitor and manipulate the proteome and glycome.
CLO4: Understand basic aspects of drug discovery and development, including small molecules and biologics.
CLO5: Understand the major outstanding problems in the field.

Background Preparation (Prerequisites)

Undergraduate level organic chemistry and biochemistry. The lectures will sometimes include detailed consideration of chemical mechanisms. The instructors and teaching assistants are happy to provide additional instruction to students with less well-developed backgrounds in organic chemistry. This course does not require students to have completed Chemical Biology I. However, students who have not taken this course are required to notify the director and request permission to enroll.

Course Materials

No textbook is required for this course. Scientific papers will be referenced throughout the course providing further reading for specific topics discussed.

Expectations and Logistics

This class will cover topics on the frontiers of chemical biology. For each segment, one or more review articles will be provided to provide a primer to each major topic. However, most of the content of the class will come from the primary literature and several papers will be required for reading for each lecture. Key papers will be presented by students on Fridays. These papers will be chosen by the instructors. Students can sign up for the papers that interest them the most. Reading assignments will be provided well in advance. Participation and interaction are strongly encouraged in class. Students are expected to challenge the status quo, if justified, but to do so in a constructive and respectful fashion.

Attendance Statement

Attendance to all lectures is mandatory. The progression of lectures requires consistent attendance as the course is designed to build on fundamental principles taught in previous lectures. Students are responsible for their own work and must obtain permission from the instructor if they must miss a class.

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:

- Attendance, Class Participation, and Preparedness: 25%
- Literature Presentations**:** 25%
- Midterm Exam**:** 25%
- Final Exam**:** 25%

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)

Course Summary

Date	Details
Mon Apr 1, 2024	Introduction and Origins of Chemical Biology (Kodadek)
Wed Apr 3, 2024	Natural Products as Tools For Discovery Biology (Kodadek)
Fri Apr 5, 2024	Journal Article Presentations (Kodadek) - SEMINAR ROOM
Mon Apr 8, 2024	Chemical Dimerizers I (Erb)
Wed Apr 10, 2024	Chemical Dimerizers II (Erb)
Fri Apr 12, 2024	Journal Article Presentations (Students)
Mon Apr 15, 2024	Manipulation of Engineered Systems with Small Molecules (Parker)
Wed Apr 17, 2024	Lecture
Fri Apr 19, 2024	Journal Article Presentations (Students)
Mon Apr 22, 2024	High-Throughput Screening I (Lairson)
Wed Apr 24, 2024	High-Throughput Screening II (Lairson)
Fri Apr 26, 2024	Journal Article Presentations (Students)
Mon Apr 29, 2024	Ligand Discovery I: Genetically encoded libraries (Kodadek)
Wed May 1, 2024	Lecture
Fri May 3, 2024	Journal Article Presentations (Students)

Mon May 6, 2024	Ligand Discovery II: Synthetic libraries (Kodadek)
Wed May 8, 2024	Lecture
Fri May 10, 2024	Journal Article Presentations (Students)
Mon May 13, 2024	Review Session
Wed May 15, 2024	Mid-Term Exam
Fri May 17, 2024	No Class (Commencement)
Mon May 20, 2024	Ligand Discovery III: Fragment-based and proteomic methods (Parker)
Wed May 22, 2024	Lecture
Fri May 24, 2024	Journal Article Presentations (Students)
Mon May 27, 2024	No Class (Memorial Day)
Wed May 29, 2024	Ligand Characterization I: Kinetics and Thermodynamics (Kodadek)
Fri May 31, 2024	Journal Article Presentations (Students)
Mon Jun 3, 2024	Ligand Characterization II – Target ID and Mechanism of Action (Seath)
Wed Jun 5, 2024	Lecture
Fri Jun 7, 2024	Journal Article Presentations (Students)
Mon Jun 10, 2024	Protein modification and bio-orthogonal chemistry (Kodadek)
Wed Jun 12, 2024	Lecture
Fri Jun 14, 2024	Journal Article Presentations (Students)
Mon Jun 17, 2024	Review Session (didactic) (Kodadek, et. al)
Tue Jun 18, 2024	Review Session (TAs)
Wed Jun 19, 2024	No Class (Juneteenth)
Fri Jun 21, 2024	Final Exam