

Chemistry 1810 – Chemical biology: Discoveries at the interface

Syllabus · Fall 2018 · University of Pittsburgh

Instructor: Professor W. Seth Childers

Office: Chevron Science Center, Room 801

Office Hours:

E-mail: wschild@pitt.edu

Class meetings

TTH 4:00-5:15

Lawrence Hall 121

Office Hours - Chevron Science Center 801

W12-1, T12-1, or by appointment

Course Description

This course is designed to teach biochemistry from a chemical and molecular perspective. Revolutionary transformations in chemistry and biology have led to a merging at the boundary of these disciplines where contributions from both fields impact our molecular and quantitative understanding of biology. Throughout the course particular emphasis will be placed on the molecular interactions that underlie biological processes.

Text

Van Vranken, David & Weiss, Gregory. *Introduction to Bioorganic Chemistry and Chemical Biology*, 1st ed.; Garland Science: New York, 2013.

Some course material will consist of advanced topics from published journal articles. Students can acquire these references online through the university library.

Attendance

New material will be introduced at each lecture period, and you are responsible for all material discussed in lectures. Exams will be centered on material presented in the course and learning objectives. If you know you will miss a class, an email notice of your expected absence is appreciated.

Courseweb

Materials presented in class will be posted on Courseweb typically at least 2 days after each class period. In addition, materials (e.g. reading assignments and videos) and other activities will also be posted on course-web to help you prepare for each class.

Disability Resources:

If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and Disability Resources and Services no later than the second week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call (412) 648-7890 (Voice or TTD) to schedule an appointment. The Disability Resources and Services office is located in 140 William Pitt Union.

Academic Integrity:

Students in this course will be expected to comply with University of Pittsburgh's Policy on Academic Integrity (<http://www.as.pitt.edu/fac/policies/academic-integrity>). Any student suspected of violating this obligation for any reason during the semester will be required

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to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity.

Copyright Notice:

Course materials may be protected by copyright. United States copyright law, 17 USC section 101, et seq., in addition to University policy and procedures, prohibit unauthorized duplication or retransmission of course materials. See Library of Congress Copyright Office (<http://www.copyright.gov/>) and the University Copyright Policy (<http://oscp.library.pitt.edu/intellectual-property/copyright/pitt-policies-on-copyright/>).

Statement on Classroom Recording:

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

Grading

The overall course grade will be based on the following distribution (dates subject to change). I will not accept late individual and group assignment. There will be no final exam for this course.

Component	Tentative Dates	
Exam 1: Chapter 1-2, 5 Introduction to Biology, Non-covalent interactions, Amino acids and Protein Structure	Sep 25, 2018	25%
Exam 2: Chapter 6,8: Enzyme function, kinetics, Terpenes and Polyketide Natural products	Oct 30, 2018	25%
Exam 3: Chapter 3,4: DNA/RNA Structure and Function	Dec 4, 2018	25%

*No final exam will be given for this course.

Chemical Biology Wiki and Video Project Components	Date	
Wiki Assignment 1	Sep 18, 2018	2%
Wiki Assignment 2	October 16, 2018	2%
Finalized Wiki and Video Project	Nov 20, 2018	18%
Chembio Wiki and Video: Peer Learning and Review	Nov 29, 2018	2%
Chemical Biology Film Festival	Dec 6, 2018	1%

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Grading Scale: The following represents the tentative grading scale for this course based upon historical student performance in the class. However, this grading scale is subject to change.

Numerical Grade	Letter Grade
96-100	A+
92-95	A
86-91	A-
82-85	B+
75-81	B-
70-74	C+
65-69	C
60-64	C-
55-59	D+
50-54	D
45-49	D-
0-44	F

Exam Re-grades:

If you believe that part of an exam was scored in error, you may request that I regrade it. Such requests must be made in writing no later than the next class period after exams are returned. Attach a cover page identifying which problem(s) you believe were scored incorrectly. I will review the entire exam and return it promptly. This is the only mechanism by which an assigned exam grade will be reconsidered.

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Tentative Dates		Tentative Themes
Week 1	8/28, 8/30	Central concepts from biology, non-covalent interactions
Week 2	9/4, 9/6	Non-covalent interactions of biomolecules, amino acids, pKa, peptide synthesis
Week 3	9/11, 9/13	Protein secondary structure, protein purification, coiled-coil structure; amyloid; antibodies as drugs
Week 4	9/18 9/20	Green fluorescent protein Exam 1 Review
Week 5	9/25	Exam 1: Non-covalent interactions and Protein structure (Chapter 1,2,5)
	9/28	Catalytic Mechanisms; Kinase, Phosphatases, Proteases
Week 6	10/2, 10/4	Enzyme catalytic mechanisms, cofactors, enzyme kinetics, drug design - protease inhibitors
Week 7	10/9, 10/11	Enzymes used in manufacturing, polyketides
Week 8	10/18	Polyketides and Terpenes
Week 9	10/23	Metabolic Engineering
	10/25	Exam 2 Review
Week 10	10/30	Exam 2: Protein Function and Polyketides (Chapter 6 and 8)
	11/1	DNA structure, electrophoresis, DNA synthesis, and oligonucleotides as drugs
Week 11	11/6, 11/8	Synthesis of DNA, PCR, RNA structure, mRNA, tRNA and translation
Week 12	11/13, 11/15	RNA structure, mRNA translation
Week 14	11/27	CRISPR-Cas9 and genome engineering
	11/29	Exam 3 Review
Week 15	12/4	Exam 3: DNA and RNA (Chapter 3 and 4)
	12/6	Chemical Biology Film Festival