

# BB490/590: Biochemistry 1 - Structure and Function

~ Syllabus Fall 2019 ~

**Course Description:** Sequence professional course to meet the requirements of majors in biochemistry and biophysics. The first course in the series, BB 490/590, covers how the structure and function of biological macromolecules arises from the organic chemistry of their fundamental building blocks. The organic chemistry of biochemistry will be a focus, including the mechanisms by which enzymes catalyze biological reactions.

**Course Credits:** This course combines approximately 30 hours of in-class instruction with roughly 60 hours of reading, studying, and assignments for 3 credits.

**INSTRUCTOR:** Dr. Andy Karplus ; 2011 ALS Bldg ; [Andy.Karplus@oregonstate.edu](mailto:Andy.Karplus@oregonstate.edu)

**INSTRUCTOR:** Amber Vogel ; 2101 ALS Bldg ; [vogela@oregonstate.edu](mailto:vogela@oregonstate.edu)

**OFFICE HOURS:** TA and Instructor office hours and location will be provided on Canvas.

## COURSE PREREQUISITES:

- BI211, BI212, BI213 (Biology) with a C- or better ;
- CH 332 or CH 336 (organic chemistry) with a C- or better;

## LEARNER OUTCOMES

Students in this course will:

1. *Think like a biochemist:* see all of life's processes as resulting from the spontaneous interactions of real physical molecules;
2. Describe the names, structures and properties of key biochemical building blocks and macromolecules and their relation to function;
3. Use proper technical language to communicate key biochemical concepts and information, and the evidence that supports them;
4. Understand principles of energetics in molecular interactions, biochemical reactions, and enzyme catalysis;
5. Carry out biochemical calculations related to pH, enzyme kinetics, and metabolic reactions;
6. Integrate concepts covered to assess data and propose explanations that fit data presented;
7. Describe glucose and glycogen metabolism pathways and predict their behavior based on given conditions;
8. BB590 students will extract, organize and present information from the scientific literature regarding a selected biochemical process.

## LEARNER EXPECTATIONS

1. Study material before and as it is being covered. Formulate and ask questions to understand concepts/processes as the material is covered as opposed to cramming before exams.
2. Recognize that understanding a complex topic like biochemistry requires mastering considerable background information, assimilating considerable new material, and investing sufficient time and effort to put these together to gain mastery of the material.

**EXAM AND QUIZ DATES** - There will be two midterms and a final. The two midterms *will not* be cumulative. The final will have a portion that is equivalent to a third midterm focused on the last part of the course, and a second portion that is cumulative over the whole course.

Quizzes will be on most Mondays during the first ten minutes of class.

Exam 1: Friday October 18 (in the regular classroom at the regular time)

Exam 2: Friday November 15 (in the regular classroom at the regular time)

Final Exam: Thursday Dec 12 at 6:00 p.m. (location to be announced)

Quizzes: Sept. 30, Oct. 7, Oct. 14, Oct. 28, Nov. 4, Nov. 25, Dec. 2

BB590 project draft due Nov 8; final presentation and report due Fri Dec 6 (for assignment details see Canvas)

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## Grading scale

All grades will be determined on an absolute scale, so there is no disadvantage to any student for helping another. In fact, often students develop a much better understanding of the concepts and material in the course through discussing them with other students.

Grades will be assigned according to the following scale\*:

B+ 77-80 ; C+ 62-65 ; D+ 47-50  
A 83-100 ; B 68-77 ; C 53-62 ; D: 38-47 ; F: <35  
A- 80-83 ; B- 65-68 ; C- 50-53 ; D- 35-38

\*The cutoffs may be lowered but will not be raised.

Listed below is the how course activities contribute to your final grade.

	<b>BB490</b>	<b>BB590</b>
Weekly Quiz (top 5 of 7 @ 20 pts each)	100	100
Mid-term Exams (2 @ 250 pts each)	500	500
Paper reviews	-	200
Final exam (portion 1=250 pts; portion 2=150 pts)	400	400
<b>TOTAL</b>	<b>1000</b>	<b>1200</b>

## QUIZ, EXAM and REGRADE POLICIES

There will be seven quizzes and three exams (including the final) and no makeup quizzes or exams. The lowest 2 quiz scores will be dropped. Students taking examinations are not allowed to use a calculator, books, or notes of any kind. Other than a pencil/pen, no other materials are allowed for use on exams unless explicitly announced by the instructor.

Excused absences will not be given for missing exams due to airline reservations, routine illness (colds, flu, stomach aches, headaches, or other common ailments), various personal challenges, difficult schedules, or misreading the time of an exam or going to the wrong room. It is assumed that in registering for this course you reserve the time needed to complete it. Life challenges can impact performance, but that is true for all students. Excused absences will *almost never* be given after the absence, so students must make any special arrangements BEFORE an exam.

It is each student's responsibility to check that their exam has been properly graded. Regrade requests must be turned in stapled to the front of the exam by one week after the exam or quiz was returned to the class. To request a regrade for one or more questions, students *must* prepare a cover sheet with a clear written explanation stating all requests for reconsideration.

## REGISTRATION DEADLINES

Students are expected to meet all deadlines as appropriate for withdrawing from the class, should that be necessary. Petitions to make changes after deadlines have passed will not be approved except in extraordinary circumstances. The deadline for dropping classes (no grade) during the academic year is the second week of the term. The deadline for withdrawing from a class (grade of W) is the seventh week of the term. Students not withdrawing by Friday of the seventh week of the term will receive a grade in the course.

## POLICY ON INCOMPLETES

A grade of I is appropriate when 1) a course requirement has not been completed due to circumstances beyond the control of the student and 2) at least half of the work for the course has

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been completed at a level of C- or better. For medical problems that prohibited the student from fulfilling a requirement of the course, a note from a doctor is required. The request may be supplied without the note, and the request (if acceptable) will typically be granted, conditional on the note being provided later. For other circumstances, supporting evidence, such as a note from an advisor, will be helpful to the petitioner's case.

## REACH OUT FOR SUCCESS

University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success at [oregonstate.edu/ReachOut](http://oregonstate.edu/ReachOut). If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255)

## GENERAL OSU POLICIES

**Statement Regarding Students with Disabilities:** Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

**Student Conduct Expectations link:** <http://studentlife.oregonstate.edu/code>

Cheating or plagiarism by students is subject to the disciplinary process outlined in the Student Conduct Regulations. Students are expected to be honest and ethical in their academic work. "Academic dishonesty" is defined as an intentional act of deception in one of the following areas:

- ◆ Cheating-use or attempted use of unauthorized materials, information or study aids
- ◆ Fabrication-falsification or invention of any information
- ◆ Assisting-helping another commit an act of academic dishonesty
- ◆ Tampering-altering or interfering with evaluation instruments and documents
- ◆ Plagiarism-representing the words or ideas of another person as one's own

Behaviors disruptive to the learning environment will not be tolerated and will be referred to the Office of Student Conduct for disciplinary action.

*"The goal of Oregon State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning will not be tolerated, and will be referred to the Student Conduct Program for disciplinary action. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office."*

Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.

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## Tentative Course Calendar and Suggested Readings

Reading assignments listed are very broad *with an intent to expose you to a greater breadth of material than will be covered in class. So these are meant to skim through* before each topic starts with a goal of noticing context and themes, but not trying to learn details. More selective readings to focus on in depth will be provided as we get to each section.

	Date	Topics	Text Reading
Wk 0	9/25	Introduction	Syllabus; Ch 1 "How does THAT work?" assignment
	9/27	The Matrix of Life	Ch 2
Wk 1	9/30(Q)	The Matrix of Life	"
	10/2	The Energetics of Life	Ch 3
	10/4	The Energetics of Life	"
Wk 2	10/7(Q)	Nucleic Acids	Ch 4
	10/9	Nucleic Acids	"
	10/11	Proteins: primary structure	Ch 5 (pp. 136-158)
Wk 3	10/14(Q)	Proteins: primary structure	"
	10/16	Proteins: purification/analysis	Ch 5 Tools (pp. 161-176)
	10/18	<b>Midterm 1</b>	
Wk 4	10/21	Proteins: folding and 3D structure	Ch 6
	10/23	Proteins: folding and 3D structure	"
	10/25	Proteins : Function/Evolution	Ch 7
Wk 5	10/28(Q)	Proteins : Function/Evolution	"
	10/30	Carbohydrates	Ch 9
	11/1	Carbohydrates	"
Wk 6	11/4(Q)	Lipids and Membranes	Ch10
	11/6	Lipids and Membranes	"
	11/8	Enzymes I	Ch 11 (pp. 410-431)
Wk 7	11/11	<b>Veterans Day Holiday</b>	
	11/13	Enzymes II	Ch 11 (pp. 431-450)
	11/15	<b>Midterm 2</b>	
Wk 8	11/18	Enzymes III	Ch 11 (pp. 431-450)
	11/20	Enzymes IV	Ch 11 (pp. 451-463)
	11/22	Introduction to Metabolism	Ch 12
Wk 9	11/25(Q)	Carbohydrate metabolism I	Ch 13 (pp. 518-540)
	11/27	Carbohydrate metabolism II	"
	11/29	<b>Thanksgiving Holiday</b>	
Wk 10	12/2(Q)	Carbohydrate metabolism III	Ch 13 (pp. 540-557)
	12/4	Carbohydrate metabolism IV	Ch 13 (pp. 561-575)
	12/6	BB590 presentations	

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	12/12	<b>Final Exam</b> (Thursday Dec 12 at 6:00 – 7:50 p.m.)
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