

BB 490/590 Biochemistry 1-Structure and Function

Course Description: Introductory biochemistry will cover a description of the components of platform for understanding what biological macromolecules are and how they function. Living organisms are also able to perform thousands of chemical reactions all in the same compartment every second. How living organisms carry out chemical reactions with unparalleled efficiency and specificity will be described. Biochemistry is a complex and rapidly growing discipline. This course will attempt to encapsulate the fundamental chemical principles needed to understand how biochemistry as a developing discipline will impact future scientific research. BB 490, 491, and 492 must be taken in order.

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. Ryan A. Mehl
2135 ALS Bldg
Ryan.Mehl@oregonstate.edu

OFFICE HOURS: TA's office hours will be listed on Canvas. They will be held in the ALS 2162 (Undergrad bb lounge).

COURSE PREREQUISITES: CH 332 or CH 336

LEARNER OUTCOMES 490

The intention of the course is for students to:

1. Acquire the technical language used to communicate biochemical information.
2. Recall key elements of basic biochemistry principles, including metabolic pathways, molecule names, molecular structures (as noted), control mechanisms, and terms used to describe categories of molecules.
3. Communicate (through writing) key concepts relevant to biochemistry.
4. Understand and apply general concepts of biochemistry to relevant, specific problems.
5. Predict the directions of metabolic pathways from an understanding of the control mechanisms and energy considerations of each.

LEARNER OUTCOMES 590

This component is in addition to the 490 intentions above and worth 20% of your final grade (see below for details):

1. Learn how to read and critically evaluate the literature as it relates to course material.
2. Identify what are the gaps in knowledge worthy of future scientific effort.
3. Prepare a research proposal from a selected literature assignment that describes how overcome current limitations.

LEARNER EXPECTATIONS

1. Advance preparation
2. Studying and formulating and asking questions so as to understand concepts/processes as the

material is covered and not right before an exam.

3. Recognition that the understanding of a complex topic like biochemistry requires considerable background prior to the class, a considerable amount of information to be acquired in the class, and sufficient time and effort to put these together to master the material.

OPTIONAL LEARNING RESOURCES

1. Lectures are MWF 10:00-10:50 in WNGR 116. There is no substitute for being at lectures and taking your own notes. The exams are based heavily on material covered in the lectures.
2. Textbook: *Biochemistry*, 4th Edition by: Mathews, Van Holde, Appling, Anthony-Cahill. Studying assigned readings before the lecture date is highly valuable.
3. Powerpoint outlines of the text chapters on Canvas. These are not lecture notes and will not be used during lecture. These are intended to supplement the text and provide additional perspective on chapter material.
4. Additional textbook: *Biochemistry Free and Easy* (FREE textbook) by Ahern
5. TA and Professor office hours

EXAM AND QUIZ DATES - There will be two exams and a final exam. The first two exams will be cumulative but will focus on the material subsequent to the previous exam. They will be in the regular classroom at the regular class time (WNGR 116). The final will be cumulative and in the regular final exam slot. Quizzes will be given weekly during the first ten minutes of lecture.

Sept 21st classes start

Exam 1: Monday October 17th, 2013 (class 12)

Exam 2: Monday November 21, 2013 (class 26)

Quizzes: Sept. 26st, Oct. 3rd, Oct. 10th, Oct. 24th, Oct. 31st, Nov. 7th, Nov. 14th

590 Paper Summaries: Sept. 30th, Oct. 14th, Oct. 28th, Nov. 18th.

590 Research Proposal: Dec. 9th

Tentative Course Calendar and Suggested Readings

Review of the basics

Introduction to Biochemistry	Ch. 1
Bonding, Water, Ionic Equilibria	Ch. 2
Thermodynamics and Kinetics	Ch. 3
Biochemical Reaction Types	Ch. 12

Basic structure of monomers, polymers and their function

Nucleic Acids	Ch. 4
Carbohydrates: Sugars, Saccharides, Glycans	Ch. 9
Lipids and Membranes	Ch. 10
Amino Acids and Protein Structure	Ch. 5, 6 and 10
Protein function (Protein binding, dynamics and locations)	Ch. 7, 8, 9, 10
Test 1	

Enzymes and Metabolism

Enzymes – Biological Catalysts	Ch. 11
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Enzyme – Kinetics	Ch. 11
Chemical Logic of Metabolism	Ch. 12
Carbohydrate metabolism	Ch. 13
Test 2	
Metabolic/Enzyme Regulation	Ch. 7 & 13

The above schedule should be viewed as a tentative syllabus. The material covered on any hour exam will depend on the material covered prior to the exam date. Any adjustments of coverage will be announced, and explained in class prior to the exam date.

Course Evaluation

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 by **dealing with the different problems and viewpoints of other students**.

Grade Distribution:

Your grade will be given as a letter grade and grading scale for the course will be on a fixed scale of:

As >85 // Bs 84-74 // Cs 73-63 // Ds 62 - 52 // F <51%

The instructor reserves the right to lower these cutoffs, but will not raise them. Graduate students exams will be graded according to a higher standard.

Listed below is the contribution of course activities to your final grade.

490 Distribution

Weekly Quiz (7) (top 5 @ 20 pts each)	100
Mid-term Exams (2 @ 225 pts)	450
<u>Final exam</u>	<u>450</u>
TOTAL	1000

590 Distribution

Weekly Quiz (7) (top 5 @ 20 pts each)	100
Mid-term Exams (2 @ 175 pts)	350
Paper reviews (4@25 pts)	100
Term Project	100
<u>Final exam</u>	<u>350</u>
TOTAL	1000

Paper Summaries (590)

A single page summary of a selected literature paper responding to directed questions. Details for each paper will be posted on Canvas.

Term Project (590)

A two page summary of a research proposal will be due at the end of the term. Details for the proposal will be posted on Canvas.

QUIZ, EXAM and REGRADE POLICIES

There will be three exams given in this course (including the final) and no makeup exams. All exams will take place in the regular classroom. 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 student use on exams unless explicitly announced by the instructor.

Excused absences will not be given for those 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 date or time of an exam or going to the wrong room. Life's challenges can impact performance in a course, but that is true for all students. Also, excused absences will *almost* never be given after the absence has occurred, so students must make any special arrangements with the instructor **BEFORE** the exam.

It is the responsibility of each student to check that his/her exam has been properly graded. If errors are made, or if the student feels that more points should have been awarded for one or more questions, students must prepare a cover sheet with a clear written explanation stating all of their cases for questions to be regraded. These requests for regrading must be turned in stapled to the front of the exam by the end of the third (3rd) class day after the examination is returned to the class. Failure to follow these instructions will result in automatic denial of the request.

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 (fall, winter, spring terms) is the second week of class. The deadline for withdrawing from a class (grade of W) is the seventh week during the academic year. 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 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.

The following are some reasons that are **not** acceptable:

- The course proved to be more time-consuming or difficult than expected.
- Work in other courses ended up taking too much time.
- Work or travel associated with a job ended up interfering with course work.
- Time conflicts prohibited contact with the instructor or TAs during office hours.
- The student misunderstood the requirements or grading schemes of the course.
- The student wishes to avoid a low grade and/or retake the course at a later date

POLICY ON ATTENDANCE

It is recommended that you come to class. This will likely improve your performance on the evaluative portions of this course.

GENERAL OSU AND DEPARTMENTAL POLICIES

Statement Regarding Students with Disabilities

Oregon State University is committed to student success; however, we do not require students to use accommodations nor will we provide them unless they are requested by the student. The student, as a legal adult, is responsible to request appropriate accommodations. The student must take the lead in applying to Disability Access Services (DAS) and submit requests for accommodations each term through DAS Online. OSU students apply to DAS and request accommodations at our [Getting Started with DAS](#) page.

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.

The Department of Biochemistry/Biophysics follows the university policies on student conduct. These can be found at <http://studentlife.oregonstate.edu/studentconduct/offenses-0>

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.