

Syllabus-Biochemistry II-Metabolism (BB491/591)

Course Name: Biochemistry II-Metabolism

Course number: BB491/591

Course location: LINC 302

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Course description: This course will focus on the biochemical pathways associated with how organisms synthesize and degrade carbohydrates, lipids, and amino acids. The energy transduction pathways associated with converting organic compounds into metabolic energy, and specific modes of metabolic regulation will be emphasized. Finally, we will consider how several human diseases arise from defects in metabolic pathways.

Course Objectives:

- Understand the metabolism of carbohydrates, lipids, and protein
- Understand the inter-relationships of anabolic and catabolic enzyme catalyzed biochemical pathways, and the regulatory mechanisms associated with these pathways
- Understand how latent chemical energy in the form of macronutrients can be transformed into metabolic energy

Course credits: BB 491/591 course meets 3 time/week (M, W, F). This course combines approximately 90 hours of instruction, 2 hours of interactive problem-based learning and student assignments (for BB591) for a total of 3 credits.

Course Prerequisites and Co-requisites: This is a sequence professional course to meet the requirements of majors in biochemistry and biophysics. It must be taken in order.

PREREQUISITE: CH 336; BB 490. COREQUISITES: CH 440; CH 441; CH 442.

Course Content: Metabolism of carbohydrates, lipids, and amino acids; biological oxidation, oxidative phosphorylation, photosynthesis; integration of metabolism.

Course Specific Measurable Student Learning Outcomes:

Learner Outcomes for BB491

- Understand the fundamental nature of mitochondrial bioenergetics
- Learn how fuel molecules are broken down and how some of the released energy is conserved in the form of high energy phospho-anhydride bonds (ATP) and NADPH
- Learn how the building blocks of polysaccharides, lipids, proteins and nucleic acids are synthesized from simpler precursors using energy from ATP hydrolysis
- Acquire a working knowledge of biochemistry related to intermediary metabolism
- Gain an understanding of how metabolic pathways are regulated
- Understand cellular signaling pathways and the biochemistry of hormone action
- Display an understanding of key concepts relevant to intermediary metabolism via performance on written examinations

Learner Outcomes for BB591

- In addition to the above, graduate students (BB591) must be able to use critical thinking to resolve and discussion question in the problem solving sessions.

Learner Expectations

- It is expected that the student will come prepared for lectures by studying the assigned text, hand-outs, and lecture notes prior to class.
- That significant time and effort will be given in preparing problem based learning module; grades will be assigned relative to the scientific rigor evident in the final product.
- That significant time is required for studying the assigned readings, lectures, and notes throughout the term; studying for exams at the last minute will likely result in a poor grade.

Learning Resources:

- Textbook: *Biochemistry*, Fourth Edition Mathews , C.K., Van Holde, K.E., Appling, D.R., and Anthony-Cahill, S.J.
- Lecture Material: For all lecturers: All slides presented in class will be available as files that can be downloaded and printed from Canvas. Many of these files are unavoidably large and therefore will take some time to download/print-out.
- *OSU Canvas will also contain the following useful information: Lecture topics/syllabus, announcements—especially regarding inclement weather, class cancellations, postponements, etc., and links to supplemental lecture material*

Evaluation:

- **BB491 Students: 500 total points.**
 - Two non-cumulative midterm examinations will provide 50% of the total points given for the term.
 - Quizzes will constitute the equivalent of 10% of the grade. The top five quizzes will be counted.
 - A cumulative final exam will constitute 40% of the final grade. The final exam will cover topics from the whole term, with emphasis on new material presented after the second mid-term exam.
 - If the your overall grade-point average is ≥ 85 going into the final exam, you will not have to take the cumulative portion of the test.
- **BB591 Students: 550 total points can be obtained**
 - Two non-cumulative examinations will provide 45% of the grade.
 - Quizzes will constitute approximately 10% of the total points given. The top five quizzes will be counted.
 - A cumulative final exam will constitute approximately 36% of the final grade.
 - Student assignments (interactive problem-based learning): will constitute approximately 9% of the grade. Participation and problem solving will determine grading for this portion of the course.
 - Some questions for the mid-term and final exams will be the same as those given to the BB491 students; however, other questions will emphasize problem-solving.
 - If the your overall grade-point average is ≥ 85 going into the final exam, you will not have to take the cumulative portion of the test.

Evaluation of Student Performance: In the OSU online catalog, refer to AT 19 regarding assignment of grades: <http://catalog.oregonstate.edu/ChapterDetail.aspx?key=75#Section2886>.

Statement Regarding Students with Disabilities

Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098.

Source: Disability Access Services, Faculty and Staff Responsibilities Before the Term (6-4-15).

Please note: “Students with documented disabilities who may need accommodations, who have any emergency medical information the instructor should know, or who need special arrangements in the event of evacuation, should make an appointment with the instructor as early as possible, no later than the first week of the term. In order to arrange alternative testing, the student should make the request at least one week in advance of the test.

Statement of Expectations for Student Conduct:

(<http://studentlife.oregonstate.edu/studentconduct/offenses-0>)

As several serious cases of academic dishonesty (i.e. cheating) have taken place in the class in the past, multiple security measures will be implemented to discourage such behavior. Before exams, seating may be arranged, or rearranged, at random and according to the proctor’s discretion; you may be asked to move to a different seat from the one you chose before the exam begins. No hats may be worn during exams. The use of cell phones, PDAs or other electronic devices, other than calculators or clickers, are strictly forbidden during exams. Students may be monitored by video surveillance during exams. Additionally, you may not leave the exam room to go to the restroom or any other reason without expressed permission of the proctor. **You will be required to show your valid OSU student identification card when turning in your exam.** There may be different versions of each exam. We are sorry that such procedures must be put into effect, but we also feel these measures are necessary in order to encourage academic honesty.

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.”