

BB451/551: Biochemistry (3 Credits)

Spring 2017

Day and Time	Monday, Tuesday, Wednesday, and Thursday 11:00 am – 11:50 am, LInC 228
Instructor	Dr. Victor Hsu 2143 Ag. Life Sci. Bldg. (ALS) (541) 737-4398 hsuv@onid.orst.edu
Office Hours	MW 1:00–2:00 pm or by appointment
Teaching Assistants	Rosalyn Huard Nick Thomas
Office Hours	TBA TBA
Additional Hours Weeks 2/5/8	TBA TBA
Course Objectives	This course in general biochemistry is intended to integrate information about metabolic pathways with respiration (respiratory control) and initiate the student into a microscopic world where blueprints are made of deoxyribonucleic acids, factories operate using enzymes, and the exchange rate is in ATPs rather than Dollars or Euros. Beyond explaining terms, and iterating reactions and metabolic pathways, this course strives to establish that the same principles that govern the behavior of the world around us also govern the transactions inside this microscopic world of the living cell. And by studying and applying these principles, we begin to understand cellular and bodily processes that include sensory mechanisms.
Learning Resources	The textbook we will be using is <i>Biochemistry Free For All</i> by Ahern, Rajagopal and Tan, Version 1.1 Both the iBooks and the PDF version can be downloaded at: http://biochem.science.oregonstate.edu/content/biochemistry-free-and-easy Readings are posted in the schedule below. It is expected that assigned reading be done <i>BEFORE</i> lecture. The lecture notes will be posted on Canvas (BB_451_X001_S2017).
Course Policies	Prerequisites: BB 450 or BB 450H is required. Students are expected to have mastered the simple organic chemistry of functional groups, general chemistry problem solving in stoichiometry, pH and equilibrium calculations, and basic algebraic skills such as equation solving and use of exponentials and logarithms. Incompletes: Take this course only if you plan to finish it in a timely manner (during this term). An "Incomplete" will only be given when there is a strong and compelling case for doing so (e.g., health reasons, military commitment).

Learner Outcomes	<p>The intention of this course is for the student to:</p> <ul style="list-style-type: none">Acquire the specialized language of biochemistry.Retain the concepts fundamental to biochemistry.Apply and describe concepts fundamental to biochemistry.Analyze and assess information concerning concepts fundamental to biochemistry.Communicate an understanding of key concepts relevant to biochemistry and the ability to use these concepts to solve problems in biochemistry via performance on written examinations.Demonstrate the ability to communicate and produce quality critical analysis of reported biochemical research results (BB551).
Learner Expectations	<p>First and foremost, we expect everyone to respect one another. Among other things, this means that only one person speaks at a time, and that each of you put forth an honest effort in class.</p> <p>Advance preparations, including reading assigned textbook pages before lectures are given.</p> <p>Prepare for exams by studying lecture notes posted on Canvas and the readings in the text.</p> <p>If there is difficulty in understanding concepts or problems, the student is expected to get help from and ask questions to the professor <i>before</i> it is too late.</p> <p>Recognition that an 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.</p> <p>Eating, chewing gum noisily, using cell phones, etc. is inconsiderate to both the person lecturing and other students listening to the lecture. Thus, these activities are prohibited.</p> <p>Arrive to class on time, prepared and with all necessary materials. Be aware that significant time is required for studying the assigned readings, lectures, and notes throughout the term.</p>
Course Evaluation	<p>Fulfillment of the student learning outcomes will be assessed through a set of exams and weekly assignments. There will be three non-cumulative exams worth 100 points each and a cumulative final worth 200 points. The exams will be given on the dates and times indicated, <i>no exceptions</i>. A weekly assignment to identify the topic/concept that you found most difficult to understand/comprehend that week and submit a test question and answer based on that topic/concept will be submitted via Canvas by 11:59 pm each Friday (assigned 0, 2, or 4 points/week). There will also be opportunities for clicker participation (4 points each, up to 28 points). Final grades will be assigned using a curved scale.</p> <p>BB 551 students will be required to write a paper. BB 551 grades will be based on 568 points plus 50 points for the paper. The paper assignment entails a critical analysis of a <i>recent, full-length, primary</i> research publication, dealing with any topic covered this term. The appropriateness of the article should be</p>

	<p>discussed with the instructor prior to May 19th. The paper should take the form of a written Journal Club presentation, in which the student presents a clear summary and critical analysis of the paper. The following questions should be considered and addressed: Is the paper a significant contribution to the knowledge base? If so, why? If not, why not? Are experimental methods clearly described? Do the authors adequately consider alternative models? Are the conclusions drawn justified based on the reported results? What are the most important future directions for the work? <i>Substantiate your opinions by citing other work from the literature.</i> Recommended length of paper: 2–3 pages. Due before 5:00 pm on Friday, June 9th.</p>
<p>Statement Regarding Students with Disabilities</p>	<p>Please note: “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.”</p>
<p>Statement of Expectations for Student Conduct</p>	<p>The University statement on student conduct and community standards can be found at: http://studentlife.oregonstate.edu/studentconduct/offenses-0. <i>Cheating or plagiarism by students is subject to the disciplinary process outlined in the Statement of Expectations for Student Conduct.</i></p> <p>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:</p> <ul style="list-style-type: none"> ◆ 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 <p>Behaviors disruptive to the learning environment will not be tolerated and will be referred to the Office of Student Conduct for disciplinary action.</p> <p><i>“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.”</i></p>

Schedule			
Week 1	4/3, 4/5 4/7*	Citric Acid Cycle Oxidative Phosphorylation I	Chapter 6.2, pp. 541–560 Chapter 5.2, pp. 429–466
Week 2	4/10 4/12 4/14* ¹	Oxidative Phosphorylation II Pentose Phosphate Pathway Lipids & Membranes	Chapter 5.2, pp. 429–466 Chapter 6.1, pp. 521–535 Chapter 2.7, pp. 220–262
Week 3	4/17 4/19, 4/21*	Midterm Exam #1 Fatty Acid Metabolism	Chapter 6.3, pp. 564–590
Week 4	4/24 4/26 4/28*	Membrane & Lipid Synthesis Steroid Synthesis Nitrogen Metabolism	Chapter 6.3, pp. 564–590 Chapter 6.4, pp. 594–613 Chapter 6.5, pp. 617–657
Week 5	5/1, 5/3 5/5*	DNA, RNA, and Genetic Information Purine & Pyrimidine Metabolism	Chapter 2.5, pp. 166–184 Chapter 6.6, pp. 661–690
Week 6	5/8 5/10 5/12*	Midterm Exam #2 Deoxyribonucleotide Synthesis DNA Replication I	Chapter 6.6, pp. 661–690 Chapter 7.2, pp. 704–726
Week 7	5/15 5/17 5/19* ²	DNA Replication II DNA Repair Recombination	Chapter 7.2, pp. 704–726 Chapter 7.3, pp. 730–745 Chapter 7.3, pp. 730–745
Week 8	5/22 5/24 5/26*	Transcription RNA Processing Translation	Chapter 7.4, pp. 747–762 Chapter 7.5, pp. 767–776 Chapter 7.6, pp. 779–799
Week 9	5/29 5/31 6/2*	Memorial Day Holiday: no class Midterm Exam #3 Protein Synthesis	Chapter 7.6, pp. 779–799
Week 10	6/5 6/7 6/9* ³	Gene Regulation I Gene Regulation II Signalling	Chapter 7.7, pp. 803–823 Chapter 7.7, pp. 803–823 Chapter 7.8, pp. 827–851
Finals Week (Monday)	6/12	Final Exam, 12:00 noon	

*: Question of the week due, submitted via Canvas before 11:59 pm.

¹: Last day to add the class; ²: Last day to change to or from S/U grading, or to withdraw from the course

³: BB551 Written paper due, submitted via Canvas before 1:00 pm