Biological Chemistry 415/515 Syllabus – Winter 2018

Introduction

Biological Chemistry 415 and 515 provide a broad introduction to the fascinating field of biochemistry. Students will explore the molecular basis and chemical principles pertinent to living systems, including eukaryotes, bacteria, and viruses. The structures and functions of the four major molecules of life (proteins, lipids, carbohydrates, and nucleic acids) and their biosynthetic pathways will be examined. Students will learn the fundamental biological processes including energetics, metabolism, protein structure, and enzyme function. The transmission of information within and between cells will be studied including signal transduction and the genetic processes of replication, transcription, and translation. Students will also learn the biochemical roles of vitamins, enzyme cofactors, hormones, drugs, antibiotics, and toxins. This course is taught by medical school faculty and emphasizes the relevance of biochemistry to health, disease, physiology and medicine. The biochemical basis of several diseases will be explored including cancer, diabetes, neurodegenerative disorders, infectious diseases, and metabolic and genetic syndromes. In all of these topics, we stress the integration of metabolism and the various modes of regulation that are vital to biological processes and physiology. Techniques and technologies used to study biochemistry and their relevance to understanding biology will be explored.

Intended Audience

This course is designed to provide a broad survey of biochemistry in one semester for students with a wide range of backgrounds. Biological Chemistry 415 is an excellent preparation for undergraduate students considering careers in biochemistry, medicine, genetics, dentistry, pharmacy, medicinal chemistry, nutrition, public health, bioengineering, environmental studies, and other healthcare-related fields.

Students who have completed MCDB 310, CHEM 351, or CHEM 451 will not be granted credit for taking BiolChem 415.

Biological Chemistry 515 is the graduate version of this course that includes a research analysis component. Graduate students are required to register for Biological Chemistry 515 and to write an analysis of a primary research paper to receive graduate level credit. Any graduate student who has incorrectly registered for Biological Chemistry 415 should make the correction in enrollment as soon as possible.

Instructors:

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Dr. Raymond Trievel	rtrievel@umich.edu	4301C MSRB III
Dr. Anne Vojtek	avojtek@umich.edu	3301C MSRB III

Teaching Assistants

Elizabeth Abshire	eabshire@umich.edu
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Lectures

Lectures will be given in **Auditorium 4 of the Modern Languages Building (MLB) from 9:05 – 9:55 AM on Monday, Wednesday, and Friday.** Material related to the class can be downloaded from the course website on Canvas.

Lectures will begin at 9:05 AM and will end at 9:55 AM. The instructors and teaching assistants will be available before and after the lectures to address questions requiring a short answer. However, more complex questions should be saved for the weekly discussion sessions held by the teaching assistants, for office hours with the instructors, or for a scheduled appointment with the teaching assistants or the instructors.

Lecture Recordings

The lectures presented in the MLB Auditorium 4 will be recorded using LSA's video recording service. Instructional Support Services will post the recordings to the 415/515 Canvas site within 24 hours after the lecture. Please note that the recordings will start at 9:00am, so there will be a five-minute dead time as the lectures will begin at 9:05am. Although video recording service does its best to ensure that the lectures are recorded, there is no guarantee that all lectures will be completely recorded due to potential unforeseen technical difficulties.

Canvas Discussion

The Canvas Discussion tool is available for students who wish to ask questions regarding the material covered in the lectures. The teaching assistants will respond to questions within 48 hours of their posting. Please note that questions pertaining to the material covered on the midterm and final exams must be posted by no later than the Mondays before the exams.

Textbook

The course will be taught using textbook: *Biochemistry, A Short Course*, by Tymoczko, Berg, and Stryer, 3rd edition, 2015. Use of this textbook is highly encouraged. Copies of *Biochemistry, A Short Course* are held on reserve at the Shapiro Undergraduate Library for students use. The text is available in paperback and loose-leaf versions. Alternatively, students may purchase or rent an electronic version of the textbook from online sources.

The assigned chapters in *Biochemistry, A Short Course* are meant to prepare students for the lectures and to provide additional background on the subject material beyond the information presented in class. The instructors will presume that appropriate chapters have been read before lectures are given on a particular topic. The previous textbook, *Biochemistry, a Short Course*, 2nd edition, may be used. However, students should be aware that chapters may be arranged differently, and some content has been updated.

Examinations

Three one-hour midterm examinations are scheduled for Wednesday, February 7th, Wednesday, March 14th, and Wednesday, April 11th. The examinations will be held in MLB Auditorium 4 from 9:00 – 10:00am. Attendance in another course that meets concurrently with BiolChem 415/515 (i.e., Monday, Wednesday, and Friday 9:00 – 10:00am) will not be accepted as a reason for missing a midterm exam.

Students who have a documented need for additional time to complete the midterm examinations beyond the 1 hour provided in class must notify Dr. Trievel with the appropriate documentation by **Friday, January 26th.** The use of electronic devices, including but not limited to laptops, cell phones, iPods, tablets, and calculators, will not be permitted during exams. **A detailed explanation of the exam policies and instructions is posted in the Files section of Canvas.**

Please note that make-up exams will not be given. The grading policy allows for one exam score to be

dropped, including one of the midterm exams or the final exam (please see below). **Students who miss a midterm exam for any reason (including sickness or other circumstances) will be required to take the final exam at the end of the semester.** An exception to this policy will be made only for students who have a prearranged absence due to a **University-affiliated activity.** These students should inform Dr. Trievel of their absence with appropriate documentation by no later than **Friday, January 26th**, so that an alternate midterm exam time can be arranged.

A two-hour, comprehensive final examination will be given on **Tuesday, April 24th from 1:30 – 3:30pm (location to be announced).** The Office of the Registrar specifies the date and time of the final exam. Please do not make travel plans to leave town earlier than this date if you need to take the final exam. **A make-up final exam is not possible under any circumstances. Enrollment in another course that meets concurrently with BiolChem 415/515 and has its final exam scheduled at the same time will not be accepted as a reason for missing the 415/515 final exam.**

Biological Chemistry 415 Problem Sets

Students enrolling in BiolChem 415/515 will complete a series of 10 problems sets that will be given throughout the term. One point credit is awarded for the successful completion of each problem set, with a total of 10 points toward the final course grade. **Additional details, instructions, and the schedule for the problem sets are provided in the Files section of Canvas.**

Biological Chemistry 515 Research Analysis (applies only to students registered for 515)

To obtain graduate credit for this course, graduate students are required to write an 8 page research paper for BiolChem 515. In this paper, the student will analyze and critique a primary research publication with relevance to biochemistry. The research analyses will be graded and the scores on the analyses will count 25 points toward the final score for BiolChem 515 students. **Instructions and Due Dates for the Research Analysis are provided in the Files section of Canvas.**

Grading

Grades for Biological Chemistry 415 and 515 will be based on three midterm exams and a comprehensive final exam consisting of multiple choice questions. When calculating the final percentage at the end of the semester, the lowest exam score will be dropped, including one of the midterm exams or the final exam. **Thus, three exams scores will be used to calculate each student's final percentage. These exams scores could include the three midterm exams, or two midterm exams and the final exam.** There are several scenarios in which a midterm exam or final exam score could be dropped when calculating grades at the end of the term:

1) Students who have completed the three midterm exams and are satisfied with their scores on these exams are not required to take the final exam.

2) Students who miss one of the midterm exams will be required to take the final exam, and their scores on the other two midterm exams and the final exam will be used to calculate their final percentage at the end of the term.

3) At their discretion, students who have taken all three midterm exams and wish to improve their grade may elect to take the final exam at the end of the semester. If their score on the final exam exceeds their lowest midterm exam score, then the lowest midterm exam score will be dropped, and their final exam score will be used to calculate their final percentage, thus increasing their grade. If their score on the final exam is lower than their lowest midterm exam score, then the final exam

score will be discarded and will not be used to calculate their final percentage. Thus, in this scenario, taking the final exam can only benefit a student's grade and cannot lower it.

The table below lists the exams and assignments, their point values, and the total possible points in BiolChem 415 and 515. The scores on the three exams (either three midterm exams, or two midterms and the final exam) will count 30 points each toward the final score, for an overall total of 90 points. For BiolChem 415 students, their scores on the problem sets will determine the remainder of their grade. For the BiolChem 515 students, their scores on the problem sets and the research analysis will account for the remainder of their grade.

Exam/Assignment	**415 (points)**	**515 (points)**
Three Exams (worth 30 points each)	90	90
Ten Problem Sets (worth 1 point each)	10	10
Research Analysis (for 515 students only)	–	25
Total Possible Points	**100**	**125**

At the end of the semester after the final exam, each student's point total will be calculated and then converted into a final percentage using the total possible points listed in the table above. A curve will then be applied to the percentages to determine the letter grades. Although the grading scale varies somewhat from year to year, the letter grade distributions are relatively consistent from an annual perspective. Based on statistics from previous terms, ~33% of the students earn a grade in the A range (A+ to A-) and ~40% earn a grade in the B range (B+ to B-) with overall class average of a B.

Office Hours and Discussion Sessions

Questions from students are encouraged. The instructors and teaching assistants will be available before and after the lectures to address questions requiring a short answer. More detailed questions can be addressed at the teaching assistants' weekly Discussion Sessions or by attending the instructors' Office Hours at the times and locations noted below. Students are strongly encouraged to attend the Discussion Sessions, which provide a valuable learning environment in which questions about the material covered in the lectures and the Problem Sets can be asked. Students can meet with the instructors and teaching assistants about their questions prior to or following class. Requests to meet with the teaching assistants or instructors outside of the scheduled Discussion Sessions or Office Hours will be arranged by appointment. Please note that the instructors and teaching assistants will attempt to respond to questions sent by e-mail within 72 hours but cannot guarantee a response within this timeframe due to other responsibilities and commitments.

Teaching Assistant Discussion Sessions: Teaching assistant office hours will be held on Monday afternoons, except where otherwise noted. On the Mondays preceding the midterm and final exams, the teaching assistants will hold a review session for the exam. **A schedule of the teaching assistants' office hours and exam review sessions is posted in the Files section of Canvas.**

Instructor Office Hours: Instructor office hours will be held in the instructors' offices on Thursday afternoons, unless otherwise noted. **A schedule of the instructors' office hours is posted in the Files section of Canvas.**