BCH 380--Fundamentals of Biochemistry--Spring 2021

Instructor Information.
Instructor: Prof. Kimberly Stanek, kimberly.stanek@umontana.edu
Office hours: T, Th 9:00-10:00 am, Chem 206 or by appointment
Text: “Biochemistry: A Short Course” by Tymoczko, Berg and Stryer 2nd ed

Learning Objectives
- Understanding the chemical and thermodynamic properties of biomolecules
- Knowledge of the 4 classes of biomolecules, including structure, synthesis and function.
- Understanding the catalytic and regulatory strategies of enzymes
- Understanding the production, use and regulation of energy in the cell
- Understanding how biochemical reactions are integrated into cellular metabolism

Prerequisites:
Biochemistry is a sub-discipline of chemistry, so students should have a good working knowledge of biology, general chemistry and organic chemistry. Prerequisites are CHMY 223 or BIOB 260. It is a good idea to review basic chemical concepts as well as organic reactions, nomenclature and functional groups.

Course Requirements
Students are expected to study the text and should read the text prior to the corresponding lectures. Questions for each chapter are given in Moodle and it is suggested that you review these problems. However, homework will not be collected or graded.

Lecture and discussion format
The Monday, Wednesday, and Friday lectures will cover material from the text. Additionally, each student is required to attend one smaller group discussion section, which is scheduled on Tuesday or Thursday. The classrooms are large enough in these discussion sections to allow everyone enrolled in that section to attend face-to-face. Material covered in the discussion periods will typically be a deeper understanding of the lecture material or of clinical/medical relevance. The discussion sessions will also serve as a time to ask questions and to clarify course material and to administer weekly tutorials on weeks without exams. On three Thursdays during the semester the entire class will meet in lieu of individual discussion periods for midterm exams.

The lecture format will be through Zoom for those students who wish to attend remotely. While the lecture will be recorded and made available for later viewing, this is not a reason for failing to attend class either face-to-face or via Zoom at the time the lecture is scheduled. The recordings are not always of high enough quality to discern content nuance and this is not meant to be an online course. There is an expectation that all students (even those meeting face-to-face) have a device capable of real time access to Zoom and Moodle.
Grading
There are weekly tutorials given in discussion sections. In addition there will be four exams, consisting of three one hour exams (given on Thursdays during discussion section time) and one comprehensive final exam. The lowest score of the three midterm exams will be dropped, but the final exam score cannot be dropped. Final grades will be assigned as: 90-100% = A, 80-89% = B; 70-79% = C; 60-69% = D; below 60% = F. Plusses and minuses may be used at the discretion of the instructor. Changes to this grading scheme is at the discretion of the instructor.

Missed tutorials and Exams
The lowest tutorial grade will be dropped, makeup tutorials will not be given. Students will have the lowest of the three midterm exams dropped so there will be no exceptions for a missed exam. THERE IS NO EXTRA CREDIT.

General Policies
If you are taking the course for a non-traditional grade (credit/no credit), note that university policy is that a “CR” grade is given in lieu of A through D- grade; an “NCR” grade is given in lieu of an F grade. The use of any external device including electronic devices such as calculators and translators for quizzes and exams requires the advanced approval of the instructor.

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://life.umt.edu/vpsa/index.cfm/page/2585

Special accommodations
If you are registered with Disability Student Services or have a COVID-related health issue and require special accommodations, please contact Prof. Stanek to make arrangements. Both of these issues can be accommodated by DSS for testing. Tests or quizzes taken at DSS must be the same day and overlap the same time period as that of the rest of the class.

COVID-19 regulations
- Mask use is required within the classroom.
- Each student is provided with a cleaning kit by UM. The expectation is that students will clean their personal work space when they arrive for class, and before they leave the classroom.
- Students are discouraged from congregating outside the classroom before and after class.
- Specific seating arrangements will be used to ensure social distancing and support contact tracing efforts.
- Class attendance will be recorded to support contact tracing efforts.
- Drinking liquids and eating food is discouraged within the classroom (which requires mask removal).
- Stay home if you feel sick and/or if exhibiting COVID-19 symptoms.
- If you are sick or displaying symptoms, please contact the Curry Health Center at (406) 243-4330
- For up to date UM COVID-19 response, see Fall 2020 website: https://www.umt.edu/coronavirus/fall2020.php
- We strongly encourage students to remain vigilant outside the classroom in mitigating the spread of COVID-19
Approximate Lecture Schedule (Chapter #’s based on 2nd edition)

WEEK 1 (1/11-1/15)

Syllabus/Class Organization
Chapter 1: Biochemistry and the Unity of Life
Chapter 2: Water, Weak Bonds and pH
No discussion sections in first week.

WEEK 2 (1/18-1/22)

Mon 1/18: MLK Day, No class
Chapter 3: Amino Acids
Chapter 4: Protein 3D Structure
Discussion Sections: Organic Chemistry Review

WEEK 3 (1/25-1/29)

Chapter 6: Basic Concepts of Enzyme Action
Chapter 7: Kinetics and Regulation
Chapter 8: Mechanisms and Inhibitors
Discussion Sections: Acids, Bases and Buffered Systems

WEEK 4 (2/01-2/05)

Chapter 9: Hemoglobin and Allosteric Proteins
Review for Test #1: Chapters 1-9 (note we skipped Chapter 5)
Discussion Sections: Amino Acids and Proteins

WEEK 5 (2/08-2/12)

Thursday 2/11 Exam 1: Chapters 1-9
Chapter 10: Carbohydrates
Chapter 11: Lipids
Chapter 12: Membranes
No discussion sections meet the week of a test

WEEK 6 (2/15-2/19)

Mon 2/15: President’s day, No class
Handback Test and go over key and grading
Chapter 13: Signal Transduction
Discussion Section: Carbohydrate Structure

WEEK 7 (2/22-2/26)

Chapter 15: Metabolism: Basic Concepts and Design
Chapter 16: Glycolysis
Chapter 17: Gluconeogenesis
Discussion Sections: Membrane Structure
WEEK 8 (3/01-3/05)

Chapter 18: Preparation for CAC
Chapter 19: CAC
Chapter 20: Electron Transport Chain

Thurs: Student Break, No discussion sections

WEEK 9 (3/08-3/12)

Chapter 21: The Proton-Motive Force
Review for test #2

Discussion Sections: Metabolism and Regulation

WEEK 10 (3/15-3/19)

Thursday 3/18 Exam 2: Chapters 10 – 20
Chapter 24: Glycogen Degradation
Chapter 25: Glycogen Synthesis
Chapter 26: Pentose Phosphate Pathway

No discussion sections meet the week of a test

WEEK 11 (3/22-3/26)

Handback Test and go over key and grading
Chapter 27: Fatty Acid Degradation
Chapter 28: Fatty Acid Synthesis

Discussion Sections: Electron Flow and Respiration

WEEK 12 (3/29-4/02)

Chapter 33: Nucleic Acid Structure
Chapter 34: DNA Replication

Fri 4/02 Student Break: No classes

Discussion Sections: Nucleic Acid Structure and Function

WEEK 13 (4/05-4/09)

Chapter 36: RNA Synthesis and Regulation
Chapter 37: Gene Expression in Eukaryotes

Review for test #3

Discussion Sections: DNA Processing

WEEK 14 (4/12-4/16)

Thursday 4/15 Exam 3: Chapters 21 – 37
Chapter 38: RNA processing
Chapter 39/40: Protein Synthesis

No discussion sections meet the week of a test
WEEK 15 (4/19-4/23)

Handback Test and go over key and grading
Review for final
Discussion Section: Review of Biochemical Structure and Metabolism

FINAL EXAM: ~80% Comprehensive and 20% Chapters 38 – 40
Tuesday 4/27; 10:10 am-12:10 pm