Fall 9-1-2021

BCH 380.00: Fundamentals of Biochemistry

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BCH 380--Fundamentals of Biochemistry--Autumn 2021

Instructor Information.

Instructor:	Prof. Kent Sugden, Kent.Sugden@umontana.edu
Office hours:	M,W 11-12 (Chem 116/back office, come through 115) or by appointment
Text:	"Biochemistry: A Short Course" by Tymoczko, Berg and Stryer 2nd or 3rd 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 CHMY 123 and BIOB 260. It is a good idea to review basic chemical concepts as well as organic reactions, nomenclature and organic 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

Covid Rules (these are mandated by the administration)

- Mask use is required within the classroom.
- If you feel sick and/or are exhibiting COVID-19 symptoms, please don't come to class and contact the Curry Health Center at (406) 243-4330.
- If you are required to isolate or quarantine, you will receive support in the class to ensure continued academic progress.
- Please try to maintain consistent seating throughout the semester to facilitate contact tracing if necessary.
- Drinking liquids and eating food is discouraged within the classroom.
- Please note this class will be recorded for those who may be in quarantine.

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. Material covered in the discussion periods will typically be a deeper understanding of the lecture material and may include 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 Tuesdays during the semester the entire class will meet in lieu of individual discussion periods for midterm exams.

Grading

There are weekly tutorials given in discussion sections. In addition there will be four exams, consisting of three one hour exams (given on Tuesdays 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***. If you miss a tutorial or exam due to Covid or Covid quarantine, that will count as your dropped tutorial or exam. You will be able to continue with the class via Zoom during this time but there are no remote exams given.

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/sa/vpsa/index.cfm/page/2585

Special accommodations

If you are registered with Disability Student Services and require special accommodations, please contact Prof. Sugden to make arrangements. 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. There is no online or remote proctored options.

Approximate Lecture Schedule (Chapter #'s based on 2nd edition)

WEEK 1 (8/30-9/3)

Syllabus/Class Organization: Chapter 1: Biochemistry and the Unity of Life

Chapter 2: Water, Weak Bonds and pH

Chapter 3: Amino Acids

No discussion sections in first week.

WEEK 2 (9/6-9/10)

Sept 6. Labor Day/No class

Chapter 3: Amino Acids

Chapter 4: Protein 3D Structure

Discussion Sections: Organic Chemistry Review

WEEK 3 (9/13-9/17)

Chapter 6: Enzymes

Chapter 7: Kinetics and Regulation

Chapter 8: Mechanisms and Inhibitors

Discussion Sections: Acids. Bases and Buffered Systems

WEEK 4 (9/20-9/24)

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 (9/27-10/1)

Tuesday 09/28 Exam 1: Chapters 1-9; in CLAPP 452 at 10:00 am

Chapter 10: Carbohydrates

Chapter 11: Lipids

Handback Test and go over key and grading

No discussion sections meet the week of a test

WEEK 6 (10/4-10/8)

Chapter 12: Membranes

Chapter 13: Signal Transduction

Chapter 15: Metabolism: Basic Concepts and Design

Discussion Section: Carbohydrate Structure

WEEK 7 (10/11-10/15)

Chapter 16: Glycolysis

Chapter 17: Gluconeogenesis

Chapter 18: Preparation for CAC

Discussion Sections: Lipids Membrane Structure

WEEK 8 (10/18-10/22)

Chapter 19: CAC

Chapter 20: Electron Transport Chain

Review for test #2

Discussion Sections: Metabolism and Regulation

WEEK 9 (10/25-10/29)

Tuesday 10/26 Exam 2: Chapters 10 – 20; in CLAPP 452 at 10:00 am

Chapter 21: The Proton-Motive Force

Chapter 24: Glycogen Degradation

Handback Test and go over key and grading

No discussion sections meet the week of a test

WEEK 10 (11/1-11/5)

Chapter 25: Glycogen Synthesis

Chapter 26: Pentose Phosphate Pathway

Chapter 27: Fatty Acid Degradation

Discussion Sections: Electron Flow and Respiration

WEEK 11 (11/8-11/12)

Chapter 28: Fatty Acid Synthesis

Chapter 33: Nucleic Acid Structure

thur 11/11: Veterans Day; No classes

Discussion Sections: Glycogen and the Pentose Phosphate Pathway

WEEK 12 (11/15-11/19)

Chapter 34: DNA Replication

Chapter 36: RNA Synthesis and Regulation

Chapter 37: Gene Expression in Eukaryotes

Discussion Sections: Nucleic Acid Structure

WEEK 13 (11/22-11/26)

Review for test #3

Thanksgiving

No discussion sections

WEEK 14 (11/29-12/3)

***Tuesday 11/30* Exam 3: Chapters 21 – 37; in CLAPP 452 at 10:00 am**

Chapter 38: Transcription

Chapter 39: The Genetic Code

Go over Test #3

Discussion Section: Transcription/Translation

WEEK 14 (12/6-12/10)

Chapter 40: Protein Synthesis

Review for final

FINAL EXAM: ~80% Comprehensive and 20% Chapters 38 – 40

Wednesday 12/15; 8:00 am-10:00 am