Chem160
Introductory Biochemistry
Fall 2019

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Lectures: 8 AM - 9:15 AM, Tuesdays & Thursdays, SSW 1500
Attendance at all lectures is strongly recommended.

Office hours: SSW 1500 by appointment or after class. You can also ask questions before class. I can also schedule zoom video conferencing office hours.

Textbook: *Essential Biochemistry* (4th ed., Pratt & Cornely) with WileyPLUS, (with Blackboard) Wiley (2017)

Homework: Online WileyPLUS

Other Assignments: You will submit assignments such as reports and discussion board comments through Bb.

Pay attention to the course calendar!

The course

Prerequisites: One semester of general chemistry (Chem100) and one semester of organic chemistry (Chem 130 or equivalent).

Course objective

Biochemistry is an attempt to describe the complex traits of biological systems in terms of the molecules that make up living things. It is an active area of experimental science. As such, its theories are constantly being reworked and refined as new biological systems are discovered and characterized. The goal of this course is to provide students with an interest in nutrition and the life sciences with a working vocabulary and a structural and functional understanding of the molecules and processes that drive these fields. To complement this, we will have active forums discussing current issues of relevance to the intersection of biochemistry and the role of food in society, including GMO's and food as medicines. In addition, students are provided with the tools to succeed in upper division courses that require an understanding of biomolecules. The topics include: thermodynamics, properties of biomolecules (carbohydrates, lipids, nucleic acids, and proteins), the biochemical composition of foods and cells, principles of enzyme and receptor chemistry, membrane transport, cell signaling, general metabolic concepts, and bioenergetics.

Course content

This is an introductory biochemistry class aimed at students interested in nutritional sciences and related fields. The major topics of the course are as follows:

1. Chemical composition and properties of cells and biomolecules: carbohydrates, lipids, nucleic acids, and proteins. Origin and evolution of life.
2. Aqueous chemistry and buffers
3. The Central Dogma: genes to RNA to proteins
4. Protein structure and function
5. Basic principles of enzymes
6. Membrane transport and cell signaling
7. Introduction to metabolism and bioenergetics

Date	Day	Topic	Reading
Aug 27	Tues	Intro: Chemical basis of life	Ch 0, Ch 1
Aug 29	Thurs	Energy and origin of life	Ch 1
Sept 3	Tues	Water, H-bonds, and hydrophobic effect	Ch 2
Sept 5	Thurs	Acid-base chemistry and buffers	Ch 2
Sept 10	Tues	DNA, genes to proteins	Ch 3
Sept 12	Thurs	Recombinant DNA technology	Ch 3
Sept 17	Tues	Amino acids and protein structure	Ch 4
Sept 19	Thurs*	Protein function: myoglobin & hemoglobin	Ch 5
Sept 24	Tues	Midterm 1	Ch 1-4
Sept 26	Thurs	Structural & motor proteins	Ch 5
Oct 1	Tues	How enzymes work	Ch 6
Oct 3	Thurs	Enzyme kinetics and inhibition	Ch 7
Oct 8	Tues	Lipids and membranes	Ch 8
Oct 10	Thurs	Membrane transport	Ch 9
Oct 15	Tues	Membrane fusion	Ch 9
Oct 17	Thurs	Signal Transduction	Ch 10
Oct 22	Tues	Signal Transduction	Ch 10
Oct 24	Thurs	Carbohydrates	Ch 11
Oct 29	Tues	Midterm 2	Ch 5-10
Oct 31	Thurs	Glycoproteins	Ch 11
Nov 5	Tues	Metabolism and bioenergetics	Ch 12
Nov 7	Thurs	Metabolism and bioenergetics	Ch 12
Nov 12	Tues	Glucose metabolism	Ch 13
Nov 14	Thurs	Glucose metabolism	Ch 13
Nov 19	Tues	Citric Acid Cycle	Ch 14
Nov 21	Thurs	OXPHOS	Ch 15
Nov 26	Tues	TBA	
Nov 28	Thurs	Thanksgiving Break	
Dec 3	Tues	Integration of fuel metabolism	Ch 19
Dec 5	Thurs	Midterm 3	Ch 11-15
Dec 10	Tues	Question and answer session	
Dec 17	Tues	Final Exam (8 – 10 AM)	Cumulative

Tentative schedule. Topics may change at the discretion of the instructors.

*Last lecture with Dr. Wiley. The remaining lectures will be given by Dr. Andreyev.

Dr. Wiley will be back for the final.

How to study for this course

Note: Attending lectures is highly recommended and crucial for your academic success; however, it is not meant to be your sole source of learning. The time you spend working with the material outside of the classroom is just as important as lecture time. Biochemistry is not an easy subject, and it requires a significant amount of time for anyone to absorb. On average, you should expect to spend 3 hours a week per unit for this class.

Before each lecture

Read all the chapter material assigned in class or indicated on the schedule. Attempt some end of chapter questions to assess your understanding and take the pre-lecture quiz (if one is assigned).

During the lecture

Stay awake during the lecture! Take notes and participate. Also, asking questions during the class periods is highly encouraged because it benefits the whole class.

After the lecture:

Ask me questions right after the lecture if something is unclear. Another way to clear up any confusion is by going to the text book. You could also ask one of your classmates who understands the concept. There will a Discussion Board for this in our Bb site. I also suggest re-reading the chapter after the lecture.

How to study for the exams

For each midterm, I will post an outline on blackboard of the material you should know. That doesn't mean that this is exactly what will be on the test. If you have completed everything that is mentioned above, then you should be well prepared. In addition to this, there are recommended questions from the back of each chapter and other resources on WileyPLUS. I know you all have busy lives, so you need to be organized and keep up with the material as we go along. If possible, study in a group. Cooperative learning is very effective. We will have some review time in class, and I will have review sessions either on campus or via zoom conferencing.

Homework

Homework will be done online in WileyPLUS. It will be posted for each chapter after we have completed in-class instruction for the chapter. Prior to attempting the HW questions on WileyPLUS, make sure you know the material. The questions will be setup so that you have 2 attempts to get the right answer, after that the most you can get will be 50% of the full score. This is done to encourage looking up the answer rather than just relying on guessing. All homework assignments will be due one week after they are assigned.

Discussion Boards

You will participate in 5 required Discussion boards online in our course Bb site.

Exams and grades

There will be a homework assignment for each of the chapters that we will cover in this course, 3 midterms, and 1 final exam. There will also be prelecture quizzes online. **No makeup exams will be given; however, I will drop your lowest midterm score.**

Exams will be multiple choice. Bring a blue scantron 20788 to each exam (one with a single column of answer choices).

Prelecture quizzes (Ch 2-15)	40 points total	~9%
Homework assignments	80 points total	~18%
Discussion Boards	40 points total	~9%
2 midterm exams @ 80 points each	160 points total	~36%
Final exam	120 points	~27%

Total: 440 points

Students with Disabilities

If you are a student with a disability and believe you will need accommodations for this class, please let me know. It will be your responsibility to contact Student Ability Success Center (SASC) at (619) 594-7722. To avoid any delay in the receipt of your accommodations, you should contact SASC (tac.sasc@sdsu.edu) as soon as possible. Please note that accommodations are not retroactive, and I can't provide accommodations based upon disability until I have received an accommodation letter/form from SASC. Your cooperation is appreciated.

Grading scale

(If you earn the points indicated, you will be guaranteed the grade listed. The scale may be lowered depending on overall class performance.)

Letter Grades		
90 % and above	396 - 440 points	A
86-89 %	378 - 395 points	A-
83-85 %	365 - 377 points	B+
80-82 %	352- 364 points	B
76-79 %	334 - 351 points	B-
73-75 %	321 – 333 points	C+
70-72 %	308 – 320 points	C
66-69 %	290 – 307 points	C-
63-65 %	277 – 289 points	D+
60-62 %	264 – 276 points	D
56-59 %	246 – 263 points	D-
< 55 %	245 points and below	F

Slides will be posted on blackboard. However, remember that the slides do not contain a comprehensive overview of the material.

You will need a calculator during some of the exams. Programmable calculators are not allowed.

No cell phone use will be permitted during exams.

Talking to your peers is prohibited during exams.

I take academic integrity seriously and know that the vast majority of you do, too. Just so that we are all on the same page, I need to tell you of my policy regarding cheating. Cheating is unacceptable. Anyone suspected of looking at the exams of other students might be asked to move to a new seat during the final. Anyone who cheats on an exam will receive 0 points for the exam and might be reported to their academic major advisor.

The final exam will be comprehensive.