Chem160
Introductory Biochemistry
Fall
2016

Instructor: Dr. Sandra Wiley
Email: swiley@mail.sdsu.edu
Office: GMCS 213F

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

Office hours: By appointment (GMCS 213F or SSW 1500)

Textbook: *Essential Biochemistry* (3rd ed., Pratt & Cornely) with WileyPLUS, (with Blackboard) Wiley (2013)

Homework: Online WileyPLUS

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. 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 30	Tues	Intro: Chemical basis of life	Ch 0, Ch 1
Sept 1	Thurs	Energy and origin of life	Ch 1
Sept 6	Tues	Water, H-bonds, and hydrophobic effect	Ch 2
Sept 8	Thurs	Acid-base chemistry and buffers	Ch 2
Sept 13	Tues	DNA, genes to proteins	Ch 3
Sept 15	Thurs	Recombinant DNA technology	Ch 3
Sept 20	Tues	Amino acids and protein structure	Ch 4
Sept 22	Thurs	Protein function: myoglobin & hemoglobin	Ch 5
Sept 27	Tues	Midterm 1	Ch 1-4
Sept 29	Thurs	Structural & motor proteins	Ch 5
Oct 4	Tues	How enzymes work	Ch 6
Oct 6	Thurs	More about enzymes	Ch 6, Ch 7
Oct 11	Tues	Enzyme kinetics and inhibition	Ch 7
Oct 13	Thurs	Lipids and membranes	Ch 8
Oct 18	Tues	Membrane transport	Ch 9
Oct 20	Thurs	Membrane fusion	Ch 9
Oct 25	Tues	Signal Transduction	Ch 10
Oct 27	Thurs	Signal Transduction	Ch 10
Nov 1	Tues	Carbohydrates	Ch 11
Nov 3	Thurs	Midterm 2	Ch 5-10
Nov 8	Tues	Glycoproteins	Ch 11
Nov 10	Thurs	Metabolism and bioenergetics	Ch 12
Nov 15	Tues	Metabolism and bioenergetics	Ch 12
Nov 17	Thurs	Glucose metabolism	Ch 13
Nov 22	Tues	Integration of fuel metabolism group work	
Nov 24	Thurs	Thanksgiving Break	
Nov 29	Tues	Glucose metabolism & Citric acid cycle	Ch 13, Ch 14
Dec 1	Thurs	Citric acid cycle & OXPHOS	Ch 14, Ch 15
Dec 6	Tues	OXPHOS	Ch 15
Dec 8	Thurs	Midterm 3	Ch 11-15
Dec 13	Tues	Question and answer session	Question session
Dec 20	Tues	Final Exam (8 – 10 AM)	

How to study for this course

Note: While attending lectures is highly recommended and crucial for your academic success, 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 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.

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. I 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.

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.

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 and participation points for in class group work and iClicker. **No makeup exams will be given.**

Exams will be multiple choice. Bring a blue scantron 20788 to each exam.

Prelecture quizzes	30 points total	6%
Class Participation (iClicker)	15 points total	3%
Class Participation (Group Work)	30 points total	6%
Homework assignments	80 points total	16%
3 midterm exams @ 70 points each	210 points total	42%
Final exam	135 points	27%

Total: 500 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 Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive and that I can not provide accommodations based upon disability until I have received an accommodation letter from Student Disability Services. Your cooperation is appreciated.

Grading scale

(If you earn the points indicated, you will be guaranteed the grade listed. The scale may be lowered.)

Letter Grades		
90 % and above	450 - 500 points	A
86-89 %	430 - 449 points	A-
83-85 %	415 - 429 points	B+
80-82 %	400 - 414 points	B
76-79 %	380 - 399 points	B-
73-75 %	365 – 379 points	C+
70-72 %	350 – 364 points	C
66-69 %	330 – 349 points	C-
63-65 %	315 – 329 points	D+
60-62 %	300 – 314 points	D
56-59 %	280 – 299 points	D-
< 55 %	279 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. However, programmable calculators are not allowed.

No cell phone use will be permitted during exams.

The final exam will be comprehensive.