Chemistry 160
Introductory Biochemistry
Fall 2025

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Lecture: Tuesdays and Thursdays 2:00 – 3:15 p.m. Pacific Time, PSFA 318
Zoom link: https://SDSU.zoom.us/j/86424046881

Zoom Office Hours: Wednesdays at 8:00 a.m. and Fridays at 4:00 p.m. Pacific Time
Zoom link: https://SDSU.zoom.us/j/85762373496
Call or e-mail if you wish to make an appointment to discuss anything one-on-one with the instructor.

Textbook: Essential Biochemistry, Fifth Edition (2021)
C.W. Pratt & K. Cornely (Wiley)

NOTE: By enrolling in the course, you are automatically permitted access to an enhanced eBook version of the text (ISBN: 9781119712855) through the Day1Ready program. If you prefer to use an alternative method for acquiring the textbook, then you must opt out by 11:59 p.m. on September 8 for a full refund. If you opt out, you will need to make other arrangements for textbook access.

The course:

Prerequisites-Elementary Organic Chemistry (Chem 130)

Course description-Biochemistry is an attempt to describe the complex traits of biological systems in terms of the molecules that make up living things. This course is designed to cover the broad field of biochemistry at an introductory level. The goal of the course is that students will gain an understanding of how, through the action of enzyme-catalyzed chemical reactions, cells can access the energy need and and carry out the processes required to sustain their organizational structure and remain alive. Students will gain an appreciation for the ever increasing role that biomolecules play in human health and nutrition and learn to think critically about the living world at the molecular scale. The course is the final of three introductory level courses in chemistry (along with Chem 100/103 and Chem 130) that complete the chemistry education for our Foods & Nutrition majors at SDSU.

The course is organized into 15 weekly modules that are accessible through the "Modules" tab at the Canvas website (https://canvas.sdsu.edu). Each weekly module contains materials that

support the lectures and culminates with either a Problem Set or an Exam. Students will also have the option of meeting together with the instructor twice weekly via Zoom during scheduled meeting times (Wednesdays at 8 a.m. and Fridays at 4 p.m.) to discuss questions and work together through practice problems. The link to these biweekly Zoom Office Hours is: https://SDSU.zoom.us/j/85762373496.

Expected student learning objectives-
Each student who successfully completes this course will be able to:

(i) identify the structures and chemical properties of the following important biomolecules: nucleic acids, proteins, lipids, and carbohydrates
(ii) clearly communicate the "central dogma of molecular biology"
(iii) explain how enzymes work, how to measure their effect on rates of chemical reactions, and how that information is used to discover therapeutic drugs
(iv) describe the composition, structure, and function of biological membranes in facilitated and active transport of nutrients and signal transduction
(v) illustrate how energetically favorable chemical reactions can be coupled to drive the energy-dependent processes required for cells to remain alive
(vi) describe how, through metabolic pathways, glucose can be broken down to produce energy, be synthesized, or be stored as glycogen
(vii) compare and contrast glucose metabolism with the breakdown and synthesis of fatty acids

***Please note*-To be successful in this course, you must develop a working familiarity with a vast amount of material. Be prepared to dedicate sufficient time each week to stay current with your reading and studying. You will need to read an average of 10-20 pages of text each week. However, not all of the chapters will be covered in their entirety. Please consult the "Reading" column in the lecture schedule at the end of this syllabus to identify chapter pages from which exam material will be taken.**

Resources available to students-The text is the primary resource for this course. Lectures will closely follow the sequence and organization of the textbook. Lectures will be Zoomcast live (https://SDSU.zoom.us/j/86424046881) and recorded and posted to Canvas. The purpose for recording lectures is to aid students when reviewing material in preparation for exams and not as a substitute for staying current and participating in lecture in real time (see bold text paragraph above). The slides used during lecture will also be posted to the Canvas website. A short list of "lecture goals" will be highlighted at the beginning of each lecture. The purpose of outlining the lecture goals is to aid students in preparing for exams. Zoom Office Hours (https://SDSU.zoom.us/j/85762373496) will be held twice a week to go over material, respond to questions, and work together through problem set questions. Attendance at Zoom Office Hours is not mandatory, but affords students with opportunities to discuss the material with their instructor and ask for clarification on problem solving. Zoom Office Hours will be recorded and posted to Canvas.

Problem Sets-There will be eleven graded "Problem Sets" with challenging questions posted on the Canvas website. The purpose of these problem sets is to give students the opportunity to

work with the course material and help them identify areas in which they need to improve their understanding in preparation for assessments and the final exam. It is highly recommended that students attempt these problems first on their own and then work together in groups and bring their questions to the instructor during Zoom Office Hours. Completed homework problem sets should be converted into .pdf format and uploaded through Canvas. A tutorial for one very convenient and effective way to prepare a single .pdf file of your work is provided under the "Announcement" tab on Canvas. Your instructor will grade the problem sets and provide you with critical feedback. Each problem set is worth up to 15 points and every student's lowest problem set score will be dropped.

Exams-There will be four exams, which are scheduled for Sep 23, Oct 16, Nov 6, and Dec 16 (refer to "Schedule" below). Exams will be completed in person, on paper, and during the lecture time and will require only a pencil, and eraser, and a non-programmable calculator. Each exam will be worth up to 100 points. As long as a student turns in at least 10 of the problems sets, the instructor will drop that student's lowest exam score and replace it with the average of their remaining three exam scores.

The point distribution is as follows:

- Problem Sets #1-11: 15 points each, every student's lowest Problem Set score will be dropped, **150** points total
- Exams #1-4 (75 min each) 100 points each, lowest exam score dropped and replaced with average of remaining three exam scores for students who have turned in at least 10 of their problem sets, **400** points total

Course grades will be assigned based on total points earned out of 550 points possible. A standard grading curve (90% or above for an A, 80-89.99% is a B, etc.) is expected for this course.

Schedule

Module 01	**Aug 26-Sep 1**	**Reading**
Aug 26	Introduction to Biochemistry and Biomolecules (01)	
28	Energy and Cells (02)	Ch. 1: pp. (1-19)
Problem Set 01	Due: Sep 1	

Module 02	**Sep 2-Sep 8**	
Sep 2	Water and Atomic Interactions (03)	2: 27-36
4	Acids, Bases, and Buffers (04)	2: 37-49
Problem Set 02	Due: Sep 8	

Module 03	**Sep 9-Sep 15**		
Sep	9	Nucleotides and Nucleic Acid Structure (05)	3: 57-66
	11	The Central Dogma of Molecular Biology (06)	2: 37-49
Problem Set	03	Due: Sep 15	
Module 04	**Sep 16-Sep 22**		
Sep	16	Nucleotides and Nucleic Acid Structure (07)	20: 582-604
	18	Review/Catch up	
	Sep 23		
Sep 23	**Exam 1** (Lectures 01-05)		
Module 05	**Sep 25-Sep 29**		
Sep	25	Amino Acids and Polypeptides (08)	4: 86-95
Problem Set	04	Due: Sep 29	
Module 06	**Sep 30-Oct 6**		
Sep	30	Protein Structure (09)	4: 95-111
Oct	2	Protein Function: Hemoglobin, Structural Proteins, and Myosin (06)	5: 126-153
Problem Set	05	Due: Oct 6	
Module 07	**Oct 7-Oct 13**		
Oct	7	How Enzymes Work (11)	6: 167-183
	9	Enzyme Kinetics and Inhibition (12)	7: 198-219
Problem Set	06	Due: Oct 13	

		Oct 14-Oct 20	
Oct	14	Review/Catch up	
Oct 16		**Exam 02** (Lectures 08-12)	
Module 08		**Oct 21-Oct 27**	
Oct	21	Lipids and Biological Membranes (13)	8: 234-251
	23	Transport Across Membranes (14)	9: 258-272
Problem Set	07	Due: Oct 27	
Module 09		**Oct 28-Nov 3**	
Oct	28	Signal Transduction (15)	10: 387-306
	30	Carbohydrates and Glycoproteins (16)	11: 315-330
Problem Set	08	Due: Nov 3	
		Nov 4-Nov 10	
Nov	4	Review/Catch up	
Nov	**6**	**Exam 3** (Lectures 13-16)	
Module 10		**Nov 11-Nov 24**	
Nov	13	Metabolism and Bioenergetics (17)	12: 337-358
	18	Breakdown of Glucose by Glycolysis (18)	13: 336-386
	20	Glycogen Synthesis and Degradation/ The Pentose-phosphate Pathway (19)	13: 386-393
Problem Set	09	Due: Nov 24	

Module 11	**Nov 25-Dec 8**	
Nov 25	The Citric Acid Cycle (20)	14: 403-421
Dec 2	Electron Transport Chain/Oxidative Phosphorylation (21)	15: 428-450
Problem Set 10	Due: Dec 8	

Module 12	**Dec 4-Dec 15**	
Dec 4	Fatty Acid Oxidation (22)	17: 483-495
9	Fatty Acid Synthesis/Ketone Bodies (23)	11: 495-504
11	Review/Catch up	
Problem Set 11	Due: Dec 15	

Dec. 16	**Exam 4** (Lectures 17-23)	In Class 1:00 – 3:00 p.m. PST