



Biochemistry | Lecture and Lab

Academic Year 2020-2021

Course Information

Course Numbers

BIO322/BIO322L

Total Credits

4 (3 Lecture + 1 Lab)

Time Requirement

75 hrs (Lecture 45hrs + Lab 30hrs)

Course Details

Recommended Prerequisites

Organic Chemistry I and II are highly recommended

Course Description

Biochemistry examines the structure and function of the following biological macromolecules in the context of cellular integrity, dynamics and metabolism: carbohydrates, lipids, proteins and nucleic acids. Topics include enzymology, bioenergetics, catabolism, anabolism, regulation of gene expression, biotechnology, and hormone regulation of mammalian metabolism and the pre-biotic evolution of life on earth. This course is designed to enhance, deepen, and further integrate knowledge of the subject by developing different problem-solving skills and conceptual organization. This course will serve as an extension of organic chemistry, in that a thorough understanding of bio-macromolecules will be achieved. The structure, function, and mechanism of polymerization will be investigated as pertains to proteins, carbohydrates, and nucleic acids. Metabolic processes will be studied, including glycolysis, the citric acid cycle, electron transport and oxidative phosphorylation. A goal will be to comprehend these complex biochemical processes with a rigid mechanistic approach, like that of organic chemistry.

Lecture and Laboratory Communication

A website will be set up on Canvas by your instructor.

Log in with your Username and password: <https://scuhs.instructure.com>

Faculty Information

Refer to the Canvas course webpage for this information.

Class Meeting Times

Refer to Canvas course webpage for this information.

Instructional Materials

Required Text(s)

Lecture: General, Organic, and Biochemistry by Katherine J Denniston 9th edition(Connect©). An electronic textbook is provided to students through Canvas.

Lab

Biochemistry Lab Manual available on Canvas course webpage.

Course Purpose

Student Learning Outcomes

At the conclusion of this course, a successful student should be able to:

1. Demonstrate thorough knowledge and understanding of the fundamental principles and core concepts of Biochemistry.
2. Apply their knowledge to appraise scientific and technical literature in the field of Biochemistry
3. Assess problems in the field of Biochemistry and develop solutions or strategies to solve those problems based on logic and the knowledge acquired during this course.
4. Professionally construct and express their ideas, thoughts, and concepts in Biochemistry through written and verbal communication.

Course Schedule (subject to slight modifications by the instructor)

Day	Lecture	Assessment
1	Introduction to Biochemistry	Class Participation
2	Water	Class participation
3	Amino Acids and the Primary structure of Proteins Proteins: 3D Dimensional Structure and Function	Exam 1
4	Carbohydrates Lipids and their functions in Biochemical Systems	Class participation
5	Protein Structure and Function Enzymes	Exam 2
6	Introduction to Metabolism Carbohydrate Metabolism	Class participation
7	Aerobic Respiration and Energy Production Fatty Acids Metabolism	Exam 3
8	DNA Replication, Repair, and Recombination Transcription and RNA processing	Class participation
9	Protein Synthesis	Class participation
10	Review	Exam 4

Tentative Grading Procedures

Lecture

Assessment	Points	Weight (%)
Exam 1	100	16
Exam 2	100	16
Exam 3	100	16
Exam 4	100	16
Participation (in class mini quizzes/activities)	75	12
Homework	150	24
Total	625	100%

Lab Schedule

(subject to slight modifications by the instructor)

Laboratory	Assessment
Check-in: Check in/safety/glassware	Lab notebook
Worksheet	
Experiment 1 Amino Acids paper Chromatography	Lab notebook
Experiment 2: Acids, Bases, pH and Buffers	Quiz 1
Experiment 3: Analysis of Lipids	Lab notebook
Experiment 4: Enzymes	Lab notebook Quiz 2
Experiment 5: Test for Carbohydrates	Lab notebook
Experiment 6: Analysis of Urine	Lab notebook Quiz 3
Experiment 7: Spectroscopic Analysis of Beta –Carotene	Lab notebook
Experiment 8: Spectrophotometric Analysis of β -Carotene	Lab notebook
Review	Quiz 4

Tentative Grading Procedures

Assessment	Points	Weight (%)
Lab Quizzes (4 x 50 points)	200	52
Lab Notebook (2 x 20)	160	42
Participation	5	1
Worksheet	20	5
Total	385	100

Grading scale:

Please note letter grades will be assigned only at the end of the trimester.

A = 90% to 100%

B = 80% - less than 90%

C = 70% - less than 80%

D = 60% - less than 70%

F = less than 60%

W = Withdrawal

Grading procedures:

The format of assessments may include multiple choice, short answer, labelling, fill-in-the-blank, or matching examinations. Participation points are required and will be assigned by the instructor as the course progresses through the use of in class activities and quizzes. For online quizzes students must have a phone, tablet, laptop or other internet connected device to participate. Students must be in class during the participation activities to receive participation marks.

Academic Integrity

Visit the [Academic Integrity](#) page to review policies for professionalism and academic integrity.

Teaching Methods and Activities

Because of the demands of the course, successful chemistry students don't wait until exam time to begin studying. Instead, you should plan to follow the chemistry rule that every hour spent in class requires two to three hours of effort outside of class to succeed in this course. As an example, let's say you've just been assigned reading on Lewis structures. Don't let a day go by without learning how to write and interpret Lewis structures. Future work will most likely use these bonding diagrams, and they are likely to reappear in lectures, quizzes and exams. Procrastination doesn't simply mean that you won't understand Lewis structures—you'll also be lost for every subsequent reading and lecture that employs these diagrams. Procrastination in a chemistry course can



quickly prove disastrous failure to learn foundational principles can make all future material seem nearly incomprehensible.

Lecture Exams: There will be a total of 4 non-cumulative tests given during the course of this class. Each test we will cover any and all material (lecture + homework + assigned reading) from the previous week of class. The tests will include multiple choice and free response questions, and there will be partial credit for only correct works shown for free response questions.

Lecture Participation: Points are received from participation during in-class activities. Attendance is not the same thing as participation. Students are expected to be involved and engaged in all classroom activities (which may include formative quizzes and other assessments graded on participation).

Attendance: Punctual attendance at each of your regularly scheduled laboratory and period is required. Additionally, you are required to stay until you and/or your group have completed the experiment. Check out with your lab instructor before leaving the laboratory after completing the experiment. You are expected to attend every one of your scheduled lab meeting times. However, if you find yourself in a situation where you are unable to attend lab, please email your instructor right away.

Prelabs: Prelabs are intended to help you prepare for the lab. You are required to complete the prelabs before coming in the lab. Prelabs must be uploaded on canvas the Wednesday before the experiment by 7:00pm. Emails containing prelabs will not be accepted.

Laboratory Reports: A lab report will be required for all experiments. These consist of data analysis and post lab questions. You must complete lab reports individually (lab reports are not group assignments). If you and another student have the same answer because you “worked together” or “helped each other”, it will be considered cheating. Reports must be uploaded on canvas every Friday by 10:00pm. Emails containing reports will not be accepted.

Laboratory Quizzes: will be given the week after your experiment and its modality will be indicated by the Professor. These quizzes will be closely based on the reports and prelabs.

Evaluation of Experimental Technique: You will be assessed on your general performance and regards for the rules of the laboratory and safety procedures.

Best Practices for Studying Biochemistry

- Read before and read after each class. Skim the chapter before it is covered in lecture to become comfortable with some of the terms associated with each topic. Review each chapter after it is covered in class to enhance your understanding of what was covered in class.
- Participate during class by taking notes during class and looking over them afterwards. Don't skip class, arrive late, or leave early. Ask questions for clarification when you don't understand the material.
- Stay on top of the homework and assignments. Do the assigned problems as close to the time as when the topic is covered in the class to increase the depth of your understanding of specific concepts and will help you learn the material more efficiently and effectively.



- Do not wait until the night before the homework is due to start the assignment. You will get more out of it if you take the time to really learn the concepts and review the material without being rushed.
- Find a group of students to study with. Seek out students dedicated to doing well in the course. This makes studying more fun and helps you learn the material better by teaching what you know and learning from your peers what you don't know. Explaining these concepts to others will help you learn the material even better.
- Stay focused by finding an environment where you can study with few distractions.

University Policies

Accommodations

As a learning-centered community, Southern California University of Health Sciences recognizes that all students should be afforded the opportunity to achieve their academic and individual potential. The University recognizes and supports the standards set forth in Section 504 of the Rehabilitation Act and

the American with Disabilities Act (ADA). In accordance with its mission and federal and applicable state laws, the University is committed to making reasonable accommodations for qualified applicants for admission and enrolled students with disabilities. A student who needs accommodation(s) due to a disability should contact the Academic Support Office located in the Learning Resource Center.

Faculty and Dr./Patient Relationships

SCU faculty are highly skilled. However, per University Policy, health care is offered to students through the University Health System only. Neither preclinical nor clinical faculty can provide advice, assessment, treatment, or other elements that would be considered part of a Doctor-Patient relationship outside of a clinical setting established for that purpose.

Learning Activities

Students are expected to spend at least two hours for each lecture hour of course time per week in activities and assessments outside the classroom. Examples of activities include, but are not limited to: writing papers; reading articles or text; small group work; presentations; completing assignments; preparation for assessments; online activities and other activities that do not include direct instructor interaction and involvement.

All university policies apply to this course and all others. For full policy information please consult the university SCU Policy Manual. For a quick reference guide to the following policies: make-up examination, F-challenge examination, grade posting, results of failing grades, student support information, syllabus amendments, special needs, student conduct, and attendance, please consult the academic policies document housed on the [Online Student Services](#).