

CHEM450L | Biochemistry Lab

Course Texts

Custom Lab Kit from Science Interactive. Access <https://esciencelabs.com/have/code> to search for Kit LP-5008-GB-01 which is \$233 (plus shipping).

Course Description

This lab-only course is designed as a standalone addition to the Biochemistry course. Students will complete at-home laboratory experiments, track and record results, answer lab-based questions reflected in graded lab reports, and complete lab-based assessments to meet the lab requirement. The labs are provided by eScience Labs, a leading provider of at-home lab kits and online lab instructional materials and resources. Labs will cover the following topics: biological molecules, cell membrane transport, cellular respiration and, fermentation, extraction of DNA, RNA, and protein synthesis, casein extraction, metabolism of polysaccharides and anaerobic fermentation, and enzymes, temperature, pH and specificity.

Learning Outcomes

After completing this course, students will be able to:

1. Analyze experimental results to determine the presence of sugars, starch, lipids, protein, and DNA in a variety of samples
2. Analyze experimental data to classify solutions as hypotonic, isotonic, or hypertonic
3. Calculate aerobic respiration rates of germinated and dormant millet seeds
4. Isolate DNA from split peas by physically breaking down plant tissues, lysing cell membranes with detergent, and precipitating isolated DNA in alcohol
5. Illustrate the formation of a protein through transcription and translation
6. Extract, determine the quantity of, and test casein proteins isolated from milk
7. Analyze extracted solution from malted barley for the conversion of starch to dextrans using a starch-iodide test
8. Analyze experimental data to calculate the optimal pH and temperature ranges for lactase activity

Course Prerequisites

There are no prerequisites to take Biochemistry Lab, though we highly recommend concurrent enrollment in Biochemistry (CHEM450).

Academic Integrity Statement

Academic integrity is the pursuit of scholarly activity in an honest, truthful and responsible manner. Violations of academic integrity include, but are not limited to, plagiarism, cheating, fabrication and academic misconduct. Failure to comply with the Academic Integrity Policy can result in a failure and/or zero on the attempted assignment/examination, a removal from the course, disqualification to enroll in future courses, and/or revocation of an academic transcript.

Course Completion Policy

In order for a course to be considered complete, **all required coursework must be attempted, submitted, and graded.** Required coursework consists of graded assignments. Any Academic Integrity Policy violations may prevent a course from being considered complete.

Assessment Types

StraighterLine courses may include any combination of the assessment types described below. Review the descriptions to learn about each type, then review the Course Evaluation Criteria to understand how your learning will be measured in this course.

Benchmarks

Benchmarks test your mastery of course concepts. You have 3 attempts, and your highest score counts.

Note: Cumulative Benchmarks (final exams) only allow 1 attempt.

Capstones

Capstones are project-based assessments that help you apply concepts to real-world scenarios. You have 2 attempts, and your highest score counts.

Checkpoints

Checkpoints are quick knowledge checks on important course concepts. All are open-book, and most have 1-3 attempts.

AI Use-Case Policies

StraighterLine Capstone assessments operate under one of three AI Use-Case Policies. These designations are selected intentionally to support learners in developing digital literacy, ethical reasoning, and authentic communication skills. Each model requires students to engage meaningfully with the course outcomes while adhering to academic standards.

Independent Work Requirement: Capstones with this designation must be completed independently without using AI tools. The goal is for learners to showcase their own understanding and skills without AI assistance. Students are expected to generate and submit original work developed solely through their own reasoning and effort.

AI-Assisted Planning Option: Capstones with this designation may allow AI tools to support brainstorming and assessment planning. If allowed, students will be asked to document any AI assistance by noting how it informed their work. Documentation must be included within the assignment or in a designated reflection field. Examples include describing how an AI tool helped organize an outline, generate ideas, or surface sources for further exploration.

AI-Integration Requirement: Capstones with this designation require AI tools as part of the learning process. Students will be asked to reflect upon their AI interactions and AI contributions to the assessment. Reflections must include which tools were used, how they were used, and what insights students gained from the process. This promotes transparency, ethical use, and metacognitive skill-building.

Course Evaluation Criteria

Your score provides a percentage score and letter grade for each course. A passing percentage is 70% or higher.

There are a total of 1000 points in the course:

Assessment	Points
Checkpoint 0: Lab Kit Photos	10
Checkpoint 1: Biological Molecules	25
Capstone 1: Biological Molecules	130
Checkpoint 2: Cell Membrane Transport	25
Capstone 2: Cell Membrane Transport	110
Checkpoint 3: Cellular Respiration and Fermentation	25
Capstone 3: Cellular Respiration and Fermentation	100
Checkpoint 4: Extraction of DNA	25
Capstone 4: Extraction of DNA	50
Checkpoint 5: DNA, RNA, and Protein Synthesis	25
Capstone 5: DNA, RNA, and Protein Synthesis	90
Checkpoint 6: Casein Extraction	25
Capstone 6: Casein Extraction	100
Checkpoint 7: Metabolism of Polysaccharides and Anaerobic Fermentation	25
Capstone 7: Metabolism of Polysaccharides and Anaerobic Fermentation	110
Checkpoint 8: Enzymes, Temperature, pH, and Specificity	25
Capstone 8: Enzymes, Temperature, pH, and Specificity	100
Total	1000

Course Roadmap

This roadmap provides an overview of the checkpoints and lessons covered in this course.

Checkpoint 0: Lab Kit Photos

- Lab Kit Inventory
- How to Complete Checkpoint 0: Lab Kit PHotos

- Lab Photo Worksheet

Checkpoint 1: Biological Molecules

- Checkpoint 1: Biological Molecules Lecture & Instructions

Checkpoint 2: Cell Membrane Transport

- Checkpoint 2: Cell Membrane Transport Lecture & Instructions

Checkpoint 3: Cellular Respiration and Fermentation

- Checkpoint 3: Cellular Respiration & Fermentation Lecture & Instructions

Checkpoint 4: Extraction of DNA

- Checkpoint 4: Extraction of DNA Lecture & Instructions

Checkpoint 5: DNA, RNA, and Protein Synthesis

- Checkpoint 5: DNA, RNA, and Protein Synthesis Lecture & Instructions

Checkpoint 6: Casein Extraction

- Checkpoint 6: Casein Extraction Lecture & Instructions

Checkpoint 7: Metabolism of Polysaccharides and Anaerobic Fermentation

- Checkpoint 7: Metabolism of Polysaccharides & Anaerobic Fermentation Lecture & Instructions

Checkpoint 8: Enzymes, Temperature, pH, and Specificity

- Checkpoint 8: Enzymes, Temperature, pH, and Specificity Lecture & Instructions

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