straighterline

Syllabus

CHEM251L | **Organic Chemistry II Lab**

Course Texts

Custom Lab Kit from Science Interactive. Access https://esciencelabs.com/have/code to search for Kit LP-5007-OC-01 which is $183 (plus shipping).

Course Description

This lab-only course is designed as a standalone addition to the Organic Chemistry II 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: infrared spectroscopy, nuclear magnetic resonance, the properties of alcohols, isolation and purification of caffeine, hydrolysis of acetylsalicylic acid, synthesis of fragrant esters, protein isolation, and isoelectric point titration.

Learning Outcomes

After completing this course, students will be able to:

1. Label peaks on infrared spectra
2. Deduce molecular structure based on provided spectra using NMR
3. Deduce the solubility of seven alcohols in water and oil
4. Illustrate the isolation and purification of caffeine
5. Illustrate a hydrolysis reaction with acetylsalicylic acid and water, using iron(III) chloride to test for the presence of salicylic acid
6. Illustrate fragrant esters synthesis by reacting a series of carboxylic acids and alcohols
7. Extract, determine the quantity of, and test casein proteins isolated from milk
8. Calculate for the pKa values and isoelectric point of an amino acid by titration with a strong base

Course Prerequisites

There are no prerequisites to take Organic Chemistry II Lab, though we highly recommend concurrent enrollment in Organic Chemistry II (CHEM251) and previous completion of Organic Chemistry I (CHEM250) and Organic Chemistry I Lab (CHEM250L), or their equivalents.

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: Infrared Spectroscopy	15
Capstone 1: Infrared Spectroscopy	173
Checkpoint 2: Nuclear Magnetic Resonance	15
Capstone 2: Nuclear Magnetic Resonance	177
Checkpoint 3: Properties of Alcohols	15
Capstone 3: Properties of Alcohols	100
Checkpoint 4: Isolation and Purification of Caffeine	15
Capstone 4: Isolation and Purification of Caffeine	85
Checkpoint 5: Hydrolysis of Acetylsalicylic Acid	15
Capstone 5: Hydrolysis of Acetylsalicylic Acid	144
Checkpoint 6: Synthesis of Fragrant Esters	15
Capstone 6: Synthesis of Fragrant Esters	56
Checkpoint 7: Casein Extraction	15
Capstone 7: Casein Extraction	60
Checkpoint 8: Isoelectric Point Transition	15
Capstone 8: Isoelectric Point Transition	75
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: Infrared Spectroscopy

- Checkpoint 1: Infrared Spectroscopy Lecture & Instructions

Checkpoint 2: Nuclear Magnetic Resonance

- Checkpoint 2: Nuclear Magnetic Resonance Lecture & Instructions

Checkpoint 3: Properties of Alcohols

- Properties of Alcohols Lecture & Instructions

Checkpoint 4: Isolation and Purification of Caffeine

- Checkpoint 4: Isolation and Purification of Caffeine Lecture & Instructions

Checkpoint 5: Hydrolysis of Acetylsalicylic Acid

- Checkpoint 5: Hydrolysis of Acetylsalicylic Acid Lecture & Instructions

Checkpoint 6: Synthesis of Fragrant Esters

- Checkpoint 6: Synthesis of Fragrant Esters Lecture & Instructions

Checkpoint 7: Casein Extraction

- Checkpoint 7: Casein Extraction Lecture & Instructions

Checkpoint 8: Isoelectric Point Transition

- Checkpoint 8: Isoelectric Point Titration Lecture & Instructions

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