



Chemistry (CHEM) 350

Organic Chemistry I (Revision 8)

Status:

Replaced with new revision, see the [course listing](#) for the current revision.

Delivery mode:

Individualized study online with a **Supervised Lab**. CHEM 350 has a **lab exemption**. This course is charged a **lab fee**.

Credits:

3

Area of study:

Science

Prerequisites:

CHEM 217 and **CHEM 218**. This course is open only to students with CHEM 217 and CHEM 218, or courses equivalent to a six-credit first-year university general chemistry course. Students who do not have the formal prerequisites may take the course with the permission of the coordinator, if they are judged to have the necessary background and experience. Concurrent registration in CHEM 218 and CHEM 350 is not permitted. To avoid unnecessary delays, the course professor will normally grant permission for students to register in CHEM 350 as soon as the final examination in CHEM 218 has been

written.

Precluded: None

Challenge: CHEM 350 is not available for challenge.

Faculty: [Faculty of Science and Technology](#) 

Overview

CHEM 350 deals with the chemistry of carbon compounds through a study of the characteristic reactions of the common functional groups. Particular emphasis is placed on the study of reaction mechanisms in an attempt to show similarities between apparently unrelated reactions. The importance of stereochemistry is stressed throughout the course. The course also includes an introduction to the use of spectroscopy in the analysis of organic compounds.

CHEM 350 and its companion course, CHEM 360, represent a full-year introductory organic chemistry course at the second-year university level. The compulsory laboratory component of CHEM 350 introduces the basic techniques employed in modern organic chemistry laboratories. Experiments have been selected to illustrate many of the principles encountered in the theoretical part of the course.

Outline

CHEM 350 comprises the following 16 units.

- Unit 1: Structure and Bonding
- Unit 2: Polar Covalent Bonds: Acids and Bases
- Unit 3: Organic Compounds: Alkanes and Their Stereochemistry

- Unit 4: Organic Compounds: Cycloalkanes and their Stereochemistry
- Unit 5: Stereochemistry at Tetrahedral Centers
- Unit 6: An Overview of Organic Reactions
- Unit 7: Alkenes: Structure and Reactivity
- Unit 8: Alkenes: Reactions and Synthesis
- Unit 9: Alkynes: An Introduction to Organic Synthesis
- Unit 10: Organohalides
- Unit 11: Reactions of Alkyl Halides: Nucleophilic Substitutions and Eliminations
- Unit 12: Structure Determination: Mass Spectroscopy and Infrared Spectroscopy
- Unit 13: Structure Determination: Nuclear Magnetic Resonance Spectroscopy
- Unit 14: Conjugated Compounds and Ultraviolet Spectroscopy
- Unit 15: Benzene and Aromaticity
- Unit 16: Chemistry of Benzene: Electrophilic Aromatic Substitution

Learning outcomes

Upon successful completion of this course, you should be able to

- use structure, including conformation and stereochemistry to recognize and designate (e.g. *R/S* or *E/Z*) stereochemistry and explain the reactivity and stability of an organic molecule.
- explain the roles of nucleophiles, electrophiles, electronegativity and resonance in organic reactions.
- use physical data (nuclear magnetic resonance spectroscopy, mass spectrometry and infrared spectroscopy) to elucidate organic structure.
- name and draw skeletal structures of saturated and unsaturated hydrocarbons, organohalides, and conjugated and aromatic compounds.
- design syntheses of organic molecules involving the compounds you drew for Learning Outcome 4.

- draw key reaction mechanisms involving those same compounds and/ or predict the outcome of reactions based on your understanding of the mechanisms you have drawn.
- apply the basic techniques for the preparation, purification and identification of organic compounds in the organic chemistry laboratory.

Evaluation

To **receive credit** [↗](#) for CHEM 350, you must achieve a course composite grade of at least a **D (50 percent)** [📄](#). You must achieve a minimum grade of 45 percent on each examination, an average of at least 60 percent on the assignments, and an average of at least 55 percent on the laboratory work.

The weighting of the composite grade is as follows:

Activity	Weight
Midterm Examination	20%
Final Examination	50%
Assignments	10%
Laboratory Work	20%
Total	100%

The **midterm and final examinations** for this course must be requested in advance and written under the supervision of an AU-approved exam invigilator. Invigilators include either ProctorU or an approved in-person invigilation centre that can accommodate online exams. Students are responsible for payment of any invigilation fees. Information on exam request deadlines, invigilators, and other exam-related questions, can be found at the **Exams and grades** [↗](#) section of the Calendar.

To learn more about assignments and examinations, please refer to Athabasca University's **online Calendar** [↗](#).

Materials

This course either does not have a course package or the textbooks are open-source material and available to students at no cost. This course has a [Course Administration and Technology Fee](#) , but students are not charged the Course Materials Fee.

Chemistry LibreTexts (part of STEMWiki Hyperlibrary UC). Davis, CA:

University of California, Davis, 2017.  (Online)

Chemistry 350: Organic Chemistry I Study Guide. Athabasca, AB: Athabasca University, 2017.  (Online)

Chemistry 350: Organic Chemistry I Course Orientation. Athabasca, AB: Athabasca University, 2017.  (Online)

Chemistry 350: Organic Chemistry I Laboratory Manual. Athabasca, AB: Athabasca University, 2009/12.  (PDF)

Chemistry 350: Organic Chemistry I Laboratory Report Book. Athabasca, AB: Athabasca University, 2012-2014.  (PDF)

Chemistry 350: Organic Chemistry I is taught using a combination of online material, laboratory work, and academic support.

Special Course Features

CHEM 350 has a compulsory laboratory component that requires students to complete about 32 hours of laboratory work (there are three lab formats). Credit may be obtained for equivalent laboratory work carried out within the last five years at a recognized college or university. For more information see [Chemistry Lab Exemptions](#) .

Laboratory sessions are offered throughout the year in Edmonton. It is strongly recommended that laboratory work be undertaken when about two-thirds of the course has been completed. All lab work and assignments should be completed before the final examination is attempted.

Please note that laboratory sessions offered by other universities may have a laboratory fee. For more information, please e-mail the fst_success@athabascau.ca.

Important links

- › [Academic advising](#) 
- › [Program planning](#) 
- › [Request assistance](#) 
- › [Support services](#) 
- › [Chemistry Lab Resources](#) 
- › [Chemistry Lab Exemptions](#) 

Athabasca University reserves the right to amend course outlines occasionally and without notice. Courses offered by other delivery methods may vary from their individualized study counterparts.

Opened in Revision 8, December 12, 2016

Updated June 5, 2024

View [previous revision](#) 
