Western Engineering

DEPARTMENT OF CHEMICAL AND BIOCHEMICAL ENGINEERING

CBE 2206 – INDUSTRIAL ORGANIC CHEMISTRY I

Course Outline Fall 2026

Prof. Ying Zheng

LECTURE:	3 hours per week
LAB or TUTORIAL:	3 hours per week
ANTIREQUISITE(s):	Chemistry 2213A/B or the former CBE 2216. CBE 2206A and GPE 2213A are anti-requisites of each other.
PREREQUISITE(s):	Chemistry 1024A/B or Chemistry 1050 or the former Chemistry 1020 or 023. Open only to students registered in the Faculty of Engineering.
CEAB Academic Units:	Basic Science = 70% Engineering Science = 30%
TEXT / Course Resources / References	L.G. Wade Jr., "Organic Chemistry", 9th edition, Prentice-Hall, 2017. Online resource: Chemistry LibreTexts – Organic Chemistry (Wade). https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Map%3A_Organic_Chemistry_(Wade)

COURSE DESCRIPTION

This course deals with the fundamental principles governing the structure and reactivity of organic molecules. Organic molecules form the basis of industrial chemical and environmental processes. The laboratory focuses on bench-scale processing of organic chemical products and modern instrumental analysis and monitoring of chemical processes.

General Learning Objectives (CEAB Graduate Attributes)

Knowledge Base	X	Engineering Tools		Impact on Society	
Problem Analysis	X	Individual & Teamwork	X	Ethics and Equity	
Investigation	X	Communication	X	Economics and Project Mgmt.	
Design		Professionalism		Life-Long Learning	

Rating: I – The instructor will introduce the topic at the level required. It is not necessary for the student to have seen the material before. D – There may be a reminder or review, but the student is expected to have seen and been tested on the material before taking the course. A – It is expected that the student can apply the knowledge without prompting (e. g. no review).

Learning Outcomes	(CAEB) Graduate Attribute
Understand the molecular orbital theory of bonding and apply it to organic compounds.	*PA1 – Demonstrate ability to define an engineering problem.* *PA2 – Demonstrate ability to formulate a strategy to solve an engineering problem.* *PA3 – Demonstrate ability to reach substantiated conclusions.* *IN2 – Demonstrate ability to conduct an investigation successfully.* *IN3 – Demonstrate ability to analyse and interpret data to reach valid conclusions.*
Classify organic compounds and identify functional groups.	
Understand and apply IUPAC nomenclature of organic compounds.	
Understand the 3-D structure and identify types of isomers of organic compounds.	
Describe the sources, preparation, and most important reactions of organic compounds.	
Understand the theory and practice of the most important instrumental techniques used to characterize organic compounds.	
Apply knowledge of organic chemistry to industrial processes.	
Apply basic skills in bench-scale laboratory techniques.	

Evaluation Components

Name	% Worth	Due Date	Learning Outcomes
Laboratory	30%	As scheduled / reports due one week after lab completion	Laboratory practice; Investigation
Quizzes (best 4)	20%	Dates TBD	Course learning outcomes
Participation	5%	Throughout term	Participation / engagement
Final Examination	45%	December examination period	Course learning outcomes

EXTRA COURSE INFORMATION

TERM STRUCTURE

One-term course with 3 lecture hours and 3 laboratory hours per week. Bench-scale experimentation begins in mid-September; students work in groups of 2–3. Lab arrangements are available on Brightspace OWL. WHMIS training is requested for attending lab sessions.

Students must attend all labs, turn in all laboratory reports. Note that the use of AI is strictly prohibited in the preparation and writing of these reports. If you miss a lab for medical or compassionate reasons, you must notify the instructor immediately to make arrangements to make up the lab and provide adequate documentation for your absence. Failure to provide the adequate documentation will result in a mark of zero.

BRIGHTSPACE RESOURCES

Lecture notes and the laboratory manual are available on Brightspace OWL.

COURSE MATERIALS

Suggested text: L.G. Wade Jr., “Organic Chemistry”, 9th edition, Prentice-Hall, 2017. Students must have laboratory safety goggles and a laboratory coat for all laboratory sessions.

ASSESSMENTS

Evaluations will focus on testing the understanding of fundamental concepts of organic chemistry and on applying this knowledge to solving problems. The laboratory component includes basic skill building as well.

Students must be prepared in advance for both the lectures and the laboratory. Some notes will be updated on the web site, but students should make their own notes during class. Laboratory reports are due one week after the completion of the lab. Late submission carries a penalty of 10% per day for 7 days, after which the particular lab will be marked zero. *All lab reports must be submitted.

LAB INFO

Bench-scale experimentation will start in mid-September. Consult the lab schedule on OWL for the dates of particular experiments. Students will form groups of 2-3 to perform the experiments. After completion of the bench scale experiments, the students will be familiar with basic laboratory equipment and instrumentation and gain experience with basic laboratory techniques such as distillation and chromatography. Chemical engineers must be familiar with these basic techniques and instruments, as they are routinely used in the chemical industry and form the basics of more involved large-scale chemical unit operations.

You must also have for this course laboratory safety goggles and a laboratory coat. Students are expected to abide to the safety rules and procedures described in the lab manual. Students without safety goggles and a laboratory coat will not be allowed into the laboratory and will receive a mark of zero for that particular lab.

Students must read the lab manual and complete the pre-lab questions prior to attending the lab.

REPEATING ALL COMPONENTS OF THE COURSE

In accordance with Senate and Faculty Policy, students who have failed an Engineering course (i.e., received a final grade below 50%) are required to repeat all components of the course. No special permission will be granted to retain laboratory, assignment, or test marks from previous years. Previously completed assignments and laboratory work may not be resubmitted for grading in subsequent years.

USE OF ENGLISH

In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the available marks on assignments, tests, and examinations for improper use of English. Poorly written work, with the exception of the final examination, may be returned without grading. If resubmission is permitted, marks may be deducted for poor English and/or late submission.

ATTENDANCE

Attendance at all lectures, laboratories, and tutorials is mandatory. A student who, in the opinion of the instructor, is absent too frequently from classes or laboratory sessions may be reported to the Dean after appropriate warning has been provided. Upon the recommendation of the Department and with the permission of the Dean, the student may be excluded from taking the regular examination in the course.

CHEATING

Cheating is considered a scholastic offence under university policy. Scholastic offences are subject to academic penalties, which may include expulsion from the program. Students found to have engaged in cheating should refer to the Scholastic Offence Policy in the Western Academic Calendar for further information.

PLAGIARISM

Students are expected to complete essays and assignments in their own words. When using ideas or text from another author, students must appropriately acknowledge the source through quotation marks, where applicable, and proper referencing, such as citations or footnotes. Plagiarism is a serious academic offence and is subject to the Scholastic Offence Policy outlined in the Western Academic Calendar.

The University of Western Ontario uses plagiarism-detection software. Students may be required to submit their work electronically for plagiarism checking.

CONDUCT

Students are expected to arrive at lectures on time and conduct themselves in a professional and respectful manner. Behaviour that disrupts the learning environment or interferes with others is not acceptable.

SICKNESS AND OTHER PROBLEMS

Students experiencing circumstances that may affect their performance in the course should consult the instructor or Department Chair as soon as possible. Where appropriate, supporting documentation should be provided. Students should seek guidance from the instructor or Department Chair regarding how best to address the situation. Failure to provide timely notification may negatively affect a subsequent appeal.
Students requiring course materials in an alternate format or other arrangements to improve course accessibility should contact the course instructor. Students may also contact the appropriate University accessibility services for assistance with accommodations.

NOTICES

Students are responsible for regularly checking their email and reviewing course-related notices and announcements.

CONSULTATION

Students are encouraged to discuss course-related questions or concerns with their teaching assistant and/or instructor. Office hours will be arranged to provide opportunities for students to meet with the instructor and teaching assistants. Additional individual consultations may be arranged by appointment with the appropriate instructor.

1 Faculty of Engineering Policies and Procedures-Undergraduate

The Faculty of Engineering has established for 2025 a set of Policies and Procedures for Undergraduate Students. The policy covers:

- Absence/Late Accommodation Policy
- Religious Accommodation
- Academic Integrity
- Academic Offences
- Faculty of Engineering AI Policy
- Accessibility
- Inclusivity, Diversity, and Respect
- Health and Well-being

See the following subsections for notes on specifics on how some of these policies apply in the context of CBE 2206.

1.1 Absence/Late Accommodation Policy

In general, you are expected to advise the Course Coordinators if you are having problems completing an assignment on time (**prior to the due date of the assignment**).

Attendance

Attendance in all lectures, labs and tutorials is mandatory. Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be excluded from taking the regular examination in the course.

Laboratory

Students must attend all labs, turn in all laboratory reports, and achieve a passing grade in the laboratory component to pass this course. If you miss a lab for medical or compassionate reasons, you must notify the instructor immediately to make arrangements to make up the lab and provide adequate documentation for your absence. Failure to provide the adequate documentation will result in a mark of 0.

Laboratory reports are due one week after the completion of the lab. Late submission carries a penalty of 10% per day for 7 days, after which the particular lab will be marked zero. *All labs must be submitted.

Tests

There will be no make-up tests. If you are unable to write a test for medical or compassionate reasons, you must provide the appropriate documentation, and the weighting of the final exam will be adjusted accordingly. Failure to provide the adequate documentation will result in a mark of 0.

2.1 Academic Considerations

CBE 2206 follows the Faculty and University policies for Academic Considerations. In accordance with the policy that instructors are permitted to designate one assessment per course per term as requiring supporting documentation to receive academic consideration. For CBE 2206 the following assessments have been designated as requiring supporting documentation:

There will be no make-up tests. Top 4 out of 5 quizzes will be counted towards final grade. Any extra missing quizzes will be shifted directly into the final exam accordingly, given that valid and appropriate documentation is provided.