

The University Of Western Ontario
Faculty of Engineering

DEPARTMENT OF CHEMICAL AND BIOCHEMICAL ENGINEERING

CBE 2206 – INDUSTRIAL ORGANIC CHEMISTRY I

Course Outline Fall 2023

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 section focuses on bench scale processing of organic chemical products, and the use of modern instruments for analysis of organic materials and monitoring of chemical processes.

Objectives

- understand the molecular orbital theory of bonding and apply it to organic compounds
- be familiar with the classification of organic compounds and functional groups
- understand and apply the IUPAC nomenclature of organic compounds
- understand the 3-D structure and types of isomers of organic compounds
- be familiar with the source/preparation and most important reactions of organic compounds
- get acquainted with the theory and practice of the most important instrumental techniques used to characterize organic compounds
- apply the knowledge of organic chemistry to industrial processes
- acquire basic skills in bench-scale laboratory techniques

Prerequisites

Chemistry 1024A/B or Chemistry 1050 or the former Chemistry 1020 or 023. Open only to students registered in the Faculty of Engineering.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Corequisites

None

Antirequisites

Chemistry 2213A/B or the former CBE 2216. CBE 2206A and GPE 2213A are antirequisites of each other.

Contact Hours

3 lecture hours, 3 laboratory hours, 0.5 course.

Instructor

Prof. Paul A. Charpentier (CMLP 3333) Telephone: 519-661-3466 email:

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Lab Technician

Nataphan Sakulchaicharoen (SEB1082) Telephone: 519-661-2111 ext: 80536 email:

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Suggested Text

L.G. Wade Jr., "Organic Chemistry", 9th edition, Prentice-Hall, 2017.

[https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Map%3A_Organic_Chemistry_\(Wade\)](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Map%3A_Organic_Chemistry_(Wade))

Course Notes

Lecture notes will be available on OWL.

Laboratory Notes

Laboratory manual will be available on OWL.

Laboratory

The laboratory section of this course consists of 3 experiments. 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. Some lab reports will be written up individually and some will be written up in groups. 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.

Units:

SI units will be used.

General Learning Objectives

Knowledge Base	x	Individual Work	x	Ethics and Equity	
Problem Analysis	x	Team Work	x	Economics and Project Management	
Investigation	x	Communication	x	Life-Long Learning	
Design		Professionalism			
Engineering Tools		Impact on Society			

Specific Learning Objectives

Organic Chemistry is at the basis of numerous industrial and biological processes. Chemical & Green Engineers must know the basics not only to be able to understand, control and optimize processes involving organic compounds, but also for safety and environmental reasons. Safe handling of chemicals requires organic chemistry knowledge, and the same is true for designing new, environmentally friendly processes.

Evaluation

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 labs must be submitted.

The final course mark will be determined as follows:

Laboratory	25 %
Mid-term exam (2 hrs)	25 %
Final Examination	50 %

Both mid-terms will be two hours in length covering different sections of the course. The final examination will take place during the December examination period. It will be 3 hours in length. No calculators of any kind will be permitted during examinations.

Note:

1) Students must pass the final examination to pass this course. Students who fail the final examination will be assigned 48% if the aggregate mark is higher than 50% or the aggregate mark.

2) 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.

3) 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.

Repeating All Components of the Course

In accordance with Senate and Faculty Policy, students who have failed an Engineering course (ie. <50%) must repeat all components of the course. No special permissions will be granted enabling a student to retain laboratory, assignment or test marks from previous years. Previously completed assignments and laboratories cannot be resubmitted for grading by the student in subsequent years.

Use of English

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

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.

Cheating

University policy states that cheating is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If

you are caught cheating, there will be no second warning (see Scholastic Offence Policy in the Western Academic Calendar).

Plagiarism

Students must write their essays and assignments in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

The University of Western Ontario has software for plagiarism checking. Students may be required to submit their work in electronic form for plagiarism checking.

Conduct

Students are expected to arrive at lectures on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others.

Sickness and Other Problems

Students should immediately consult with the instructor or Department Chair if they have any problems that could affect their performance in the course. Where appropriate, the problems should be documented. The student should seek advice from the Instructor or Department Chair regarding how best to deal with the problem. Failure to notify the Instructor or Department Chair immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Notices

Students are responsible for regularly checking their email and notices posted on Instructors' doors.

Consultation

Students are encouraged to discuss problems with their teaching assistant and/or instructor in tutorial sessions. Office hours will be arranged for the students to see the instructor and teaching assistants. Other individual consultation can be arranged by appointment with the appropriate instructor.

Accreditation (AU) Breakdown

Basic Science	=	70 %
Engineering Science	=	30 %

