

CH2310 - ORGANIC CHEMISTRY I

Worcester Polytechnic Institute

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Course website: All material from CH2310, including the syllabus, problem sets, exams, solutions to problem sets and exams, presentations and supplemental material from class are available on the course web site on Canvas.

Required Materials: *Organic Chemistry*, 9th Edition, by L. G. Wade. A set of molecular models is strongly recommended but not required. Models help to visualize molecular structure and conformation. You will be allowed to use molecular models on all exams. Model kits are available in the bookstore and also at Amazon.com. I recommend the Duluth Labs Organic Chemistry Molecular Model Student Kit MM-003 (\$25) or MM-004 (\$35) from Amazon. Kit MM-004 has more atoms and bonds allowing construction of larger molecules than kit MM-003. Amazon carries a number of model kits for organic chemistry by other companies that also will work well.

What is Organic Chemistry? Organic chemistry is the chemistry of compounds containing carbon and hydrogen. It is a sub-discipline of chemistry involving the study of the structure, composition, properties, energetics, reactivity and synthesis of hydrocarbons and compounds derived from hydrocarbons. Organic compounds exhibit a diverse range of structures and chemical functionality that form the basis of all life on earth. They also serve as the fundamental molecular building blocks used to produce medicines, food, energy, materials (e.g., plastics, cosmetics, explosives, coatings, etc.) and more complex biomolecules such as proteins, DNA/RNA, membranes and sugars.

Scope of the course: It is not possible to cover all of the material necessary to master organic chemistry in a single term. As such, Organic Chemistry I (CH2310) is the first course in a sequence of three courses (CH2310-CH2330) that together introduce the fundamental concepts necessary to understand the structure, reactivity, functionality and synthesis of organic compounds. Organic Chemistry I, II and III each cover roughly 1/3 of the material presented in your text. Completing the entire CH2310-CH2330 sequence is essential to avoid significant gaps in your knowledge if you are planning to pursue a career in the physical sciences or biosciences, medicine or engineering that require a background in organic chemistry. Given that organic chemistry of carbonyl compounds, amines, sugars, peptides and other bio-related molecules is covered in CH2330, it is highly recommended that you take that course if you are planning a career in biochemistry or biosciences. The material presented in this course will be defined by the lectures, discussions, reading assignments and problem sets. You should assume that all material covered in class, the chapters in your text, problem sets, and supplemental reading is important on exams unless I indicate otherwise. Relevant material in the text you should read and focus on is specified in the problem sets.

Outcomes: The goal in CH2310 is to become familiar with basic concepts of organic chemistry that include classification of organic compounds by functional group, the structures, properties and stereochemistry of alkanes and cycloalkanes (hydrocarbons are the foundation for all other organic compounds), the structure and reactivity of organic functional groups that include alkyl halides and alkenes, the different types of reaction mechanisms, and the chemical and energetic factors that determine chemical reactivity. You should expect to become proficient at drawing organic molecules and mechanisms for organic reactions and to understand and predict how reactions proceed. If you find yourself guessing how reactions work or memorizing reactions, you will have a difficult time mastering organic chemistry.

Reading: It is important that you read the textbook as we go over material from each chapter in class. *The sections in each chapter that you should read are indicated in the problem sets.* Sections that you may skip also are indicated. The lectures alone will not suffice. You are accountable on exams for the assigned reading from the text, material from lectures, and any supplemental material covered in class.

Topics Covered: Material in chapters 1-8 (below) will be introduced and discussed in class. You are responsible for learning this material by reading the text, attending lectures, and working on assigned problems. Lectures will cover most but not all of the topics in the text and will focus on the most important and relevant material.

Chapter 1: Introduction and Review (review of concepts from General Chemistry)—read on your own

Chapter 2: Structure and Properties of Organic Molecules (review of concepts from General Chemistry)—read on your own.

Chapter 3: Structure and Stereochemistry of Alkanes

Chapter 4: The Study of Chemical Reactions—relevant content in this chapter will be discussed as we cover material in other chapters.

Chapter 5: Stereochemistry

Chapter 6: Alkyl Halides: Nucleophilic Substitution and Elimination

Chapter 7: Structure and Synthesis of Alkenes

Chapter 8: Reactions of Alkenes

Problem Sets: Problems sets and solutions are posted on the course web site on Canvas. *Problem sets will not be graded or collected. It is important that you set aside time each day to work on problems relevant to the material covered in class. It will be difficult for you to do well in CH2310 if you wait until the day before an exam to start working on problems.* Problem sets include problems found within and at the end of each chapter in the text and additional problems that I may provide. Solutions to problems from the text are also available in the solutions manual for the text posted on the course web site. Your success in this class will depend in large part on your ability to understand the assigned problems. The problem sets indicate what material is important in each chapter and test your knowledge of the subject matter. You should work out answers to problems before consulting the solutions. Questions on exams will be modeled after the problem sets. You are encouraged to work with other students on problems. *I strongly recommend that you work on additional problems that have not been assigned to test your mastery of the material and do well in this course.*

Exams: Three 50-minute exams will be given in class that cover material presented in class, problem sets and the assigned reading. Exams may include any material discussed in class prior to the exam, but will emphasize new material since the last exam. Each exam will count 100 points for a total of 300 possible points. Exams will be given on the following days.

Exam 1:	Wednesday, November 7
Exam 2:	Wednesday, November 28
Exam 3:	Friday, December 14

Exams from the previous year are available on the course website to provide examples of format, potential questions and practice problems that focus on material likely to appear on exams.

Missing Exams: You will be allowed to take a make-up exam if you must miss an exam for a legitimate reason (e.g. trip sponsored by the university) *if you notify me in advance of the scheduled time for the exam.* If I am not notified in advance, a score of zero points will be recorded. Please note that a medical appointment is not an acceptable reason for missing an exam except in case of an emergency.

Final Grade: Your grade for the course will be calculated based on 300 total possible points for the four exams using the cutoffs indicated below.

<i>Grade for the course:</i>	A:	100-87% (300-261 total points)
	B:	86-77% (260-231 total points)
	C:	76-62% (230-186 total points)
	NR:	< 62% (185-0 total points)

Help Sessions: MASH (Math Science Help) sessions will be held weekly by Alli Ross, who has taken the Organic CH2310-CH2330 sequence previously at WPI. Alli has a strong background in organic chemistry. She will assist you to better understand organic chemistry by answering questions from material in lectures, problem sets and exams. I recommend that you take advantage of MASH help sessions if you have questions regarding material from lecture or problem sets, and in preparing for exams. The schedule and location of those sessions is indicated below. You may

also sign up by appointment for one-on-one tutoring sessions at the Academic Resource Center by registering at <http://tutortrac.wpi.edu>.

MASH Sessions:	Mondays	4:00 PM	Academic Resources Center (ARC)
	Tuesdays	7:00 PM	Exam Proctoring Center (EPC)
	Wednesdays	7:00 PM	Exam Proctoring Center (EPC)
	Thursdays	4:00 PM	Academic Resources Center (ARC)

Attendance: You will get the most out of this course by attending class. I often present concepts and material during lecture that is not in the text. A good record of attendance generally will help improve your grade.

Academic Honesty: The Academic Honesty Policy at WPI is provided below. Please read it carefully. Any student who violates the policy will receive an NR for the course and the academic advisor and the Dean of Students will be notified. I take academic honesty very seriously and will not hesitate to enforce WPI's policy.

Academic honesty is a fundamental principle of learning and a necessary foundation at WPI. Violations of the principle deny violators an opportunity to obtain confident command of the material they are credited with knowing, cheat their classmates out of deserved rewards and recognition, debase the institution, and demean the degree that it awards. It is, therefore, a matter of great and mutual concern to all members of the WPI community that a concerted effort be made to maintain high standards of integrity, both to protect the value of the educational process in which we are engaged and to maintain the credibility of the institution.

Individual integrity is vital to the academic environment because education involves the search for and acquisition of knowledge and understanding, which are, in themselves, intangible. Evaluation of each student's level of knowledge and understanding is a vital part of the teaching process, and requires tangible measures such as reports, examinations, and homework. Any act that interferes with the process of evaluation by misrepresentation of the relation between the work being evaluated (or the resulting evaluation) and the student's actual state of knowledge is an act of academic dishonesty. The following acts are examples of academic dishonesty at WPI:

Fabrication

- *Altering grades or other official records*
- ***Changing exam solutions after the fact***
- *Inventing or changing laboratory data*
- *Falsifying research*
- *Inventing sources*
- *Sabotage of another student's work or academic record*

Plagiarism

- ***Misrepresenting the work of another as one's own***
- *Inaccurately or inadequately citing sources including those from the Internet*

Cheating

- *Use of purchased term papers*
- ***Copying on exams, homework, or take-home exams***
- ***Use of unauthorized materials or sources of information such as a "cheat sheet," pre-programmed calculator***
- *Assistance of another person in cases where prohibited*

Facilitation

- ***Sharing test questions or answers from an exam with another student***
- ***Letting another student copy a solution to a homework problem, exam, or lab***
- ***Taking an exam for another student***

- *Assistance in any act of academic dishonesty of another student*