



AMBROSE  
UNIVERSITY COLLEGE

FACULTY OF  
ARTS & SCIENCE

**CHEM 251**  
**Organic Chemistry I**  
**Fall 2010**

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**COURSE DESCRIPTION:**

CHE 251 Organic Chemistry I (3–3) A

This course studies organic compounds – structure and bonding, aromaticity, stereochemistry, thermodynamics and spectroscopy.

*Prerequisites: CHE 103*

**LECTURE AND LABORATORY INSTRUCTOR:** Dr. Ross Gilmore

Phone: 403 410-2000 extension 5914

Fax: 403 571-2556

Email: [RGilmore@ambrose.edu](mailto:RGilmore@ambrose.edu)

[rgilmore@mtroyal.ca](mailto:rgilmore@mtroyal.ca)

Moodle access : <http://moodle.ambrose.edu/course/index.php>

Office: room: A2160

Office Hours: W and F 11:30 -1:30 pm or by appointment

**LECTURE AND LAB SCHEDULE:**

**Lecture:**

Wednesday and Friday 9:45 am – 11:00 am Room: A2210

**Lab:**

Monday 1:00 – 3:45: pm Room: A2145

This conflicts with the general chem labs, therefore;

possibly 11:00 am – 1:45 pm same room

**REQUIRED TEXTS:**

- I. *Organic Chemistry*: Francis A. Carey, 8<sup>th</sup> Ed (or earlier), McGraw Hill Publishers
- II. *Laboratory Manual: Selected Organic Chemistry Laboratory Experiments*. This manual is an Ambrose University Compilation and will be used as a guide and resource throughout the laboratory component of the course. Availability will be discussed during the first lecture.

**REQUIRED MATERIALS:**

Lab coat, lab notebook, lab glasses/goggles, organic chemistry model kit.

**SUPPLEMENTARY MATERIALS:**

Your text is the same as that used by the University of Calgary for their equivalent course, Chemistry 351. Their website is:

<http://www.chem.ucalgary.ca/courses/351/index351-f08.html>

You may find assorted links at this site to be very helpful. They have a series of web pages that are complementary to the earlier edition of Carey's Organic Chemistry text.

**RECOMMENDED TEXTS:**

Organic Chemistry, T.W. Graham Solomons, 9<sup>th</sup> Ed or earlier. This is the text I would have prescribed for the course if synchronization with U of C was not a consideration. I prefer Solomons, approach, organization, and presentation to that of Carey.

**PRE-REQUISITES:**

Chemistry 101 (General Chem I) and 103 (General Chem II)

**COURSE OVERVIEW:**

Organic Chemistry I introduces students to the study of the compounds of carbon. Carbon containing compounds are the basis of life and much of modern industrial and medicinal chemistry. Before a student can understand and predict the products of organic synthesis, they must first learn to identify reactive groups, predict the orientation of atoms within molecules, and understand the role of solvents during such chemical reactions. In this course, you develop the skills needed to make synthetic predictions. In addition, we will examine instrumental techniques for analysing the products of reactions using methods such as NMR and IR spectroscopy.

**COURSE OBJECTIVES:**

Upon completion of the course, students will have acquired the background knowledge required to move forward into Organic Chemistry II.

This includes an understanding of the fundamental concepts of organic chemistry, acquisition of basic organic chemistry terminology, and an introduction to organic synthesis and arrow pushing.

Students will also gain insight into biochemical processes and the commercial application of organic chemistry.

To succeed in organic chemistry students are advised to read relevant topics in their text the day before or morning of their lectures. An experienced student will also review their notes within several hours of the lecture to shift acquired knowledge from short to long-term memory. In addition, since organic chemistry involves problem solving, students must practice these skills by completing the questions at the end of each chapter. You will never learn organic chemistry through memorization. Learn the reasons why reactions occur and you can predict the outcome of almost any reaction.

## EVALUATION:

Assignments and Quizzes	10%
Midterm Exam #1	10%
Midterm Exam II	10%
Laboratory and Lab Examination	30%
Final Exam	40%

A passing level of performance in the laboratory is a requirement for completion of the course. Your grade in the lab is at the discretion of your lab instructor. To pass the lecture component of the course a student must attain a minimum of 50% in the lab. To move on to courses for which this course is a pre-requisite, a C-grade (60%) is required.

## LETTER GRADE GUIDELINE

Percentage (%)	Grade	Grade Point
95-100	A+	4
86-94	A	4
80-85	A-	3.7
78-79	B+	3.3
74-77	B	3.0
70-73	B-	2.7
68-69	C+	2.5
64-67	C	2.0
60-63	C-	1.7
56-60	D+	1.5
50-55	D	1.0
0-49	F	0

**TENTATIVE LECTURE SCHEDULE: (the following is only a rough guide and students should cross check the text sections using the index found in the text book)**

<b>Week Starting, Monday</b>	<b>Text Sections (Carey 7<sup>th</sup> Ed.)</b>	<b>Lecture Topics</b>	<b>Lab Topics</b>
Sept. 6 <sup>th</sup> Monday and Tuesday are orientation days. Lectures start Wednesday	1.1 to 1.5, 1.7 to 1.9 2.3, 2.4	<b>Review</b> ; bonding, atomic and molecular orbitals, formal charge, Lewis diagrams	<b>No labs</b>
Sept 13 <sup>th</sup>	1.6 to 1.9	Formulas: Lewis, three dimensional, organic-shorthand. Resonance; carbocations and carbanions and their relative stability	<b>No labs</b>
Sept. 20 <sup>th</sup>	2.6 to 2.21 4.6, 4.10	Alkanes and cyclic alkanes, hybrid orbitals, conformers, ring strain, intro to substituted alkanes	Dry Lab: Check-in and Organic Techniques, nomenclature and structure assignment (credit) Quiz
Sept 27 <sup>th</sup>	3.7 to 3.15 and 7.1 to 7.16	Cyclohexane conformers, ring flipping, conformer stability. Ring strain, crowding.	Lab 1-A: Separation of Solids
Oct. 4 <sup>th</sup>	2.1, 2.5 to 2.8, 3.1 to 3.15 4.14 to 4.18	Synthesis of alkanes and substituted alkanes, nomenclature Free radical halogenation and intro to arrow pushing, free energy. Alcohols, synthesis, reactions of	Lab 1-B: Separation of Solids
Oct. 11 <sup>th</sup> (Thanksgiving day holiday on Monday, Oct 11 <sup>th</sup> )	2.11 to 2.13 to 2.16,	Alcohol nomenclature. <b>1<sup>st</sup> midterm in class</b> <b>Wednesday, Oct 13<sup>th</sup></b>	<b>Monday is a holiday, no lab this week</b> Takehome assignment to be distributed(credit)
Oct. 18 <sup>th</sup> (Wednesday Oct 20 <sup>th</sup> , and Thursday Oct 21 <sup>st</sup> are	2.20, 5.1 to 5.10	Stereochemistry, chirality, nomenclature of enantiomers, optical activity, enantiomer synthesis	Lab 2-A: Thin Layer Chromatography

community days)			
Oct. 25 <sup>th</sup>	5.11 to 5.18, 6.1 to 6.9, 6.12 to 6.22 7.1 to 7.16	Fischer projections of diastereomers Reactions leading to diastereomers, resolution of enantiomers	Lab 2-B: Thin Layer Chromatography
Nov. 1 <sup>st</sup>	4.1 to 4.5,	Nucleophilicity SN <sub>1</sub> rxn and rate laws (RX from ROH), SN <sub>2</sub> reactions and rate laws (RX from ROH)	, Lab 3: Distillation, parts A and B
Nov. 8 <sup>th</sup> (remembrance day holiday on thursday, the 11th)	5.1 to 5.18	Elimination reactions (E1 and E2 mech's), dehydrohalogenation (alkene synthesis), alkene nomenclature and stereochemistry. <b>2<sup>nd</sup> mid-term in-class, friday the 12th</b>	Lab 4-A1/A2: Nucleophilic Substitution and GC analysis Lab 4-B, Properties of alkanes and alkenes
Nov. 15 <sup>th</sup>	6.1 to 6.8	Hydrogenation and hydration of alkenes, electrophilic addition of HX, free radical addition	<i>Lab 5: Stereochemistry of Bromination</i>
Nov. 22 <sup>rd</sup>	9.1 to 9.14	Alkynes, nomenclature, properties, hybridization, reactions. Intro to redox reactions: permanganate oxidation and ozonolysis of unsaturated hydrocarbons	Lab 6: Dry Lab only : Spectroscopy, IR, NMR, Mass Spectroscopy and UV-vis (Handout and Assignment)
Nov. 29 <sup>th</sup>	13.1 to 13.17	Proton and <sup>13</sup> C-NMR theory and examples.	<b>Lab Exam and Check out</b>
Dec 6 <sup>th</sup> Thursday is the last day of classes	13.24, 13.25 and 13.20 to 13.22	Intro to Mass-spec, infra-red spec, and UV-spec	
	6.22, 29.1 to 29.16	Polymerization of organic molecules, Organics in biology.	
Dec 13 <sup>th</sup> to 18th		<b>Final Exam Period</b>	

**Important Notes/Dates:**

The last day to enter a course without permission and /or voluntary withdrawal from a course without financial penalty – Friday, September 17, 2010 (Fall semester) or Friday, January 21, 2011 (winter semester)

The last day to voluntarily withdraw from a course or change to audit without academic penalty – Friday, November 12, 2010 (Fall semester) or Friday, March 18, 2011 (Winter semester)

***Please note that final grades will be available on your student portal. Printed grade sheets are no longer mailed out.***

### **LAB SAFETY:**

Lab coats and goggles are mandatory. You **must** abide by the regulations outlined in your lab manual. Proper handling and disposal of chemicals is important to protect both the environment and your fellow students. Every chemical used in the laboratory comes with a WHMIS sheet. If uncertain regarding risks, ask your lab instructor, and/or refer to the WHMIS information sheet. Be familiar with all safety equipment and emergency exits within the lab. Hair should be tied back, no open shoes/sandals, avoid wearing contact lenses since many organic chemicals are readily absorbed by the gas permeable material of the lenses and are difficult to eradicate. Always be attentive and **think** about the risks associated with the lab procedure in progress.

### **Instructor's Attendance Policy:**

Students are expected to attend all classes and laboratories. Non-excused absence may result in loss of marks or in additional assignments being required. Individual absence from class not satisfactorily validated by the course instructor may lead to a penalty on the final grade. When possible, students should advise their instructor of anticipated absence from class.

A student may be denied permission to write the final examination on the recommendation of the instructor pending approval of the Deans Council. Grounds for such debarment are: failure to complete a substantial part of the written assignments for a course; frequent absence from class; or failure to complete a sufficient amount of the required practical or laboratory work in a course.

### **Classroom Policies:**

Questions are encouraged. Student participation in classroom discussions is expected. If a point requires clarification, always feel free to interject. Exceptions to this open lecture policy will occur when, or if, the time available to cover a topic is limited.

No cell phones or MP3 players are to be turned on during lectures. Phones should also be out of site and off your desk. Use of camera phones, digital cameras, recording devices of any kind, or laptop cameras is prohibited without prior permission from your instructor. Repeat offences may result in expulsion from the class.

### **Institutional Academic Policies:**

It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Student Handbook and Academic Calendar. Personal information, that is information about an individual that may be used to identify that individual, may be collected as a requirement as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at [privacy@ambrose.edu](mailto:privacy@ambrose.edu).

Although extensions to coursework in the semester are at the discretion of the instructor, students may not turn in coursework for evaluation after the last day of the scheduled final examination period unless they have received permission for a "Course Extension" from the Registrar's Office. Requests for course extensions or alternative examination time must be submitted to the Registrar's Office by the appropriate deadline (as listed in the Academic Calendar <http://www.ambrose.edu/publications/academiccalendar>). Course extensions are only granted for serious issues that arise "due to circumstances beyond the student's control."

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university college. Students are expected to be familiar with the policies in the current Academic Calendar and the Student Handbook that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean.

Students are advised to retain this syllabus for their records.

Course changes, including adding or dropping a course, may be made during the Registration Revision period, as outlined in the Calendar of Events. All course changes must be recorded on a Registration form, available from the Office of the Registrar. Due to circumstances such as class size, prerequisites or academic policy, the submission of a Registration form does not guarantee that a course will be added or removed from a student's registration. Students may change the designation of any class from credit to audit up to the date specified in the Calendar of Events, although students are not entitled to a tuition adjustment or refund after the Registration Revision period.

Withdrawal from courses after the Registration Revision period will not be eligible for tuition refund. Students intending to withdraw from some or all of their courses must submit a completed Registration form to the Registrar's office. The dates by



which students may voluntarily withdraw from a course without penalty are listed in the Calendar of Events. A grade of 'W' will be recorded on the student's transcript for any withdrawals from courses made after the end of the Registration Revision period and before the Withdrawal Deadline (also listed in the Calendar of Events). 'W' grades are not included in grade point average calculations. A limit on the number of courses from which Academic a student is permitted to withdraw may be imposed. Students wishing to withdraw from a course, but who fail to do so by the applicable date, will receive the grade earned in accordance with the course syllabus. A student obliged to withdraw from a course after the Withdrawal Deadline because of health or other reasons may apply to the Registrar for special consideration.

An appeal for change of grade on any course work must be made to the course instructor within one week of receiving notification of the grade. An appeal for change of final grade must be submitted to the Office of the Registrar in writing within 30 days of receiving notification of the final grade, providing the basis for appeal. A review fee of \$50.00 must accompany the appeal to review final grades. If the appeal is sustained, the fee will be refunded.

Academic dishonesty is taken seriously at Ambrose University College as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to give credit to another person's ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from Ambrose. Students are expected to be familiar with the policy statements in the current academic calendar and the student handbook that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean and become part of the student's permanent record.