



CHEM 253
Organic Chemistry II
Winter 2011

COURSE DESCRIPTION:

CHE 253 Organic Chemistry II (3–3) A

A continuation of Chemistry 251, this course looks at the reactions of common functional groups and examines mechanisms of biological significance.

Prerequisite: Chemistry 251

This course has a pending transfer credit agreement through Alberta Council on Admissions and Transfer. Visit <http://www.transferralberta.ca> for details.

LECTURE AND LABORATORY INSTRUCTOR: Dr. Ross Gilmore

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Office Hours: W and F 9:00 -11:00 am or by appointment

LECTURE AND LAB SCHEDULE:

Lecture:

Wednesday and Friday 11:15 pm – 12:30 pm Room: A2145

Lab:

Monday 1:00 pm – 4:00 pm Room: A2145

REQUIRED TEXTS:

- I. *Organic Chemistry*: Francis A. Carey, 8th 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 353. Their website is at;

<http://www.chem.ucalgary.ca/courses/350/index353-w09.html>

Past U of C exams are here;

<http://www.chem.ucalgary.ca/courses/350/exams/3513/index.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, 9th Ed or earlier. This is the text I would have recommended 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:

Organic Chemistry 251.

COURSE OBJECTIVES:

In Organic Chemistry 253 the preparation and reactivity of various molecules such as alkynes, dienes, arenes, organometallic compounds, carbonyl containing compounds, amines, ethers and epoxides will be studied. We will also continue our spectrometric identification of functional groups in the context of their molecular environments. In addition, effort will be made to link organic synthesis concepts to natural processes and pharmacology.

COURSE OBJECTIVES:

- III. To understand the relationship between structure and reactivity
- IV. To make predictions regarding product formation based upon the nature of reactants
- V. To begin to design synthesis pathways for moderately complex organic molecules from simple starting materials
- VI. To link organic chemistry with biological chemistry and other disciplines
- VII. To further expand our ability to identify organic compounds using spectrometric techniques.

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 (64%) is required.

LETTER GRADE GUIDELINE

Percentage (%)	Grade	Grade Point
86-100	A	4.0
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)

Week Starting	Text Sections	Lecture Topics	Lab Topics
Jan 10th	14.1-14.4 17.15 17.16	Addition reactions. Redox in organic and biochemistry. Permanganate oxidation. PCC and chromate oxidations Organometallic compounds: organolithium and more borohydride reactions	No labs during first week
Jan 17th	14.5- 14.9	Grignard's, organomagnesium, rxn of epoxides and carbonyls with Grignard's	No labs
Jan 24th	10.4-10.7 10.8-10.12	Planning Grignard synthesis Allyl stability and free radical substitution review, MO description, allyl cation stability, alkadienes and stability	<i>Locker Check-In</i> Lab #1 Ester Synthesis
Jan 31	10.13- 10.15 11.1- 11.10	Dienes and spectroscopy, 1-4 addition, Diels-Alder rxn, factors and stereochemistry. Aromatic compounds: nomenclature, reactions and stability, MO theory	Dry Lab: Grignard reactions etc.. Quiz #1
Feb 7	11.19 11.11- 11.16 1.22-11.23 12.1-12.8	Huckel's Rule of Aromaticity, other aromatics, aromatics in biochem, spectroscopy of aromatics Electrophilic Aromatic Substitution Reactions Midterm 1: Wednesday, February 3rd	Lab #2: Biodiesel Synthesis
Feb 14th	12.1-12.8	Halogenation, nitration, sulfonation, Friedel-Crafts Acylation	Lab #3: Plastics and polymers
Feb 21	11.1-11.9	Reading Week, College Closed February 22nd to 25th	no labs
Feb 28	12.9 – 12.16	Clemmensen Reduction, Ortho-Para directors. Side chain halogenation and benzylic radicals.	Dry Lab: Aromatics etc.. Quiz #2
March 7th	11.12- 11.16 12.16-	Alkenylbenzenes, side chain oxidation, ring oxidation. Protecting groups, disubstituted	Lab #4: Sodium Borohydride Reaction

	12.18	rings	
Mar 14	11.11, 11.14 17.1-17.5	Reactivity of allylic and benzylic halides. Birch reduction. Aldehydes and Ketones; nomenclature, physical prop's.	Dry Lab #3: more Aromatics, ring oxidation, etc.. Quiz #3
Mar 21	17.4-17.6 17.8, 17.9 17.14	Aldehyde synthesis, ketone synthesis, Hemiacetals and acetals from carbonyls. Midterm 2: Friday, March 19th	Lab #5: Identification Of An Unknown (Part 1) unknowns A to E, common Report
Mar 28	17.10, 17.7, 17.12	Thioacetals, imine formation, oximes and hydrazones, enamines, cyanohydrins, Wittig reaction.	Dry Lab #4: aldehydes, ketones, hemiacetals, etc Quiz #4
Apr 4	17.17 18.1 – 18.10	Spectroscopic analysis of aldehydes and ketones. Enols and enolates, keto-enol tautomers, halogenation of aldehydes and ketones, haloform rxn and environmental effects Friday Apr 2nd is Good Friday	Lab #5: Identification Of An Unknown (Part 2) Individual Report
Apr 11	18.2, 18.3 18.11- 18.14 19.1-19.10 19.18	Aldol reactions, crossed aldol rxns, cyclizations, lithium enolates Conjugate addition in unsaturated aldehydes and ketones Carboxylic Acids: Nomenclature, Properties, Preparation, Synthesis	Check Out
Apr 18		Last Day of Classes is April 14th 18th to 29th is Final Exam Period	

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.

Academic Policies:

Attendance at lectures and labs is mandatory.

Instructor's Attendance Policy:

Students are expected to attend all classes and laboratories. Unexcused absence may result in loss of marks or in additional assignments being required. 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.

Institutional 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.

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.