AMBROSE UNIVERSITY COLLEGE | FACULTY OF ARTS & SCIENCE

CHEM 251
Organic Chemistry I
Fall 2009

LECTURE AND LABORATORY INSTRUCTOR: Dr. Ross Gilmore

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Office Hours:	W and F 9:30 -11:30 am or by appointment

LECTURE AND LAB SCHEDULE:

Lecture:
Wednesday and Friday 1:00 pm - 2:15 pm Room: A2145

Lab:
Monday 9:30 – 12:30: am Room: A2151

REQUIRED TEXTS:

I. *Organic Chemistry:* Francis A. Carey, 7th 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, 9th 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
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)

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Week Starting, Monday	Text Sections (Carey)	Lecture Topics	Lab Topics
Sept. 7th	1.1 to 1.5, 1.7 to 1.9 2.3, 2.4	**Review;** bonding, atomic and molecular orbitals, formal charge, Lewis diagrams	**No labs**
Sept 14th	1.6 to 1.9	Formulas: Lewis, three dimensional, organic-shorthand. Resonance; carbocations and carbanions and their relative stability	**No labs**
Sept. 21st	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
Sept 28th (community day on Wednesday Sept 30th)	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-A: Separation of Solids
Oct. 5th	2.11 to 2.13 to 2.16, 4.1 to 4.5,	Alcohol nomenclature. Nucleophilicity SN_1 rxn and rate laws (RX from ROH), SN_2 reactions and rate laws (RX from ROH)	Lab 1-B: Separation of Solids
Oct. 12th (Thanksgiving day holiday on monday, Oct 12th)	2.20, 5.1 to 5.10	Stereochemistry, chirality, nomenclature of enantiomers, optical activity, enantiomer synthesis **1st midterm in class Wednesday, Oct 15th**	**Monday is a holiday, no lab this week**
Oct. 19th (thursday Oct 22nd is a community day)	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-A: Thin Layer Chromatography
Oct. 26th	3.7 to 3.15 and 7.1 to 7.16	Cyclohexane conformers, ring flipping, conformer stability. Ring strain, crowding.	Lab 2-B: Thin Layer Chromatography,
Nov. 2nd	5.1 to 5.18	Elimination reactions (E1 and E2	Lab 3:

		mech's), dehydrohalogenation (alkene synthesis), alkene nomenclature and stereochemistry.	Distillation, parts A and B
Nov. 9th (remembrance day holiday on Wednesday, the 11th)	6.1 to 6.8	Hydrogenation and hydration of alkenes, electrophilic addition of HX , free radical addition **2nd midterm in-class Friday the 13th**	Lab 4-A1/A2: Nucleophilic Substitution and GC analysis Lab 4-B, Properties of alkanes and alkenes
Nov. 16th	9.1 to 9.14	Alkynes, nomenclature, properties, hybridization, reactions. Intro to redox reactions: permanganate oxidation and ozonolysis of unsaturated hydrocarbons	*Lab 5: Stereochemistry of Bromination*
Nov. 23rd	13.1 to 13.17	Proton and ^{13}C-NMR theory and examples.	Lab 6: Dry Lab only : Spectroscopy, IR, NMR, Mass Spectroscopy and UV-vis (Handout)
Nov. 30th	13.24 , 13.25 and 13.20 to 13.22	Intro to Mass-spec, infra-red spec, and UV-spec	***Lab Exam*** *and Check out*
Dec 7th Thursday is the last day of classes	6.22, 29.1 to 29.16	Polymerization of organic molecules, Organics in biology.	
Dec 14th to 18th		**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 REGULATIONS:

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. 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.

Students must familiarize themselves with College Academic Policies (page 71 to 83 of the Ambrose University College Academic Calendar) and penalties for plagiarism and other forms of academic dishonesty (page 79).

Ambrose University Policy: *Quote (Academic Calendar, 2008/2009)*

33. Academic Dishonesty

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.

33.1 Plagiarism

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 includes, but is not limited to

- *submitting work previously submitted in another course without the consent of the instructor;*
- *representing the words, ideas, or work of another as one's own in any academic exercise;*
- *conducting any act that defrauds the academic process.*

Nearly all forms of plagiarism can be avoided by giving credit to others whenever using

- *another person's idea, opinion, or theory;*
- *any facts, statistics, graphs, drawings –any pieces of information – that are not common knowledge;*
- *quotations of another person's actual spoken or written words;*
- *a paraphrase of another person's spoken or written words.*

33.2. Cheating

Cheating is a serious form of academic dishonesty. Cheating includes, but is not limited to

- *sitting for an examination by surrogate or acting as a surrogate;*
- *tampering or attempting to tamper with examinations, grades, or class records;*
- *communicating with another student during an examination in a dishonest way;*
- *bringing into an examination any textbook, note book, paper, information or electronic device not authorized by the instructor or examiner;*
- *consulting any person or materials outside the examination room without permission to do so;*
- *attempting to read other students' examination papers.*

34. Penalties and Procedures for

Academic Dishonesty

If an instructor finds there is sufficient evidence of academic dishonesty on the part of a student, the student will be subject to penalty. Any form of academic dishonesty may result in a zero grade on the assignment, loss of credit in that course, suspension, or other administrative action.

All cases of academic dishonesty will be reported to the Deans' Council. Where there is reason to believe a student is in violation of an academic standard outlined in the academic policies, the following process will be in effect:

Normally, the respective faculty member will deal with the matter, although the appropriate Academic Dean may be involved at the request of the faculty member. Faculty members have the authority and responsibility to assess penalties for academic dishonesty, which will normally be an 'F' on the work so compromised.

In any event, the matter will be reported to the Deans' Council, and a written record will be kept of the violation in the student's permanent file, a copy of which will be sent to the student.

The Deans' Council has the authority to impose any penalty considered appropriate for the infraction. The most severe penalty imposed will be a recommendation to the President that the student be dismissed from University College. The Deans' Council will communicate its decision to the student in writing.

Students whose cases have been referred may appear before the Deans' Council to present their case, but must leave while the Council is deliberating and arriving at a decision. Whenever students appear to present their case before an individual or committee, they may bring one other person who is able to support them in some way. However, this person may not be professional legal counsel.

Unquote.

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.