

# Chemistry 2213a – Fall 2008

## Organic Chemistry for Life Sciences

---

Mandatory notice from the Registrar:

"Unless you have either the prerequisites 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."

Prerequisites: Chemistry 1050, 1020, or the former 020, 023 or 024a/b

---

**Instructors:**    **Dr. Mel Usselman**    **(course coordinator)**, [usselman@uwo.ca](mailto:usselman@uwo.ca), **ChB 072** (section 001)  
                  **Dr. Felix Lee**            **(lab coordinator)**, [flee32@uwo.ca](mailto:flee32@uwo.ca), **ChB 1202 (MSA)** (section 002)

**Class Times:**            Section 001    M, W, F at 12:30 p.m.    North Campus Bldg 101  
                                  Section 002    M, W, F at 1:30 p.m.    North Campus Bldg 101

**Additional Resources:**            Review sessions on M and Th, 5:30 – 6:50 p.m. MC 110 (see website)  
  Drop-in help room, times and location to be announced (see website)

---

**Course Website:**            <http://instruct.uwo.ca/chemistry/2213>

- login = your Western email username (without the @uwo.ca portion)
- password = your Western email password

The course website contains the course outline, lecture notes, information on term tests and exams, and other course information. You should check the website regularly for updates.

---

### ***Text and other Purchases (from Western BookStore)***

- *Introduction to Organic Chemistry* –Third Edition (2005) by W. H. Brown and T.Poon, **and** *Student Solutions Manual for Introduction to Organic Chemistry* (2005) by M.S.Erickson.  
**Both available at a bundled price; also available at the used bookstore**
  - *2008 Laboratory Manual for Chemistry 2213a*. This Manual also contains past midterm tests and final exams. **The new 2008 version of this manual is required.**
  - Molecular Model Set: Darling Models (the “Molecular Visions” kit in a green plastic case)
  - Safety Glasses with side-panels, and lab coat. **Both are required**
-

---

## Evaluation

The final grade for the course will be determined by the following:

<b>Lab Mark</b>	<b>15%</b>	(5 labs × 3% per lab; all five labs count and none are dropped) <b>Departmental policy is that students who repeat a course must repeat the entire course, including the lab component.</b>
<b>Term Test</b>	<b>35%</b>	<b>Saturday, October 18, 2008, 7:30 - 9:45 p.m.</b> (there is only <u>one</u> test time; there is no make-up test)
<b>Final Exam</b>	<b>50%</b>	( <i>cumulative</i> ; 3 hours: scheduled by the Registrar)

***In order to pass the course, a student must perform at least three of the five experiments, and obtain a minimum mark of 50% in both the laboratory component and the whole course.***

**Students who cannot attend an experiment, for any reason, will initially be assigned an NGR (no grade) for the experiment. There are no make-up labs, and we do not reschedule labs.** Those who arrive unprepared or late for a lab will also receive an NGR. No credit will be given for completed pre-lab exercises. Students are deemed unprepared if they arrive without a completed pre-lab, possess a plagiarized pre-lab or old lab report, have pre-filled observations, or arrive in improper attire. Students are deemed late if they arrive after the start of the pre-lab talk, which contains important safety information. Lab technicians and teaching assistants have the right to eject students from the lab under appropriate circumstances.

**NOTE:** There may be an opportunity to replace the grade of NGR, by writing a short quiz based on the missed lab. This quiz only replaces the grade of NGR, and the missed lab still counts towards your limit of two missed labs. See next page.

Students who complete less than 3 experiments and reports will receive a maximum course grade of 45.

Exams are multiple-choice and consist of both lecture and lab questions. No electronic devices of any sort, including calculators, are allowed during tests and exams. Course marks are calculated as described in this outline, and will not be adjusted on an individual basis.

**Plagiarism:** Students must write their lab reports, essays and assignments in their own words. Whenever students take an idea, or a passage 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** (for more info go to <http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf>).

*Tests and exams will be checked with software that checks for unusual coincidences in answer patterns that may indicate cheating. Appropriate academic penalties will be applied to all confirmed instances of cheating in the course.*

---

## Student Development Centre

Students are encouraged to make use of the free, study-skills courses and other services provided by the Student Development Centre, <http://www.sdc.uwo.ca>.

## ***Missed course components due to legitimate reasons***

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to your Dean's Office as soon as possible and contact your instructor immediately. It is the responsibility of the student to make alternative arrangements, if applicable, with his or her instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from your Dean's Office immediately. For further information please consult the university's medical illness policy at <http://www.uwo.ca/univsec/handbook/appeals/medical.pdf>.

A student requiring academic accommodation due to illness should use the Student Medical Certificate ([https://studentservices.uwo.ca/secure/medical\\_document.pdf](https://studentservices.uwo.ca/secure/medical_document.pdf)) when visiting an off-campus medical facility. For visits to Student Health Services, request a Record's Release Form, which is located in the Dean's Office.

## ***Missed labs***

**There are no make-up labs, and it is not possible to reschedule labs.** Students who cannot attend a lab, for any reason, will initially be assigned an NGR (No Grade) for the corresponding lab. If the Dean's Office has approved your circumstances, the NGR may be replaced by writing a short, paper quiz based on the missed lab. The student must do all three of the following in a timely manner:

1. Submit the appropriate documentation to your Dean's Office;
2. Download and submit a *Missed Lab Application*; and
3. Write the proper lab quiz at the end of the term.

The mark obtained on the lab quiz only serves to replace your experiment mark of NGR. It does not count as an experiment that has been performed, and it is still necessary to perform at least three experiments to be able to pass the course.

Legitimate absences generally include medical and compassionate reasons. Academic misconduct, arriving late (defined as arriving after the start of the prelab talk) or in improper attire, or missing the lab due to a conflict with a test/exam in another course, are not legitimate reasons and students will not be allowed to write the missed lab quiz to replace the mark of NGR. University policy specifies that an instructor who holds a test/exam at the same time as your regularly scheduled class, lab, or tutorial must accommodate you.

## ***Missed term test or exam***

There are no make-up term tests. If you miss the term test, the final exam will be worth 85% of your course grade.

If you miss the final exam, please contact your Dean's Office to obtain approval for the SPC exam. It is Faculty of Science policy that a student who chooses to write a test or exam while ill (physically or emotionally) is deemed medically fit enough to write, and the student must accept the mark obtained.

In accordance with Registrar guidelines, we will approve an SPC if you have three exams in three consecutive periods (e.g. 2 pm, 7 pm, 9 am). However, we will not authorize SPC exams for those with three exams in four or more periods, nor for those with conflicts. The Registrar will accommodate conflicts in designated conflict rooms.

## Laboratory Schedule

All labs are carried out in Chemistry Building 111 and 112 (first floor). You **must** attend the lab section and room to which you are assigned. The assigned section may differ from your section of first registration. **Check the course website on the weekend of Sept 13 for your assigned section and lab room.**

Laboratory	Experiment	Sections 003 – 011a, 20, 22, 24, 26	Sect 011b, 012 – 019, 21, 23, 25, 27
Experiment 1A & B	Melting Point Determination and Recrystallization	Week of Sept. 15	Week of Sept. 22
Experiment 2	Separation of a Mixture by Extraction	Week of Sept. 29	Week of Oct. 6
<b>NOTE: There are no labs during the Week of October 13 because of the Thanksgiving holiday!</b>			
Experiment 3	Synthesis of Cyclohexene and Tests for Unsaturation	Week of Oct. 20	Week of Oct. 27
Experiment 4	Preparation and Reactions of Alkyl Halides	Week of Nov. 3	Week of Nov. 10
Experiment 5	Tests for Carbonyl Compounds and the Synthesis of Aspirin	Week of Nov. 17	Week of Nov. 24

## Approximate Lecture Outline

Chapter & Section references are to *Introduction to Organic Chemistry, 3<sup>rd</sup> Edition* (2005) by W. H. Brown and T. Poon.

### Week 1: Chap 1, 1.1 to 1.8

- Structure of atoms, bonding, molecular orbitals, shapes of molecules, resonance, arrow conventions, functional groups

### Week 2: Chap 2, 2.1 - 2.6 (not 2.7)

- Bronsted-Lowry Acids and Bases, factors affecting acidity: inductive effects and electron withdrawing groups, electronegativity, resonance.

### Week 2-3: Chap 3, 3.1 - 3.11

- ALKANES and CYCLOALKANES: Structure, constitutional isomerism, cycloalkanes, conformations, cis-trans isomerism in cycloalkanes, properties, reactions, sources.

### Week 3-4: Chap 4, 4.1 - 4.5; Chap 5, 5.1 – 5.5

- ALKENES AND ALKYNES: Structure, geometrical isomerism, terpenes, reactions

### Week 5-6: Chap 6, 6.1 - 6.11; Chap 11, 11.1 - 11.5; Chap 12, 12.1 - 12.5, 12.10

- STEREOMERISM: Chirality, enantiomers, properties, optical activity, resolution of enantiomers.
- SPECTROSCOPY: Infrared (IR) and <sup>13</sup>C Nuclear Magnetic Resonance (NMR) spectroscopy

**Week 7: Chap 7, 7.1 – 7.10**

- HALOALKANES: physical properties, nucleophilic substitutions, elimination reactions

**Week 8: Chap 8, 8.1 – 8.7**

- ALCOHOLS, ETHERS and THIOLS: physical properties, chemical reactions, epoxides, reactions of thiols

**Week 9: Chap 9, 9.1 - 9.7, 9.9 (not 9.8)**

- BENZENE and DERIVATIVES: Structure, nomenclature, resonance, reactivity, electrophilic aromatic substitution, phenols

**Week 10: Chap 10, 10.1 - 10.6 (not 10.7, 10.8)**

- AMINES: Structure, physical properties, basicity, reactions

**Week 10 - 11: Chap 12, 12.6 – 12.9, 12.11, 12.12; Chap 13, 13.1 – 13.11**

- SPECTROSCOPY: <sup>1</sup>H NMR
- ALDEHYDES and KETONES: Structure, nomenclature, physical properties, chemical reactions, addition of carbon nucleophiles, acetals, tautomerism, reductive amination

**Week 12: Chap 14, 14.1 – 14.9; Chap 15, 15.1 – 15.9**

- CARBOXYLIC ACIDS and DERIVATIVES: Structure, physical properties, chemical reactions, derivatives, decarboxylation, Fischer esterification.

**Keys to Success in Chem 2213a**

- Organic chemistry (to a much greater extent than year-1 chemistry) is rigorously cumulative. Therefore  
ϕ EARLY AND CONSISTENT STUDY IS ESSENTIAL
- Collect and maintain a good set of lecture notes. Partial lecture notes are available on the web, but they need to be supplemented by lecture material. Attend class, add information to the outline notes, and  
ϕ STUDY AND UNDERSTAND THE LECTURE MATERIAL
- To access and print out the outline notes, access the course website:

<http://instruct.uwo.ca/chemistry/2213>

- Success on tests and exams requires that you understand course material and know how to apply it in a variety of ways. Organic chemistry is not primarily a memorization course
- Solve and UNDERSTAND the solution strategies to assigned problems. Review past tests to learn how to apply knowledge to problems; do not memorize specific question types. Attend tutorials and review sessions for assistance.
- Prepare for, and attend, all laboratory periods.
- Take an interest in learning course material. **Organic chemistry is interesting and relevant to everyone's life, especially those with an interest in the life sciences.**

“The language of chemistry- an international language, a language without dialects, a language for all of time, and a language that explains where we came from, what we are, and where the physical world will allow us to go” (Nobel Prize Winner Arthur Kornberg, 2000)