Chem 2513: Introductory Organic Chemistry I

Instructor/Contact	Teri Gullon, teri.gullon@acadiau.ca (A); Dr. Matthew Lukeman, matthew.lukeman@acadiau.ca (B)
Office and Office Hours	ELL 322 (Teri) T/Th 10-11:30am; ELL 215 (Dr. Lukeman) M 1:30-4:30pm. Both sections are welcome to attend either office hours
Lecture	MWF 8:30-9:30 (Section A); MWF 11:30-12:30 (Section B)

Book (Optional): ***Organic Chemistry*** by Solomons and Fryhle, J Wiley and Sons, 11th Edition– NOTE: Any edition of the text is acceptable. (Chapter 1-11, except parts of Chapter 9) Another recommended/alternative book: ***Organic Chemistry as a Second Language*** (1st semester topics) by David Klein (not available at the bookstore)

Description: This is an introductory course in organic chemistry. Topics to be examined include: organic structure and nomenclature (alkane, alkene, alkyne, alcohols, alkyl halides), basic functional groups and IR spectroscopy, isomerism, stereochemistry, and an introduction to synthesis, reactions and reaction mechanisms. Structure and function will be emphasized.

Requirements: The prerequisite for this course is CHEM 1023 or CHEM 1123 with a minimum grade of C-. Since chemistry is a laboratory science, the laboratory for this class is an integral part of the course. You must obtain a passing grade in the laboratory to pass the course. You will be expected to complete ALL laboratory experiments by attending ALL pre-lab sessions and the corresponding laboratory classes. You will also have to write up these laboratories according to a specified format and hand them in to be marked at specified times. Unexcused absences will result in a zero grade for that particular laboratory session. If you have more than one unexcused absence from the laboratory, you will be assigned a failing grade for the course.

Course Material: REQUIRED: Lab coat, safety glasses, lab book, lab manual (current year) RECOMMENDED: Textbook (Solomon and Fryhle), Molecular Model Kit, Sapling Learning

Grading	Sapling Homework 5 % Labs 15 % Mid Term Exams 40% Final Exam 40%	OR	Labs 15 % Mid Term Exams 40% Final Exam 45%

Organization: Lectures will be delivered primarily by PowerPoint presentations. Modified Lectures in pdf format will be posted in the Notes section of this Course Website (Acorn). Practice problems (not to be marked) will be posted on the Course Assignment page of this Course Website. You will have the option of registering in Sapling Learning (highly recommended) for homework. The Sapling homework is worth 5%; if you opt out then the final exam will be worth 45% (see Grading). LATE HOMEWORK WILL NOT BE ACCEPTED. No mid-term make up tests will be given in this course. If you feel you have a valid reason for missing a test, please send the documents to Registrar's office. **Only Registrar's note of excuse will be accepted for all course work**. A missed test with no valid reason by the deadline will count as zero. An excused test will be eligible for replacement with the final examination grade. Only ONE midterm test may be replaced in this way. The course will terminate in a written 3 h examination date TBA.

Miscellaneous: During the course of the term, tutorial sessions MAY be held. Additional recorded lectures are available as a resource through Acorn.

Midterm Dates:
Oct 9th 7pm
Nov 13th 7pm
Early writes will be available for both midterms WITH permission

Disability Access: If you are a student with a documented disability who anticipates needing accommodations in this course, please inform me after you meet *Jill Davies (902-585-1127)* or *Kathy O'Rourke (902-585-1823)* in Disability Access Services, Student Resource Centre, lower floor of the Old SUB (Old Student Union Building).

Topics Covered:

Chapter 1: Review of Lewis structures, Valence Bond theory, resonance structures, molecular shapes, bond and molecular polarity, bond-line and condensed structural formulae.
Chapter 2: Survey of organic functional groups, intermolecular forces, and the use of IR spectroscopy to identify functional groups.
Chapter 3: Acid-base chemistry of organic molecules, curved arrow notation, factors that affect acid strength, nucleophiles and electrophiles, introduction to reactive intermediates (carbocations and carbanions).
Chapter 4: IUPAC nomenclature, stability and boiling points in alkanes, alkane conformations (Newman projections), conformations of cycloalkanes, ring-flipping in cyclohexane chair conformations, strain in organic molecules, ^{13}C NMR spectroscopy.
Chapter 5: Chirality and optical rotation, R/S naming, enantiomers and diastereomers, Fischer projections.
Chapter 6: Nucleophilic substitution reactions, S_N1, S_N2, E1, and E2 mechanisms, factors that control competition between S_N1, E1, S_N2, and E2.
Chapter 7: Alkene bonding, E/Z isomerism, and stability; mechanism of dehydration of alcohols; Zaitzev's rule; carbocation rearrangements; mechanism of dehydrohalogenation; Hoffman's rule; anti-coplanar elimination restriction; elimination to produce alkynes; terminal alkyne acidity; acetylides as nucleophiles; S_N1 and S_N2 reactions of alcohols; halogenation of alcohols with $SOCl_2$ and PBr_3.
Chapter 8: Hydrogenation of alkenes and alkynes; poisoned catalysts; dissolving metal reduction of alkynes; addition of HX to alkenes and alkynes; alkene hydration; Markovnikov's rule; rearrangements; oxymercuration/demercuration of alkenes; hydroboration/oxidation of alkenes; addition of halogens to alkenes and alkynes; carbene addition to alkenes; oxidation of alkenes to vic-diols; oxidative cleavage of alkenes and alkynes. For all reactions, the mechanism and stereochemistry is discussed thoroughly.
Chapter 10: Heterolysis and homolysis; nature of free radicals; mechanism of radical halogenation of alkanes; chain mechanisms; radical addition of HBr to alkenes and mechanism; mechanism of dissolving metal reduction; radical polymerization; lipid peroxidation.
Chapter 11: Synthesis of sulfonate esters; sulfonate esters as leaving groups; Williamson ether synthesis; alkoxymercuration/demercuration; protection of alcohols as tBu ethers; cleavage of ethers with HX; protection of alcohols as silyl ethers; deprotection of silyl ethers; epoxidation; acid and base-catalyzed ring opening of epoxides.