



**Course Outline**

**ENVIRONMENTAL**  
**TECHNOLOGY**

**ENVT 251**  
**FOUNDATIONS IN ENVIRONMENTAL CHEMISTRY**  
**FALL 2012**

**3 CREDITS**  
**3 HOURS LECTURE, 2 HOURS SEMINAR**

**INSTRUCTOR: DR. BLAINE LEGAREE**

**INSTRUCTOR:** Dr. Blaine Legaree

**PHONE NUMBER:** (780) 792-5616

**E-MAIL:** blaine.legaree@keyano.ca

**OFFICE NUMBER:** S209D

**OFFICE HOURS:** Tuesdays 10:00 – 11:00 AM  
Wednesdays 9:00 – 10:00 AM; 12:00 – 1:00 PM  
Fridays 9:00 – 11:00 AM

*If you cannot visit during office hours you may wish to set up an appointment.*

**HOURS OF INSTRUCTION:**

<b>Lectures:</b>	Tuesdays	1:00 – 2:50 PM	Room S112
	Fridays	8:00 – 8:50 AM	Room S112
<b>Seminar:</b>	Wednesdays	10:00 – 11:50 AM	Room S112

*Seminars will be used for problem solving, chapter review, and group project presentations. Occasionally there will be a short quiz. **Attendance is mandatory.***

### **COURSE DESCRIPTION:**

The course provides a basic understanding of organic chemistry, with an emphasis on the impact of organic compounds in our life and the surrounding environment. The topics covered in the first half of the course are aimed to introduce the important tools of organic chemistry: bonding, isomers, conformational analysis, and stereochemistry. The second half of the course consists in a systematic description of organic compounds based on their functional group, highlighting the correct nomenclature and chemical reactivity.

**PRE-REQUISITE(S):** ENVT 151

### **COURSE OUTCOMES:**

Upon successful completion of this course, the student will be able to:

1. Distinguish between different classes of organic chemistry compounds and name them using proper nomenclature rules
2. Use molecular model kits for understanding conformations and stereoisomers of alkanes, cycloalkanes, alkenes and other compounds
3. Correlate the hybridization of carbon atoms with the molecular structure and the chemical properties of organic compounds
4. Be able to work in groups on assignments regarding organic compounds of significant impact on the environment
5. Understand basic organic chemistry mechanisms, including radicalic substitution, electrophilic addition, nucleophilic substitution/elimination, nucleophilic addition, and electrophilic aromatic substitution

**REQUIRED RESOURCES:**

1. **Organic Chemistry: A Short Course**; Hart, Hadad, Craine, Hart; Brooks/Cole, Cengage Learning, 2012 (13<sup>th</sup> edition).

*Available electronically at [NelsonBrain.com](http://NelsonBrain.com)*

2. **Molecular Visions Molecular Model Kit (Darling)** on sale in the bookstore.

*In case you wish to share costs, one half of a Molecular visions kit will give enough models. Alternate models are acceptable as long as they give ball-&-stick models that can be rotated about the bonds, with plenty of 109° and 120° bond angles.*

3. Other chemistry texts may also be helpful, but please consult with your instructor.

*(E.g. **Foundations of College Chemistry**; by Hein & Arena will be useful for review purposes and covers some basic concepts of organic chemistry.)*

**ADDITIONAL RESOURCES:**

**MOODLE:** Go to <http://ilearn.keyano.ca>

This course is supported through **Moodle**. The course syllabus, lecture notes, study questions, weblinks, PowerPoints and other electronic resources will be made available to you on **Moodle**.

*\* It is recommended that you download or print the lecture notes **before** coming to class.*

***Other Texts on Library Reserve:***

Introduction to Organic Chemistry, Streitwieser and Heathcock; QD251.2 S915

*(This text is more advanced, but is particularly good reference and useful for alternative explanations of course material.)*

Chemistry, Zumdahl; QD31.2 Z95

*This is a general chemistry textbook.*

***Problem Sets:***

Practise questions will be posted throughout the duration of the course that will help you learn the material and prepare for examinations. It is the student's responsibility to complete each problem set in time to check the solutions. Solutions will be posted on Moodle shortly after the problem set is issued.

**TOPICS TO BE COVERED:**

**Please Note:** This course outline may be modified to facilitate unforeseen time constraints. Date and time allotted to each topic is subject to change.

<b><u>Lecture Topic</u></b>	<b><u>Textbook</u></b>
<b>1. REVIEW OF ENVT 151</b> Atoms, Compounds and Intermolecular Forces Chemical Equations and Stoichiometry Solutions and Solubility Acids, Bases and Salts	<i>Refer to your ENVT 151 textbook and ENVT 251 course notes.</i>
<b>2. BONDING, ISOMERS, CONFORMERS</b> Ionic and covalent bonding, valence Isomers, formal charge Hybridization, classification of organic compounds Alkanes – nomenclature and properties	Ch.1.1-1.7 1.8-1.13 1.15-1.18 2.1-2.7, 2.12
<b>3. CHEMISTRY OF HYDROCARBONS</b> Alkenes, alkynes – nomenclature and isomerism Alkenes – addition and oxidation reactions Alkynes – addition reactions and acidity Aromatic compounds – nomenclature and aromaticity Aromatic compounds – electrophilic aromatic substitution	3.1-3.5 3.6-3.17 3.18-3.21 4.1-4.7, 4.13 4.8-4.12
<b>4. STEREOCHEMISTRY</b> Chirality and enantiomers Properties of enantiomers	5.1-5.5 5.6-5.12
<b>5. NUCLEOPHILIC SUBSTITUTION / ELIMINATION REACTIONS</b> Nucleophilic substitution reactions (SN1, SN2) Eliminations reactions (E1, E2)	6.1-6.6 6.7-6.8
<b>6. CHEMISTRY OF ORGANIC COMPOUNDS</b> Alcohols and phenols – nomenclature and properties Thiols – properties Amines – nomenclature and properties Aldehydes and ketons – nomenclature and properties Carboxylic acids and their derivatives – nomenclature and properties	7.1-7.16 7.17 11.1-11.8 9.1-9.13 10.1-10.21

**EVALUATION:**

<b>Weekly Assignments &amp; Quizzes</b>	<b>20%</b>	Due Weekly
<b>Group Project</b>	<b>20%</b>	TBA
<b>Midterm Examination</b>	<b>25%</b>	Tues, Oct 16 <sup>th</sup> , 2012
<b>Final Examination</b>	<b>35%</b>	<i>Date to be set by the Registrar</i>

*Students who do not complete all the required work should not expect to pass the course.*

- Weekly Assignments and Quizzes will be handed out during the seminars. Quizzes will be announced in advance. Credit will not be given for quizzes missed due to absence. *Assignments submitted late will not normally be accepted for grading.*
- Group Project: Students will be assigned a research paper related to environmental chemistry. Marks will be awarded for a written report, PowerPoint presentation, and evaluation of projects by other groups.
- Exams are based on material covered in lectures, seminars, assignments, problem sets, and quizzes. The final exam is cumulative.

The final lecture examination **must** be written in order to complete this course. (Note: **travel plans will not be accepted as a valid excuse for missing a final exam.**)

Students should consult: <http://keyano.ca/current-students/students/exams>

**Note:** Lectures, study questions, lab assignments, and textbook readings are all designed to help you succeed in this course. **Completing assignments and attending lectures are essential to your success. Students who do not complete all the required work should not expect to pass the course.** Good study habits, such as reviewing material in advance of the midterms and participating in class, will also aid your efforts.

**GRADING SYSTEM:**

Letter Grade	Description	Grade Points
A+		4
A	Excellent	4
A-		3.7
B+		3.3
B	Good	3
B-		2.7
C+		2.3
C	Satisfactory	2
C-		1.7
D+		1.3
D	Minimal Pass	1
F	Failure	0

Students intending to transfer to other institutions should strive for a 'C-' as a minimum.

Transfer information on each course is available at the [Alberta Council on Admission and Transfers](#).

**IMPORTANT DATES:**

Sept 3	Labour Day (no classes)
Sept 18	Courses dropped after this date will be designated “W”. (A withdrawal (W) is not reflected in your GPA)
Oct 8	Thanksgiving (no classes)
Oct 26	Courses dropped after this date will be designated “WF”. (A withdrawal failure (WF) counts as a 0 in your GPA)
Nov 12	Holiday in place of Remembrance Day (no classes)
Dec 7	Last day of classes
Dec10-19	Final Exams

**CLASSROOM POLICIES:**

- **Regular attendance is expected at lectures and attendance will be taken.** The lectures will often include material which is not in your textbook or the emphasis in class may differ from that in the text; you will be responsible for the material taught. Notes and PowerPoints should be thought of as **study guides**: you must take additional notes in class to do well!
- **University Studies Department Policy on Cell Phones and Other Electronic Devices:**  
Except by express permission of the instructor, cell phones and other electronic devices:
  - a) must be turned off and unavailable for use during class;
  - b) must be turned off and stored in a designated area during all exams;

## COLLEGE POLICIES

### Equality, Equity and Respect

The Keyano College is committed to providing an environment of equality, equity and respect for all people within the College community. All members of this community are considered partners in developing teaching and learning contexts that are welcoming to all. Faculty, staff, and students are encouraged to use inclusive language to create a classroom atmosphere in which students' experiences and views are treated with equal respect and valued in relation to their gender, ethnic and cultural background, and sexual orientation.

*Students should consult:* <http://keyano.ca/current-students/individual-rights>

### Plagiarism and Cheating

Every student expects to be treated and evaluated fairly in a course. Plagiarism and cheating robs everyone of this right.

No student may submit words, ideas or data of another student or person as his or her own in any writing, project, assignment, quiz, electronic presentation, exam etc. Any work used that is not the student's own must be clearly cited as belonging to someone else. There are penalties for using other's work and not citing it. The Student's Rights & Responsibilities document clearly outlines these penalties and the appeal process.

- No learner can obtain information from another student during an exam.
- No learner can bring unauthorized information (paper or electronic) into an exam or quiz.
- No student can submit work done in another course for grading in this course without the written prior approval of the course instructor.
- No student can submit copyright protected or commercially produced materials as part or all of an assignment without proper citation & permission.

### Student Rights & Responsibilities

Students should consult the Keyano College Credit Calendar or online at:

[http://keyano.ca/sites/default/files/a\\_files/calendars/keyano.calendar.credit\(2012-2013\).pdf](http://keyano.ca/sites/default/files/a_files/calendars/keyano.calendar.credit(2012-2013).pdf)

### Specialized Supports and Duty to Accommodate

*Disability Support Services: Learner Assistance Program*

If you have a documented disability or you think that you would benefit from some assistance from a Disabilities Counsellor, please call or visit the Disability Supports Office 780-792-5608 to book an appointment (across from the library). Services and accommodations are intended to assist you in your program of study, while maintaining the academic standards of Keyano College. We can be of assistance to you in disclosing your disability to your instructor, providing accommodations, and supporting your overall success at Keyano College.

*Specialized Supports and Duty to Accommodate*

Specialized Support and Duty to Accommodate are aligned with the office of Disability Support Services: Learner Assistance Program (LAP) guided by federal and provincial human rights legislation, and defined by a number of Keyano College policies. Keyano College is obligated by legislation to provide disability-related accommodations to students with identified disabilities to the point of undue hardship.