



Grande Prairie Regional College  
 Department of Science: Chemistry  
 Forty-Fifth Session: 2010 – 2011

## Course Outline: Organic Chemistry CH2610 A3

**CH2610 A3:** Organic Chemistry I; Prerequisite, CH1010 or CH1030

**INSTRUCTOR:** Dr. John P. Sloan  
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 WileyPlus Web Site: <https://edugen.wiley.com/edugen/secure/index.uni>

**LECTURE:** CH2610 T, R 13:00 – 14:20 in D308

### TRANSFERABILITY/ALBERTA TRANSFER CREDIT

(Ref: 2010-2011 Guide to Transfer Credit at Alberta Post-Secondary Institutions)

GPRC:	CH2610 (3)
U of Alberta:	CHEM 261 (3) or AUCHE 250 (3)
U of Calgary:	CHEM 351 (3)
U of Lethbridge:	CHEM 2500 (3)
Athabasca U:	CHEM 350 (3)
Canadian UC:	CHEM 241 (4)
Concordia UC:	CHEM 261 (3)
Grant MacEwan University:	CHEM 261 (3)
King's University College:	CHEM 3xx (3)

Also, the transfer guide listing is as follows:

- [Athabasca University: CHEM 350 \(3\)](#)
- [Canadian University College: CHEM 241 \(4\)](#)
- [Concordia University College of Alberta: CH 261 \(3\)](#)
- [Grant MacEwan University: CHEM 261 \(3\)](#)
- [King's University College, The: CHEM 3xx \(3\)](#)
- [University of Alberta: CHEM 261 \(3\) OR AUCHE 250 \(3\)](#)
- [University of Calgary: CHEM 351 \(3\)](#)
- [University of Lethbridge, The: CHEM 2500 \(3\)](#)

**COURSE DESCRIPTION:****LECTURE COMPONENT:**

A study of the fundamental principles of the chemistry of carbon compounds. The study is based on a reaction mechanism approach to the functional group chemistry of alkanes, alkenes, alkynes, cycloalkanes, alkyl halides, alcohols and ethers. Topics include: structure and bonding; physical properties; acidity and basicity; conformations of molecules; stereochemistry; addition, elimination and substitution reactions; structure-reactivity relationships; and introduction to methods for structure determination.

A representative selection of molecules found in agricultural, biological, environmental, industrial, medical, and pharmaceutical applications of organic chemistry will be discussed, e.g., molecules found in agrochemicals, fibres, food additives, perfumes, polymers, and prescription drugs.

**LABORATORY COMPONENT:**

Laboratory Techniques in organic chemistry; preparation of some organic compounds, and; methods of qualitative organic analysis.

**TUTORIAL COMPONENT:**

The weekly seminars will be for problem solving, and discussion sessions. Weekly assignments will be given in two formats, namely:

1. Grading Assignments: WileyPlus Interactive-On-Line-Assignments, including on-line grading, and;
2. Non-Grading Assignments: WileyPlus and/or Moodle Ten-Question-Assignments for completion On-Line or through Hand-Writing.

Detailed solutions to the, "Ten-Question-Assignments", will be posted on WileyPlus and/or Moodle after the due dates for the assignments. The WileyPlus web site is: <https://edugen.wiley.com/edugen/secure/index.uni>

**NOTES:**

1. Lectures, Time and Place  
CH2610 A2            T, R   13:00 - 14:20 in D308
2. Laboratory Component, Time and Place  
CH2610 L1            M   14:30 - 17:20 in J116  
CH2610 L2            T   14:30 - 17:20 in J116  
CH2610 L3            W   14:30 - 17:20 in J116
3. Tutorial Component, Time and Place  
CH2610 S1            F     8:30 - 9:20 in J201  
CH2610 S2            F   10:00 - 10:00 in J201
4. Office Hours: Individual and group assistance will normally be available in office J207 during regular college business hours outside of formal class lecture, laboratory and tutorial hours.

**TEXT BOOKS AND LABORATORY ITEMS:**

The following text book is required:

**CH2610**

Solomons, T.W.G., and C.B. Fryhle, *Organic Chemistry*, 10th Edition, Wiley, 2011, including access to the WileyPlus web site at: <https://edugen.wiley.com/edugen/secure/index.uni>.

**And**

A Three Ring Binder to Hold: Sloan, J.P., *Organic Chemistry Experiments, Chemistry 2610/2630*, Grande Prairie Regional College, 2010/2011.

**Molecular Models are highly recommended, namely:**

Molecular Model Set for Organic Chemistry, Prentice Hall.

**Study Guides, Solutions Manuals, and Wiley Plus are supplementary items, namely:**

1. Fernandez, J.E., and Solomons, T.W.G., *Study Guide and Solutions Manual to Organic Chemistry*, 10th Edition, 2011;
2. Wiley Plus at the web site: <https://edugen.wiley.com/edugen/secure/index.uni>

**Note:**

1. All required and supplementary books, molecular structure model sets, safety glasses, and lab coats are available at the College Bookstore. *Organic Chemistry Experiments*, by J.P. Sloan, will be given as handouts in advance of each lab period. These are to be inserted in a three ring binder.

**GRADING CRITERIA/EVALUATION:**

## Examination Schedule and Composition of the Final Grade:

1.	Midterm Exam # 1, Friday February 18 -----	20%
2.	Midterm Exam # 2, Friday March 25 -----	20%
2.	Final Exam to be scheduled between April 14 – 27 -----	30%
3.	Laboratory -----	20%
4.	Tutorial Grading Component -----	<u>10%</u>
		100%

The Grades are based on the alpha grading system. The Registrar's Office will convert alpha grades to four-point equivalence for the calculation of grade point averages. Alpha grades, 4-point equivalence, and grade descriptors are as follows:

<b>Alpha Grade</b>	<b>4-Point Equivalence</b>	<b>Percentage Guidelines</b>	<b>Descriptor</b>
A <sup>+</sup>	4.0	90 – 100	Excellent
A	4.0	85 – 90	
A-	3.7	80 – 84	Very Good First Class Standing
B+	3.3	77 – 79	
B	3.0	73 – 76	Good
B-	2.7	70 – 72	
C+	2.3	67 – 69	Satisfactory
C	2.0	63 – 66	
C-	1.7	60 – 62	
D+	1.3	55 – 59	Poor*
D	1.0	50 – 54	Minimal Pass*
F	0.0	0 – 49	Failure
WF	0.0	0	Fail, withdraw after the deadline

\* Other post secondary institutions may not award transfer credit for grades of D and D+.

**Grading Notes, and Student Responsibilities and Requirements:**

1. The Mid-Term Exams will be of 2 hours duration and the Final Exam will be of 3 hours duration.
2. Between 5 and 15% of exam content will be taken from a combination of weekly assignments, Wiley Plus, and questions in the organic chemistry textbook by Solomons and Fryhle.
3. A pass grade is essential for the Laboratory Component.
4. The Tutorial Grading Component will contribute to 10% of the final grade and will consist of:
  - 4.1 WileyPlus On-Line-Assignments. These assignments will be automatically graded On-Line.
5. Assistance with course material will be given upon request.
6. Students are responsible for completing all course material.
7. Regular attendance in Lecture, Laboratory, and Tutorial Components is a Course Requirement.

**Grande Prairie Regional College Calendar 2010 - 2011: Course Description (p 177).****CH2610 3(3-1-3)UT, 105 Hours, Organic Chemistry I**

The correlation of structure and chemical bonding in carbon compounds with the physical properties and chemical reactivity of organic molecules. Discussion will be based on functional groups with emphasis on hydrocarbons and derivatives that contain halogens, oxygen, sulfur and the hydroxyl group. Introduction to stereochemistry, three dimensional structures, reaction mechanisms, especially addition to double bonds, nucleophilic substitution and elimination reactions, and methods of structure determination. The study covers the functional group chemistry of alkanes, alkenes, alkynes, alcohols, ethers and sulfides.

Prerequisites: CH1010 or CH1030

Notes: Credit will be granted for only one of CH1610 or CH2610.

Transfer: UA, UC, UL, AU\*, AF, CU, CUC, KUC\*

**STATEMENT ON PLAGIARISM AND CHEATING:**

Please refer to pages 48-49 of the College calendar regarding plagiarism, cheating and the resultant penalties. These are serious issues and will be dealt with severely.

## **COURSE LAYOUT: CHEMISTRY 2610: Timetable, Reading, Studying, and Practice Problems**

All references are to T.W.G. Solomons and C.B. Fryhle, *Organic Chemistry*, **10th Edition, Wiley, 2011.**

### **Winter Semester**

Weeks of Jan 5 & 10: THE BASICS: Bonding and Molecular Structure: Read and Study Chapter 1.

### **Graded Assignments through automatic On-Line-Grading.**

You are required to complete the interactive WileyPlus On-Line-Assignments. These assignments will be automatically graded On-Line.

### **Non-Graded Assignments and Practice Problems.**

You are encouraged to work all of the in-chapter problems; the John Sloan assignments 1-10; and the Mastery-On-Line-Multiple-Choice-Assignments – “Clicking” the “Reset” button results in a new set of “Mastery”, multiple choice questions on the same topic. The, “John Sloan”, and, “Mastery”, assignments are for learning and practice, and will not be graded.

### **WileyPLUS Exercises, Questions, and Mastery Assignments.**

The problem types and resources in WileyPLUS are designed to enable and support problem-solving, skill development, and conceptual understanding of organic chemistry. The coverage of WileyPLUS includes:

1. End of Chapter Exercises: many of the exercises are algorithmic, feature structure drawing using Marvin-Sketch, and provide immediate answer feed-back to students.
2. Test Bank Questions consisting of over 3,000 questions.
3. Prebuilt concept mastery assignments, organized by topic and concept, and featuring answer feedback.

### **The Value of Doing Problems in Organic Chemistry.**

Routinely doing problems in organic chemistry leads to understanding of the theory, and good grades in organic chemistry. In the words of Solomons and Fryhle:

*“One way to check your progress is to work each of the in-chapter problems when you come to it. These problems have been written just for this purpose and are designed to help you decide whether or not you understand the material that has just been explained.”*

And, in the words of Wade:

*“It’s easy to fool yourself into thinking you understand organic chemistry when you actually do not. As you read through this book, all the facts and ideas may make sense, yet you have not learned to combine and use those facts and ideas. An examination is a painful time to learn that you do not really understand the material.*

*The best way to understand organic chemistry is to use it. You will certainly need to read and reread all the material in the chapter, but this level of understanding is just the beginning. Problems are provided so you can work with the ideas, applying them to new compounds and new reactions that you have never seen before. By working problems, you force yourself to use the material and fill in the gaps in your understanding. You also increase your level of self-confidence and your ability to do well on exams”.*

Problems/Page #’s	In-Chapter	1.1 to 1.25
47	End of Chapter	1.26 to 1.50
50	Challenge Problems	1.46 to 1.50
51	Learning Group Problems	1 to 8

Week of Jan 17: FAMILIES of CARBON COMPOUNDS: Functional Groups, Intermolecular Forces, and Infrared (IR) Spectroscopy. Read and Study Chapter 2.

Problems/Page #’s	In-Chapter	2.1 to 2.28
93	End of Chapter	2.29 to 2.54
96	Challenge Problems	2.55 to 2.58
96	Learning Group Problems	1 to 8

Week of Jan 24: AN INTRODUCTION TO ORGANIC REACTIONS and THEIR MECHANISMS: ACIDS AND BASES IN ORGANIC CHEMISTRY. Read and Study Chapter 3.

Problems/Page #’s	In-Chapter	3.1 to 3.17
132	End of Chapter	3.18 to 3.40
134	Challenge Problems	3.41 to 3.45
135	Learning Group Problems	1 to 4

Week of Jan 31: NOMENCLATURE AND CONFORMATIONS OF ALKANES AND CYCLOALKANES. Read and Study Chapter 4

Problems/Page #’s	In-Chapter	4.1 to 4.22
182	End of Chapter	4.23 to 4.46
184	Challenge Problems	4.47 to 4.51
180	Learning Group Problems	1 to 4

Week of Feb 7: STEREOCHEMISTRY: CHIRAL MOLECULES. Read and Study Chapter 5.

Problems/Page #’s	In-Chapter	5.1 to 5.32
225	End of Chapter	5.33 to 5.49
228	Challenge Problems	5.50 to 5.53
228	Learning Group Problems	1 to 3

Additional Problems - The CD accompanying the text book includes a set of computer molecular model stereochemistry exercises that are keyed to the text

Weeks of Feb 14: IONIC REACTIONS: Nucleophilic Substitution and Elimination Reactions of Alkyl Halides. Read and Study Chapter 6.

Problems/Page #’s	In-Chapter	6.1 to 6.19
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277	End of Chapter	6.20 to 6.47
282	Challenge Problems	6.48 to 6.56
283	Learning Group Problems	1 to 2

Week of Feb 21: Family Day and Winter Break: No Classes.

Week of Feb 28: ALKENES AND ALKYNES I: Properties and Synthesis.  
Elimination Reactions of Alkyl Halides. Read and Study Chapter 7.

Problems/Page #/s:	In-Chapter	7.1 to 7.24
323	End of Chapter	7.25 to 7.48
327	Challenge Problems	7.49 to 7.54
327	Learning Group Problems	1 to 8

Week of March 7: ALKENES AND ALKYNES II: Addition Reactions. Read and Study Chapter 8.

Problems/Page #'s:	In-Chapter	8.1 to 8.25
376	End of Chapter	8.26 to 8.65
381	Challenge Problems	8.66 to 8.70
382	Learning Group Problems	1 to 4

Week of March 14: RADICAL REACTIONS. Read and Study Chapter 10.

Problems/Page #'s:	In-Chapter	10.1 to 10.19
496	End of Chapter	10.20 to 10.33
499	Challenge Problems	10.34 to 10.41
400	Learning Group Problems	1 to 2

Week of March 21: ALCOHOLS AND ETHERS: Synthesis and Reactions. Read and Study Chapter 11.

Problems/Page #'s:	In-Chapter	11.1 to 11.24
541	End of Chapter	11.25 to 11.53
545	Challenge Problems	11.54 to 11.58
546	Learning Group Problems	1 to 3

Week of March 28: ALCOHOLS FROM CARBONYL COMPOUNDS: OXIDATION-REDUCTION AND ORGANOMETALLIC COMPOUNDS. Read and Study Chapter 12.

Problems/Page #'s:	In-Chapter	12.1 to 12.9
576	End of Chapter	12.10 to 12.37
581	Challenge Problems	12.38 to 12.40
582	Learning Group Problem	

Week of April 4: CONJUGATED UNSATURATED SYSTEMS. Read and Study Chapter 13.

Problems/Page #'s:	In-Chapter	13.1 to 13.14
624	End of Chapter	13.15 to 13.47
629	Challenge Problems	13.48 to 13.51
630	Learning Group Problems	1 to 2

Week of April 11: Review Class, e.g. review of a Practice Final Exam.