



DEPARTMENT OF SCIENCE

COURSE OUTLINE: CH2610 A3, Organic Chemistry I

INSTRUCTOR: Dr. John P. Sloan **PHONE:** 780-539-2004
OFFICE: Office # J207 **E-MAIL:** jsloan@gprc.ab.ca

OFFICE HOURS: Mon & Wed 10:00 – 11:30 & 13:00 – 14:30; Thursday 14:30 – 16:00.

PREREQUISITE(S)/COREQUISITE: CH1010 or CH1030

REQUIRED TEXT/RESOURCE MATERIALS:

1. 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>.
1. A Three Ring Binder to Hold: Sloan, J.P., *Organic Chemistry Experiments, Chemistry 2610/2630*, Grande Prairie Regional College, 2011/2012.
2. Molecular Models are highly recommended, namely: Molecular Model Set for Organic Chemistry, Prentice Hall.
3. The Study Guide and Solutions Manual is an optional item; namely:
 - 3.1 Fernandez, J.E., and Solomons, T.W.G., *Study Guide and Solutions Manual to Organic Chemistry*, 10th Edition, 2011;

Note: 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 hand outs in advance of each lab period. These are to be inserted in a three ring binder.

CALENDAR DESCRIPTION: CH2610 3(3-1-3)UT, 105 Hours, Organic Chemistry I

The correlation of structure and 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, sulphur and the hydroxyl group. Introduction to stereochemistry, three dimensional structure, 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

CREDIT/CONTACT HOURS: CH2610 3(3-1-3)UT, 105 Hours, Organic Chemistry I

DELIVERY MODE(S): Organic Chemistry I, consists of CH2610 A3, S1 & L1 and is delivered in Lecture, Tutorial and Laboratory Components.

OBJECTIVES (OPTIONAL): The objective of Organic Chemistry I is for students to become proficient in their understanding of the theory of Organic Chemistry as outlined in the Calendar Description and in this Course Outline.

TRANSFERABILITY:

ALBERTA TRANSFER CREDIT

(Ref: Alberta Council of Admissions and Transfers, 2011-2012)

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)
Grant MacEwan U:	CHEM 261 (3)
Athabasca U:	CHEM 350 (3)
Canadian UC:	CHEM 241 (4)
Concordia UC:	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)

GRADING CRITERIA:

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:

Alpha Grade	4-Point Equivalence	Percentage Guidelines	Descriptor
A ⁺	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

* Grades of D and D+ may not be acceptable to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institution to ensure transferability.

EVALUATIONS:

Examination Schedule and Composition of the Final Grade:

1.	Midterm Exam # 1, Friday February 17 -----	20%
2.	Midterm Exam # 2, Friday March 23 -----	20%
2.	Final Exam to be scheduled between April 16 – 26 -----	35%
3.	Laboratory -----	20%
4.	Tutorial Grading Component -----	5%
		<u>100%</u>

Notes:

1. The Mid-Term Exams will be of 1.5 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 5% of the final grade and may consist of two components as determined by the Instructor with input from the class. The two components are;
 - 4.1 Moodle posted assignments consisting of ten questions per assignment, and;
 - 4.2 On-line Wiley Plus tests prepared by the Instructor and marked electronically, with feedback to the students.
5. Assistance with assignments will be given upon request.

STUDENT RESPONSIBILITIES:

Students are responsible for regular attendance in Lecture, Laboratory, and Tutorial Components of the Organic Chemistry I course. They are also responsible for submission of assignments and laboratory reports according to the course policy; and for attending the exams according to the Exam Schedule.

STATEMENT ON PLAGIARISM AND CHEATING:

Refer to the Student Conduct section of the College Admission Guide at

<http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at www.gprc.ab.ca/about/administration/policies/**

**Note: all Academic and Administrative policies are available on the same page.

COURSE SCHEDULE AND TIMELINE:

The Course Schedule consists of Lecture, Laboratory and Tutorial Components. A brief description of these components and the course schedule is as follows:

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:

Problem solving and discussion sessions. Weekly assignments may be given in two formats, namely:

1. Moodle posted assignments consisting of ten questions per assignment, and;
2. On-line Wiley Plus tests prepared by the Instructor and marked electronically, with feedback to the students

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

The Course Schedule is:

- | | | | | | |
|----|---------------------------------------|-----------|------|---------------|---------|
| 1. | Lectures, Time and Place: | CH2610 A3 | T, R | 13:00 - 14:20 | in J203 |
| 2. | Laboratory Component, Time and Place: | CH2610 L1 | M | 14:30 - 17:20 | in J116 |
| | Laboratory Component, Time and Place: | CH2610 L2 | T | 14:30 - 17:20 | in J116 |
| 3. | Tutorial Component, Time and Place: | CH2610 S1 | F | 8:30 - 9:20 | in J201 |
| | Tutorial Component, Time and Place: | CH2610 S1 | F | 10:00 - 11:20 | 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.

TIMELINE: The Timetable for CH 2610 A3, Organic Chemistry I, is as follows:

CH2610 A3, Organic Chemistry I: Schedule for Reading, Studying and Practice Problems

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

WINTER SEMESTER

Weeks of

Jan 5 & 9: THE BASICS: Bonding and Molecular Structure: Read and Study Chapter 1.

Practice Problems: You are encouraged to work all of the in-chapter problems, and you are required to complete the assignments given in-seminar-class, and you may complete additional organic chemistry problems using WileyPlus. 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 16: 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 23: AN INTRODUCTION TO ORGANIC REACTIONS and THEIR MECHANISMS: ACIDS AND BASES IN ORGANIC CHEMISTRY. Read & 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 30: 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 6: STEREOCHEMISTRY: CHIRAL MOLECULES. Read & 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 WileyPlus accompanying the text book includes a set of computer molecular model stereochemistry exercises that are keyed to the text

Weeks of Feb 13: 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
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 20-24: No Classes: Family Day is Feb 20 and Winter Break is Feb 21 – 24.

Week of Feb 27: 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

Week of March 5: ALKENES & ALKYNES II: Addition Reactions. Read & Study Chapter 8.

Problems/Page #':	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 12: RADICAL REACTIONS. Read and Study Chapter 10.

Problems/Page #':	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 19: ALCOHOLS & ETHERS: Synthesis & Reactions. Read & Study Chapter 11.

Problems/Page #':	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 26: ALCOHOLS FROM CARBONYL COMPOUNDS: OXIDATION-REDUCTION AND ORGANOMETALLIC COMPOUNDS. Read and Study Chapter 12.

Problems/Page #':	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 2: CONJUGATED UNSATURATED SYSTEMS. Read and Study Chapter 13.

Problems/Page #':	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

Weeks of April 9: Review Class, e.g. review of a Practice Final Exam.

CH2610 A3, Organic Chemistry I: Schedule for Reading, Studying and Practice Problems

References are to T.W.G. Solomons and C.B. Fryhle, *Organic Chemistry*, 9th Edition, Wiley, 2008.

WINTER SEMESTER

Weeks of Jan 5 & 9: HE BASICS: Bonding and Molecular Structure: Read and Study Chapter 1.

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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 1.15
47	End of Chapter	1.16 to 1.38
50	Learning Group Problem	

Week of Jan 16: REPRESENTATIVE CARBON COMPOUNDS: Functional Groups, Intermolecular Forces & Infrared (IR) Spectroscopy. Read & Study Chapter 2.

Problems/Page #'s	In-Chapter	2.1 to 2.19
87	End of Chapter	2.20 to 2.48
90	Learning Group Problem	

**Week of Jan 23: AN INTRODUCTION TO ORGANIC REACTIONS:
ACIDS AND BASES IN ORGANIC CHEMISTRY. Read and Study Chapter 3.**

Problems/Page #'s:	In-Chapter	3.1 to 3.14
	124	End of Chapter 3.15 to 3.42
	127	Learning Group Problem

**Week of Jan 30: NOMENCLATURE AND CONFORMATIONS OF ALKANES AND
CYCLOALKANES. Read and Study Chapter 4**

Problems/Page #'s:	In-Chapter	4.1 to 4.21
	178	End of Chapter 4.22 to 4.54
	180	Learning Group Problems

Week of Feb 6: STEREOCHEMISTRY: CHIRAL MOLECULES. Read and Study Chapter 5.

Problems/Page #'s:	In-Chapter	5.1 to 5.29
	218	End of Chapter 5.30 to 5.44
	220	Learning Group Problems

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

**Weeks of Feb 13: IONIC REACTIONS: Nucleophilic Substitution and Elimination Reactions of
Alkyl Halides. Read and Study Chapter 6.**

Problems/Page #'s:	In-Chapter	6.1 to 6.12
	252	End of Chapter 6.13 to 6.48
	268	Learning Group Problems

Week of Feb 20-24: No Classes: Family Day is Feb 20 and Winter Break is Feb 21 – 24.

**Week of Feb 27: 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 7.17
	306	End of Chapter 7.18 to 7.46
	310	Learning Group Problems

Week of March 5: ALKENES & ALKYNES II: Addition Reactions. Read & Study Chapter 8.

Problems/Page #'s:	In-Chapter	8.1 to 8.26
	356	End of Chapter 8.27 to 8.68
	361	Learning Group Problems.

Week of March 12: RADICAL REACTIONS. Read and Study Chapter 10.

Problems/Page #'s:	In-Chapter	10.1 to 10.22
461	End of Chapter	10.23 to 10.34
463	Learning Group Problems.	

Week of March 19: ALCOHOLS AND ETHERS. Read and Study Chapter 11.

Problems/Page #'s:	In-Chapter	11.1 to 11.24
509	End of Chapter	11.25 to 11.51
512	Learning Group Problems.	

Week of March 26: ALCOHOLS FROM CARBONYL COMPOUNDS: OXIDATION-REDUCTION AND ORGANOMETALLIC COMPOUNDS. Read and Study Chapter 12.

Problems/Page #'s:	In-Chapter	12.1 to 12.10
542	End of Chapter	12.11 to 12.29
545	Learning Group Problems.	
546	First Review Problem Set 1 to 25.	

Week of April 2: CONJUGATED UNSATURATED SYSTEMS. Read and Study Chapter 13.

Problems/Page #'s:	In-Chapter	13.1 to 13.15
589	End of Chapter	13.16 to 13.46
594	Learning Group Problems.	

Weeks of April 9: Review Class, e.g. review of a Practice Final Exam.