



**DEPARTMENT of SCIENCE**  
**COURSE OUTLINE – WINTER 2016**

**CH2610 (A3): Organic Chemistry I – 3 (3-1-3) 105 Hours for 15 Weeks**

**INSTRUCTOR:** Dr. John P. Sloan                      **PHONE:** 780-539-2004  
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**OFFICE HOURS:** Mon, Wed & Thursday 10:00 – 11:30 & 13:00 – 14:30.

**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.

**PREREQUISITE(S)/COREQUISITE:** CH1010 or CH1030

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

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

**REQUIRED TEXT/RESOURCE MATERIALS:**

1. Solomons, T.W.G., C.B. Fryhle, S.A. Snyder, *Organic Chemistry*, 11th Edition, Wiley, 2014, including access to the WileyPlus web site at: <https://edugen.wiley.com/edugen/secure/index.uni>.
2. A Three Ring Binder to Hold: Sloan, J.P., *Organic Chemistry Experiments, Chemistry 2610/2630*, Grande Prairie Regional College, 2015/2016.
3. Molecular Models are highly recommended, namely: Molecular Model Set for Organic Chemistry, Prentice Hall.
4. Study Guide and Solutions Manual (978-1-118-14790-0) is an optional item; namely:
  - 4.1 The Study Guide and Solutions Manual for Organic Chemistry, 11<sup>th</sup> Edition, authored by Jon Antilla, University of South Florida, Robert Johnson, Xavier University, Craig Fryhle, Graham Solomons, and Scott Snyder.

Note: Solomons et al, Organic Chemistry, 11<sup>th</sup> Edition including access to WileyPlus; 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. Use of Molecular Models is encouraged.

**DELIVERY MODE(S):** Organic Chemistry I, consisting of CH2610 A3, S1, S2, L1, and L2 will be delivered in Lecture, Tutorial and Laboratory Components.

### **COURSE OBJECTIVES:**

The course 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.

### **LEARNING OUTCOMES:**

The Learning Outcomes of Organic Chemistry I is for students to be aware of their ability to apply their understanding of the theory of Organic Chemistry as presented in the course and as outlined in the Calendar Description and in this course outline. The Learning Outcomes includes the students being able to apply their understanding of Organic Chemistry to related issues and problems in addition to the specific issues and problems directly addressed throughout the course. The learning outcomes of the students are directly related to the grades earned by the students in the course.

### **TRANSFERABILITY: ALBERTA TRANSFER CREDIT**

(Ref: Alberta Council of Admissions and Transfers, updated August 18, 2015)

GPRC:	CH 2610 (3)	CH 2630 (3)
U of Alberta:	CHEM 261 (3) or AUCHE 250 (3)	CHEM 263 (3) or AUCHE 252 (3)
U of Calgary:	CHEM 351 (3)	CHEM 353 (3)
U of Lethbridge:	CHEM 2500 (3)	CHEM 2600 (3)
Grant MacEwan U:	CHEM 261 (3)	CHEM 263 (3)
Athabasca U:	CHEM 350 (3)	CHEM 360 (3)
Canadian UC:	CHEM 241 (3)	CHEM 242 (3)
Concordia UC:	CHEM 261 (3)	CHEM 263 (3)
King's UC:	CHEM 3xx (3)	CHEM 351 (3)

**\*Warning:** Although we strive to make the transferability information in this document up-to-date and accurate, **the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities.** Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at Alberta Transfer Guide main page <http://www.transferalberta.ca> or, if you do not want to navigate through few links, at <http://alis.alberta.ca/ps/tsp/ta/tbi/onlineSearch.html?SearchMode=S&step=2>

**\*\* Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

## EVALUATIONS:

### Examination Schedule and Composition of the Final Grade:

1.	Midterm Exam # 1, Friday February 12 -----	20%
2.	Midterm Exam # 2, Friday March 12 -----	20%
2.	Final Exam to be scheduled between April 15 – 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.
5. A pass grade is essential for the Laboratory Component.
6. The Tutorial Grading Component will contribute to 5% of the final grade and will consist of ten assignments with ten questions per assignment.
5. Assistance with assignments will be given upon request.

## GRADING CRITERIA:

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	93-100	C+	2.3	67-70
A	4.0	87-92	C	2.0	63-66
A-	3.7	83-86	C-	1.7	60-62
B+	3.3	79-82	D+	1.3	55-59
B	3.0	75-78	D	1.0	50-54
B-	2.7	71-74	F	0.0	00-49

## COURSE SCHEDULE/TENTATIVE 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 with weekly problem sets. Regular assignments will be given and marked. There will be ten assignments with each assignment consisting of ten questions.

Detailed solutions to the, "Ten-Question-Assignments", will be posted on Moodle after the due dates for the assignments.

The WileyPlus web site for additional resources is: <https://edugen.wiley.com/edugen/secure/index.uni>

The Course Schedule is:

1. Lectures, Time and Place: CH2610 A3 M,W 8:30 - 9:50 in J201
2. Laboratory Component, Time and Place: CH2610 L1 M 14:30 - 17:20 in J116  
CH2610 L2 T 14:30 - 17:20 in J116
3. Tutorial Component, Time and Place: CH2610 S2 F 8:30 - 9:20 in J229  
CH2610 S1 F 10:00 - 11:20 in J204
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.

### **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:**

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, 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 <http://www.gprc.ab.ca/about/administration/policies/>

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

## TENTATIVE TIMELINE:

The Tentative Timetable for CH 2610 A2, Organic Chemistry I, is as follows:

### CH2610 A2, Organic Chemistry I:

Schedule for Reading, Studying and Practice Problems

References are to:

T.W.G. Solomons, C.B. Fryhle and S.A. Snyder, *Organic Chemistry*, 11th Edition, Wiley, 2014.

### WINTER SEMESTER

Week of Jan 6: THE BASICS: Bonding and Molecular Structure: Read and Study Chapter 1, including the Concept Map on page 54.

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 to earning 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 1.28
49	End of Chapter	1.29 to 1.50
52	Challenge Problems	1.51 to 1.56
53	Learning Group Problems	1 to 8

Week of Jan 11: FAMILIES of CARBON COMPOUNDS: Functional Groups, Intermolecular Forces, and Infrared (IR) Spectroscopy. Read and Study Chapter 2, including the Concept Map on page 103.

Problems/Page #'s	In-Chapter	2.1 to 2.28
99	End of Chapter	2.29 to 2.53

- 102 Challenge Problems 2.54 to 2.57
- 102 Learning Group Problems 1 to 8

Week of Jan 18: AN INTRODUCTION TO ORGANIC REACTIONS and THEIR MECHANISMS: ACIDS AND BASES IN ORGANIC CHEMISTRY. Read & Study Chapter 3, including the Concept Map on page 141.

- Problems/Page #'s: In-Chapter 3.1 to 3.17
- 137 End of Chapter 3.18 to 3.40
- 139 Challenge Problems 3.41 to 3.45
- 140 Learning Group Problems 1 to 4

Week of Jan 25: NOMENCLATURE and CONFORMATIONS of ALKANES and CYCLOALKANES. Read and Study Chapter 4, and read the Concept Map on page 190.

- Problems/Page #'s: In-Chapter 4.1 to 4.22
- 186 End of Chapter 4.23 to 4.46
- 188 Challenge Problems 4.47 to 4.51
- 189 Learning Group Problems 1 to 4

Week of Feb 1: STEREOCHEMISTRY: CHIRAL MOLECULES. Read & Study Chapter 5, and read the Concept Map on page 238.

- Problems/Page #'s: In-Chapter 5.1 to 5.32
- 234 End of Chapter 5.33 to 5.51
- 237 Challenge Problems 5.52 to 5.55
- 235 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 8: IONIC REACTIONS: Nucleophilic Substitution and Elimination Reactions of Alkyl Halides. Read and Study Chapter 6, and read the, "Summary and Review Tools – Mechanism Review: Substitution versus Elimination", on page 290.

- Problems/Page #'s: In-Chapter 6.1 to 6.19
- 284 End of Chapter 6.20 to 6.47
- 288 Challenge Problems 6.48 to 6.56
- 290 Learning Group Problems 1 to 2

Week of Feb 15-19: No Classes: Family Day is Feb 15, and Winter Break is Feb 16 – 19.

Week of Feb 22: ALKENES AND ALKYNES I: Properties and Synthesis. Elimination Reactions of Alkyl Halides. Read and Study Chapter 7, read Summary and Review Tools, and the Concept Map on pages 335 and 336.

- Problems/Page #'s: In-Chapter 7.1 to 7.24
- 329 End of Chapter 7.25 to 7.49
- 332 Challenge Problems 7.50 to 7.55
- 333 Learning Group Problems 1 to 5.

Week of Feb 29: ALKENES & ALKYNES II: Addition Reactions. Read & Study Chapter 8, and read, “Summary and Review Tools; Summary of Alkene Addition Reactions, and Synthetic Connections of Alkynes and Alkenes II”, on page 389 and 390.

Problems/Page #'s: In-Chapter	8.1 to 8.25
383	End of Chapter 8.26 to 8.65
387	Challenge Problems 8.66 to 8.67
388	Learning Group Problems 1 to 4

Week of March 7: RADICAL REACTIONS. Read and Study Chapter 10, and read the, “Concept Map – Mechanism Review of Radical Reactions”, on page 497.

Problems/Page #'s: In-Chapter	10.1 to 10.17
492	End of Chapter 10.20 to 10.33
495	Challenge Problems 10.34 to 10.41
496	Learning Group Problems 1 to 2

Week of March 14: ALCOHOLS & ETHERS: Synthesis & Reactions. Read & Study Chapter 11, and read the, “Summary and Review Tools – Some Synthetic Connections of Alkenes, Alkynes, Alcohols, Alkyl Halides and Ethers”, on page 541.

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

Week of March 21: ALCOHOLS FROM CARBONYL COMPOUNDS: OXIDATION-REDUCTION AND ORGANOMETALLIC COMPOUNDS.

Read and Study Chapter 12, and read the, “Summary and Review Tools – Synthetic Connections of Alcohols and Carbonyl Compounds”, on pages 879 and 880.

Problems/Page #'s: In-Chapter	12.1 to 12.10
572	End of Chapter 12.11 to 12.38
577	Challenge Problems 12.39 to 12.41
577	Learning Group Problem

Week of March 28: CONJUGATED UNSATURATED SYSTEMS. Read and Study Chapter 13, and read the, “Concept Map”, on page 625.

Problems/Page #'s: In-Chapter	13.1 to 13.17
618	End of Chapter 13.18 to 13.50
623	Challenge Problems 13.51 to 13.54
624	Learning Group Problems 1 to 2

Weeks of April 4 & April 11: Review Class, e.g. review of a Practice Final Exam.