

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, GMU, KUC*. * An asterisk (*) beside any transfer institution indicates important transfer information. Consult the Alberta Transfer Guide.

REQUIRED TEXT/RESOURCE MATERIALS:

1. Recommended Text, however:

The Text is expensive and alternative on-line free resources are available:

Solomons, T.W.G., C.B. Fryhle, S.A. Snyder, *Organic Chemistry*, 12th Edition, Wiley, 2016, including access to the WileyPlus web site at: (Other Organic Texts are OK)

<https://edugen.wiley.com/edugen/secure/index.uni>.

ISBN: 978-1-118-87576-6

Note: The 11th Edition is acceptable; namely:

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>.

ISBN: 978-1-118-13357-6

On-Line Reference Resource Material will be Posted On-line via Zoom in D2L.

2. A Three Ring Binder to Insert and Hold: Sloan, J.P., *Organic Chemistry Experiments, Chemistry 2610/2630*, Grande Prairie Regional College, 2020/2021.

3. Molecular Models are highly recommended, namely: Molecular Model Set for Organic Chemistry, Prentice Hall. Molecular Models may be checked out from John Hiebert for use.

4. Organic Chemistry, 12e Study Guide / Student Solutions Manual (12th Edition); Craig B. Fryhle, Scott A. Snyder, Robert G. Johnson, Jon Antilla, Paperback, 744 Pages; Published 2016, ISBN: 978-1-119-07732-9

Note: The 11th Edition Solutions Guide to the 11th Edition Text Book is:

Study Guide and Solutions Manual, 11th Edition, authored by Jon Antilla, University of South Florida, Robert Johnson, Xavier University, Craig Fryhle, Graham Solomons, and Scott Snyder.

ISBN: 978-1-118-14790-0 is an Optional Item.

Note: *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.

DELIVERY MODE(S):

Organic Chemistry I, consists of CH2610 A3, B3, S1, S2, S3, L1, L2 & L3 and is delivered in Lecture, Seminar 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:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page <http://www.transferalberta.ca>.

**** 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 14 – 22 -----	35%
3.	Laboratory -----	20%
4.	Tutorial/Seminar/Assignment 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. The current plan is to have Open Book Exams written on-line via Zoom and D2L and submitted Marking under the, "Assignment", Tab of D2L within the scheduled exam time.
2. Between 5 and 15% of exam content will be taken from a combination of weekly assignments, 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 nine 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

Please Note:

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

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. Laboratory Reports are to be submitted via Zoom and D2L under, "Assignments".

Seminar/Tutorial Component:

Problem solving and discussion sessions with weekly problem sets. Regular assignments will be given and marked. The Assignments are to be submitted via Zoom and D2L under, "Assignments".

There will be nine assignments with each assignment consisting of ten questions.

Detailed solutions to the, "Ten-Question-Assignments", will be Posted on Zoom via D2L after each assignment due date.

The Course Schedule is:

- Lectures, Time & Place: --- CH2610 A3 T,R 8:30 - 9:50; Remote Delivery via Zoom on D2L
--- CH2610 B3 M,W 8:30 - 9:50; Remote Delivery via Zoom on D2L
- Laboratory Component: --- CH2610 L2 M 14:45 -17:35; Face to face in J116
--- CH2610 L1 T 14:45 -17:35; Face to face in J116
--- CH2610 L3 W 14:45 -17:35; Face to face in J116
- Seminar/Tutorials: ----- CH2610 S1 F 8:30 - 9:20; Remote Delivery via Zoom on D2L
----- CH2610 S2 F 10:30 -10:50; Remote Delivery via Zoom on D2L
----- CH2610 S3 F 11:30 - 12:20; Remote Delivery via Zoom on D2L
- Office Hours:
 - Individual and group assistance will normally be available on-line via Zoom on D2L upon request and mutually convenient times. Request for assistance is welcome via, personal contact, e-mail and telephone: e-mail: sloan@gprc.aab.ca. iPhone 780-876-1363.
 - Individual and group assistance will normally be available outside class lecture, laboratory and seminar/tutorial hours.

TENTATIVE TIMELINE:

The tentative timetable follows, "Student Responsibilities", and the, "Statement on Plagiarism and Cheating"

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 Calendar at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <https://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 A3 & B3, Organic Chemistry I, is as follows:

CH2610 A3 & B3, Organic Chemistry I:

Schedule Guideline: Reading, Studying & Practice Problems. Topics can be accessed On-Line.

References to:

T.W.G. Solomons, C.B. Fryhle and S.A. Snyder, *Organic Chemistry*, 12th Edition, Wiley, 2016.

WINTER SEMESTER

Weeks of Jan 4 & 11: 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 the in-chapter problems, and you are required to complete the assignments 1 to 9. 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 18: 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 25: AN INTRODUCTION TO ORGANIC REACTIONS and THEIR MECHANISMS: ACIDS AND BASES IN ORGANIC CHEMISTRY. Read & Study Chapter 3, including the Concept Map on page 143.

- Problems/Page #'s: In-Chapter 3.1 to 3.19
- 137 End of Chapter 3.20 to 3.43
- 139 Challenge Problems 3.44 to 3.48
- 140 Learning Group Problems 1 to 4

Week of Feb 1: NOMENCLATURE and CONFORMATIONS of ALKANES and CYCLOALKANES. Read and Study Chapter 4 and read the Concept Map on page 192.

- 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 8: STEREOCHEMISTRY: CHIRAL MOLECULES. Read & Study Chapter 5 and read the Concept Map on page 239.

- 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 textbook includes a set of computer molecular model stereochemistry exercises that are keyed to the text

Weeks of Feb 10: 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 281.

- Problems/Page #'s: In-Chapter 6.1 to 6.19
- 284 End of Chapter 6.20 to 6.41
- 288 Challenge Problems 6.42 to 6.49
- 290 Learning Group Problems 1 to 2

Week of Feb 15-29: 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 on pages 327, 328, 329, 334, 335 and 336.

- Problems/Page #/s: In-Chapter 7.1 to 7.26
- 329 End of Chapter 7.27 to 7.57
- 332 Challenge Problems 7.58 to 7.64

Week of March 1: 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 8.61
387	Challenge Problems	8.62 to 8.63
388	Learning Group Problems	1 to 4

Week of March 8: RADICAL REACTIONS. Read and Study Chapter 10, and read the, “Concept Map – Mechanism Review of Radical Reactions”, on page 488.

Problems/Page #'s:	In-Chapter	10.1 to 10.17
492	End of Chapter	10.18 to 10.35
495	Challenge Problems	10.36 to 10.43
496	Learning Group Problems	1 to 2

Week of March 15: 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 533.

Problems/Page #'s:	In-Chapter	11.1 to 11.24
535	End of Chapter	11.25 to 11.56
539	Challenge Problems	11.57 to 11.60
540	Learning Group Problems	1 to 3

Week of March 22: 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 570 and 571.

Problems/Page #'s:	In-Chapter	12.1 to 12.8
572	End of Chapter	12.9 to 12.36
577	Challenge Problems	12.37 to 12.39
577	Learning Group Problem	

Week of March 29: CONJUGATED UNSATURATED SYSTEMS. Read and Study Chapter 13, and read the, “Concept Map”, on page 616.

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

Week of April 5 & 12: Class Review including Review of the Practice Final Exam.
April 12: Last Day of Classes. Final Exam Schedule: April 14 - 22, 2021.



Organic Chemistry Experiments

CH 2610 A3 & B3, and CH 2630 A2

John Purdie Sloan

Grande Prairie Regional College

2020– 2021

Fall and Winter Semesters

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January 4, 2021.



Organic Chemistry Experiments

Chemistry CH 2610 A3 & B3

Laboratory Schedule - Winter Semester 2021

Contents:

Date.	Lab #.	Lab Title.
Week of:		
Jan 18	Lab 1:	Check-in. Introduction to Laboratory Safety, Laboratory Equipment, Instrumentation, and the Technique of Mixed Melting Points.
Jan 25	Lab 2.	Flavours and Fragrances: Synthesis of Isopentyl Acetate (Banana Oil).
Feb 1	Lab 3.	Infrared Spectroscopy: Interpretation of Infrared Absorption Spectra.
Feb 8	Lab 4.	Molecular Models.
Feb 15	No Lab.	Family Day and Winter Break.
Feb 22	Lab 5.	Canola Oil from Canola Seed and Miscible and Immiscible Liquids.
March 1	Lab 6.	Biodiesel from Canola Oil
March 8 & 15		Labs 7 & 8. The Separation of Acids, Bases, and Neutral Compounds.
March 22	Lab 9.	Synthesis of Acetyl Salicylic Acid (Aspirin) from Salicylic Acid and Acetic Anhydride, and Ferric Chloride Tests for the presence of Phenol Functional Groups.
March 29	Lab 10.	Check-out and Sign-out.
April 5		Final Exam Review.

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January 4, 2021