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

Course Outline: Organic Chemistry CH2630 A2

CHEMISTRY 2630 A2: Organic Chemistry II

PREREQUISITE: CH1610 or CH2610

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

LECTURE: CH2630 A2 T,R 8:30 – 9:50 in J204

ALBERTA TRANSFER CREDIT
(Ref: 2009-2010 Guide to Transfer Credit at Alberta Post-Secondary Institutions)

GPRC:	CH 2610	(3)	CH 2630	(3)
U of Alberta:	CHEM 261	(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)
Athabasca U:	CHEM 350	(3)	CHEM 360	(3)
Canadian UC:	CHEM 241	(4)	CHEM 242	(4)
Concordia UC:	CHEM 261	(3)	CHEM 263	(3)
King's UC:			CHEM 351	(3)

COURSE OUTLINE:

Lecture Component:

A continuation of the study of the fundamental principles of the chemistry of carbon compounds as commenced in Chemistry 2610. The study is based on a reaction mechanism approach to the functional group chemistry of arenes, aldehydes, ketones, carboxylic acids, esters, amides, amino acids and carbohydrates. Topics include: structure and bonding; physical properties; acidity and basicity; conformations of molecules; stereochemistry; addition, elimination and substitution reactions; structure-reactivity relationships; aromaticity and aromatic substitution; and spectroscopic methods for structure determination.

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

Laboratory Component:

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.

Notes:

1. Lectures: Days, Time and Place
   CH2630 A3 T,R 8:30 - 9:50 in J204

2. Laboratory Component: Day, Time and Place
   CH2630 L1 M 14:30 - 17:20 in J116

3. Tutorial Component: Day, Time and Place
   CH2630 S1 F 11:30 - 12:20 in J204

TEXT BOOKS AND LABORATORY ITEMS:

The following text book is required:

CH2630

Solomons, T.W.G., and C.B. Fryhle, *Organic Chemistry*, 9th (or 10th) Edition, Wiley, 2008 (or 2011), including access to the WileyPlus web site: 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 WileyPlus are supplementary items, namely:

1. Fernandez, J.E., and Solomons, T.W.G., *Study Guide and Solutions Manual to Organic Chemistry*, 9th Edition, 2008;
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.

EVALUATION:

Examination Schedule and Composition of the Final Grade:

1. Midterm Exam # 1, Friday October 8 ---------- 15%
2. Midterm Exam # 2, Friday November 12 ---------- 20%
2. Final Exam to be scheduled between December 9 - 18 -------- 30%
3. Laboratory ---------- 25%
4. Tutorial Grading Component ---------- 10%

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:

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

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

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 directly from weekly assignments.
3. A pass grade is essential for the Laboratory Component.
4. The Tutorial Grading Component consists of assignments and will contribute towards 10% of the final grade. A 10 question assignment will normally be given each week.
5. Assistance with assignments will be given upon request.

6. Regular attendance in Lecture, Laboratory, and Tutorial Components is a Course Requirement.

Grande Prairie Regional College Calendar 2009 - 2010: Course Description (page 178).

CH 2630 3(3-1-3)UT 105 Hours Organic Chemistry II

Continuation of the study of structural and chemical properties of the basic functional groups of organic compounds including aromatic compounds, aldehydes, ketones, carboxylic acids and their derivatives and amines. Illustration of these functional groups in natural products such as carbohydrates, amino acids and proteins, nucleic acids and lipids and discussion of the application of spectroscopic methods for structure determination in simple organic molecules.

Prerequisites: CH1610 or CH 2610

Notes: Credit will be granted for only one of CH1630 or CH2630.

Engineering students who take this course will receive 4.5 credits of transfer to University of Alberta.
Transfer: UA, UC, UL, AU, AF, CU, CUC, KUC

STATEMENT ON PLAGIARISM AND CHEATING:

Please refer to pages 49-50 of the College calendar regarding plagiarism, cheating and the resultant penalties. These are serious issues and will be dealt with severely.

CHEMISTRY 2630 A2 READING, STUDYING, AND PRACTICE PROBLEMS

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

FALL SEMESTER

Weeks of Sept 2 & 6: SPECTROSCOPIC METHODS OF STRUCTURE DETERMINATION. NUCLEAR MAGNETIC RESONANCE (NMR) and MASS SPECTROSCOPY (MS): Tools for Structure Determination. Read and Study Chapter 9.

Problems/Page #'s:	In-Chapter	9.1 to 9.23
420	End of Chapter	9.24 to 9.44
425	Learning Group Problems.	

Week of Sept 13: AROMATIC COMPOUNDS. Read and Study Chapter 14.

Problems/Page #'s:	In-Chapter	14.1 to 14.16
627	End of Chapter	14.17 to 14.39
634	Learning Group Problems.	

Weeks of Sept 20: REACTIONS OF AROMATIC COMPOUNDS. Read and Study Chapter 15.

Problems/Page #	In-Chapter	15.1 to 15.25
680	End of Chapter	15.26 to 15.56
685	Learning Group Problems.	

Week of Sept 27: ALDEHYDES AND KETONES I: NUCLEOPHILIC ADDITION TO THE CARBONYL GROUP. Read and Study Chapter 16.

Problems/page #'s:	In-Chapter	16.1 to 16.18
725	End of Chapter	16.19 to 16.46
730	Learning Group Problems.	

Week of Oct 4 & 11: CARBOXYLIC ACIDS AND THEIR DERIVATIVES: NUCLEOPHILIC ADDITION-ELIMINATION AT THE ACYL CARBON. Read and Study Chapter 18, and Special Topic B.

Problems/page #'s:	In-Chapter	18.1 to 18.18
821	End of Chapter	18.19 to 18.55
829	Learning Group Problems.	

Weeks of Oct 18: ALDEHYDES AND KETONES II: ENOLS and ENOLATES. Read & Study Chapter 17.

Problems/page #'s:	In-Chapter	17.1 to 17.27
769	End of Chapter	17.28 to 17.44
774	Learning Group Problems.	

Week of Oct 25: SYNTHESIS AND REACTIONS OF ß-DICARBONYL COMPOUNDS:

MORE CHEMISTRY OF ENOLATE IONS. Read and Study Chapter 19, and Special Topics C and D.

Problems/page #'s: In-Chapter 19.1 to 19.24;
872 End of Chapter19.25 to 19.51
878 Learning Group Problems.

Week of Nov 1: AMINES. Read and Study Chapter 2., and Special Topic E.

Problems/Page #'s: In-Chapter 20.1 to 20.20;
940 End of Chapter 20.21 to 20.53;
947 Learning Group Problems;

Week of Nov 8: PHENOLS AND ARYL HALIDES: NUCLEOPHILIC AROMATIC SUBSTITUTION. Read and Study Chapter 21. Read Special Topics F, G, and H, pages 992-1019.

Problems/Page #'s: In-Chapter 21.1 to 21.12
979 End of Chapter 21.13 to 21.38
984 Learning Group Problems
986 Second Review Problem Set 1 to 24.

Week of Nov 15: CARBOHYDRATES AND LIPIDS (OPTIONAL). Read Chapters 22 & 23.

Problems/Page #'s: In-Chapter 22 22.1 to 22.19
1067 End of Chapter 22.20 to 21.45
1071 Learning Group Problems

Problem/Page #'s: In-Chapter 23 23.1 to 23.11
1101 End of Chapter 23.12 to 23.26
1107 Learning Group Problems.

Week of Nov 22 & 29 AMINO ACIDS AND PROTEINS & NUCLEIC ACIDS AND PROTEIN SYNTHESIS (OPTIONAL).

Read Chapters 24 & 25: Amino Acids and Proteins & Nucleic Acids and Protein Synthesis
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Problems/Page #'s: In-Chapter 24.1 to 24.16
1154 End of Chapter 24.17 to 24.27
1157 Learning Group Problems

Problems/Page #'s: In-Chapter 25.1 to 25.13
1189 End of Chapter 25.14 to 25.16
1191 Learning Group Problem

Week of Dec 6: Review.

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CHEMISTRY 2630 A2 READING, STUDYING, AND PRACTICE PROBLEMS

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

FALL SEMESTER

Weeks of Sept 2 & 6: SPECTROSCOPIC METHODS OF STRUCTURE DETERMINATION. NUCLEAR MAGNETIC RESONANCE (NMR) and MASS SPECTROSCOPY (MS): Tools for Structure Determination. Read and Study Chapter 9.

Problems/Page #'s:		
	In-Chapter	9.1 to 9.22
444	End of Chapter	9.23 to 9.47
455	Challenge Problems	9.48 to 9.53
456	Learning Group Problems	1 to 2

Week of Sept 13: AROMATIC COMPOUNDS. Read and Study Chapter 14.

Problems/Page #'s:		
	In-Chapter	14.1 to 14.15
665	End of Chapter	14.16 to 14.39
673	Challenge Problems	14.40 to 14.44
674	Learning Group Problems	1 to 5

Weeks of Sept 20: REACTIONS OF AROMATIC COMPOUNDS. Read and Study Chapter 15.

Problems/Page #		
	In-Chapter	15.1 to 15.23
721	End of Chapter	15.24 to 15.53
725	Challenge Problems	15.54 to 15.57
726	Learning Group Problems	1 to 3

Week of Sept 27: ALDEHYDES AND KETONES I: NUCLEOPHILIC ADDITION TO THE CARBONYL GROUP. Read and Study Chapter 16.

Problems/page #'s:		
	In-Chapter	16.1 to 16.18
766	End of Chapter	16.19 to 16.49
773	Challenge Problems	16.50 to 16.51
774	Learning Group Problems	a to f

Weeks of Oct 4: ALDEHYDES AND KETONES II: ENOLS AND ENOLATES. Read & Study Chapter 17.

Problems/page #'s:		
	In-Chapter	17.1 to 17.27
769	End of Chapter	17.28 to 17.44
774	Learning Group Problems.	

Week of Oct 11 & 18: CARBOXYLIC ACIDS AND THEIR DERIVATIVES: NUCLEOPHILIC ADDITION-ELIMINATION AT THE ACYL CARBON. Read and Study Chapter 17.

Problems/page #'s:		
	In-Chapter	17.1 to 17.17
822	End of Chapter	17.18 to 17.48
829	Challenge Problems	17.49 to 17.54

830 Learning Group Problems 1 to 4

Week of Oct 25: REACTIONS at the α-CARBON of CARBONYL COMPOUNDS: ENOLS and ENOLATES. Read and Study Chapter 18.

Problems/page #'s: In-Chapter 18.1 to 18.14
859 End of Chapter 18.15 to 18.34
865 Challenge Problem 18.35
865 Learning Group Problems 1 to 2

CONDENSATION and CONJUGATE ADDITION REACTIONS of CARBONYL COMPOUNDS: More Chemistry of Enolates. Read and Study Chapter 19.

Problems/page #'s: In-Chapter 19.1 to 19.22
899 End of Chapter 19.23 to 19.57
907 Challenge Problem 19.58 to 19.60
908 Learning Group Problems 1 to 2

Week of Nov 1: AMINES. Read and Study Chapter 20.

Problems/Page #'s: In-Chapter 20.1 to 20.18
953 End of Chapter 20.19 to 20.49
960 Challenge Problems 20.50 to 20.54
962 Learning Group Problems 1 to 2

Week of Nov 8: PHENOLS AND ARYL HALIDES: NUCLEOPHILIC AROMATIC SUBSTITUTION. Read and Study Chapter 21.
Read Special Topics G between page 999 and 1000.

Problems/Page #'s: In-Chapter 21.1 to 21.12
991 End of Chapter 21.13 to 21.33
995 Challenge Problems 21.34 to 21.43
997 Learning Group Problems 1 to 2

Week of Nov 15: CARBOHYDRATES AND LIPIDS (OPTIONAL). Read Chapters 22 & 23.

Problems/Page #'s: In-Chapter 22 22.1 to 22.19
1043 End of Chapter 22.20 to 21.42
1046 Challenge Problems 22.43 to 22.45
1047 Learning Group Problems 1 to 2

Problem/Page #'s: In-Chapter 23 23.1 to 23.11
1079 End of Chapter 23.12 to 23.23
1082 Challenge Problems 22.24 to 22.25
1082 Learning Group Problems 1 to 4

Week of Nov 22 & 29: AMINO ACIDS AND PROTEINS & NUCLEIC ACIDS AND PROTEIN SYNTHESIS (OPTIONAL).

Read Chapters 24 & 25: Amino Acids and Proteins & Nucleic Acids and Protein Synthesis

Chapter 24

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Problems/Page #'s:			
	In-Chapter	24.1	to 24.16
1129	End of Chapter	24.17	to 24.23
1130	Challenge Problem	24.24	
1130	Learning Group Problems	1 to 2	

Chapter 25

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Problems/Page #'s:			
	In-Chapter	25.1	to 25.11
1162	End of Chapter	25.12	to 25.16
1164	Learning Group Problem		

Week of Dec 6: Review.

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