

GRANDE PRAIRIE REGIONAL COLLEGE***Discipline of Chemistry******Department of Science and Technology******Thirty-Seventh Session 2002 - 2003*****CHEMISTRY 1630: Organic Chemistry II****PREREQUISITE:** Chemistry 1610**INSTRUCTOR:** Dr. John P. Sloan, Office # J207, Phone # 539-2004
E-mail SLOAN@GPRC.AB.CA**LECTURE:** CH1630 A3 MW, 8:30 - 9:50 in J203**ALBERTA TRANSFER CREDIT for CH1610 plus CH1630:**

U of Alberta:	CHEM 161/163	6 credits
U of Calgary:	CHEM 351/353	6 credits
U of Lethbridge:	CHEM 2100/2200	6 credits
Athabasca U:	CHEM 2xx/3xx	6 credits
Augustana U Col:	CHE 1xx/1xx	6 credits
Concordia Col:	CH 161/163	6 credits
The King's U Col:	CHEM 2xx/2xx	6 credits
Canadian Union C:	CHEM 1xx/1xx	8 credits

COURSE OUTLINE:**Lecture Component:**

A continuation of the study of the fundamental principles of the chemistry of carbon compounds as commenced in Chemistry 1610. 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 pharmaceutical 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 tests will be given and marked.

Notes:

1. Lectures: Days, Time and Place
CH1630 A3 MW, 8:30 - 9:50 in J203.
2. Laboratory Component: Day, Time and Place
CH1630 L1 M 14:30 - 17:20 in J119
CH1630 L2 T 14:30 - 17:20 in J116
3. Tutorial Component: Day, Time and Place
CH1630 S1 F 8:30 - 9:20 in J203
CH1630 S2 F 9:30 - 10:20 in J203

TEXT BOOKS AND LABORATORY ITEMS:

The following books are required:

1. Solomons, T.W.G., and C.B. Fryhle, *Organic Chemistry*, 7th Edition Upgrade, Wiley, 2002;
2. A Three Ring Binder to Hold: Sloan, J.P., *Organic Chemistry Experiments, Chemistry 1610/1630*, Grande Prairie Regional College, 2002/2003.

The following is highly recommended:

3. Molecular Model Set for Organic Chemistry, Prentice Hall.

The following is a supplementary item:

1. Fernandez, J.E., and Solomons, T.W.G., *Study Guide and Solutions Manual to Organic Chemistry*, 7th Edition Upgrade, 2002;

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 to be Scheduled for week of Feb 18	-----	25%
2.	Final Exam to be scheduled between April 21 & 30	-----	40%
3.	Laboratory	-----	25%
4.	Tutorial Grading Component	-----	10%
			100%

The Grades are based on the Nine Point Stanine Scale and correlate with the following designations:

<u>Stanine</u>	<u>Designation</u>
9 -----	Outstanding
8 -----	Excellent
7 -----	Very Good
6 -----	Good
5 -----	Fair
4 -----	Pass
3	
2	
1	

Notes:

- The Mid-Term exam will be of 2 hours duration and the Final Exam will be of 3 hours duration.
- Between 5 and 15% of exam content will be taken directly from weekly Tests.
- A pass grade is essential for the Laboratory Component.
- The Tutorial Grading Component consists of tests and will contribute towards 15% of the final grade. A 10 question test will normally be given each week during the tutorial hour. To encourage general discussion and active student participation, test questions may be answered within "paired teams". Tests not completed during the tutorial period are due within 24 hours without penalty, or later at the discretion of the Instructor. The marking scheme is:
 - 1 mark per correct answer with full details;
 - ½ mark per correct answer with incomplete details;
 - 20% may be deducted from the mark for each college business day that a test is overdue.
- Regular attendance in Lecture, Laboratory, and Tutorial Components is a Course Requirement.

Grande Prairie Regional College Calendar 2001 - 2002: Course Description (page 151-152).**CH1630 3(3-1-3)UT, Organic Chemistry II**

Continuation is provided of the structure and reactivity of functional groups with special emphasis on molecules important to biology (e.g. fats, sugars, medicinal agents, antibiotics, amino acids, proteins, nucleic acids). Molecules found in everyday life (soaps, detergents, fibres, perfumes, and bio-polymers) will be discussed.

Prerequisite: CH1610

CHEMISTRY 1630
READING, STUDYING, AND PRACTICE PROBLEMS

All references are to T.W.G. Solomons and C.B. Fryhle, *Organic Chemistry*, 7th Edition Upgrade, Wiley, 2002.

WINTER SEMESTER

Weeks of Jan 6 & 13: SPECTROSCOPIC METHODS OF STRUCTURE DETERMINATION.

Sect #	Page #	Read and Study Chapter 9.
9.1	367	Introduction;
9.2	368	The Electromagnetic Spectrum;
9.3	370	Nuclear Magnetic Resonance (NMR) Spectroscopy;
9.3A	370	Sweep [Continuous Wave (CW)] NMR Spectrometers;
9.3B	371	Fourier Transform (FT) NMR Spectrometers;
9.3C	372	Chemical Shift - Peak Position in an NMR Spectrum;
9.3D	373	Integration of peak Areas - The Integral Curve;
9.3E	373	Signal Splitting;
9.4	374	Nuclear Spin: The Origin of the Signal;
9.5	376	Shielding and Deshielding of Protons;
9.6	377	The Chemical Shift;
9.7	379	Chemical Shift Equivalent and Nonequivalent Protons;
9.7A	379	Homotopic Hydrogen Atoms;
9.7B	380	Enantiotopic and Diastereotopic Hydrogen Atoms;
9.8	381	Signal Splitting, Spin-Spin Coupling;
9.9	391	Proton NMR Spectra and Rate Processes;
9.10	393	Carbon-13 NMR Spectroscopy;
9.10A	393	Interpretation of C-13 NMR Spectra;
9.10B	393	One Peak for Each Unique Carbon Atom;
9.10C	394	C-13 Chemical Shifts;
9.10D	396	Off-Resonance Decoupled Spectra;
9.10E	396	DEPT C-13 Spectra;
9.11	397	Two-Dimensional (2D) NMR Techniques;
9.11A	399	COSY Cross-Peak Correlations;
9.11B	401	HETCOR Cross-Peak Correlations;
9.12	403	An Introduction to Mass Spectrometry;
9.13	403	The Mass Spectrometer;
9.13A	405	Fragmentation;
9.13B	405	Ion Sorting;
9.14	406	The Mass Spectrum;
9.15	409	Determination of Molecular Formulas and Molecular Weights;
9.15A	409	The Molecular Ion and Isotopic Peaks;
9.15B	412	High-Resolution Mass Spectrometry;
9.16	413	Fragmentation;
9.16A	414	Fragmentation by Cleavage at a Single Bond;
9.16B	414	Fragmentation Equations;
9.16C	419	Fragmentation by Cleavage of two Bonds;