

Chemistry 212

ORGANIC CHEMISTRY

Dan. Libby 213 Collier Ext. 1436 E-mail: rdlibby@cs.moravian.edu	Class Hours	Office Hours
	MWF 9:10-10:00	Mon. 3:00 PM -> 4:00PM
	Tues. 9:10-10:00	Tues. 10:00 AM ->11:00AM
	Room 116 PPHAC	Wed. 10:00 AM ->11:00AM
		Thurs. 11:30 AM ->12:30PM
		Or any time, just call X1436

SCHEDULE OF TOPICS FOR CH 211 & 212

Introduction to the Structure of Organic Molecules

- A. Isomerism [Lab Exercise & CH 1 & 2]
- B. Organic Functional Groups [CGWW CH 2]

Equilibrium Controlled Reactions:

- A. Introduction to Organic Reactions: Thermodynamics vs. Kinetics [CGWW CH 5 & CH 13: pp. 305-323]
- B. Acid Base Reactions [CGWW CH 8 & 21]
- C. Reactions of Carbonyl Compounds. [CGWW CH 13]
 - 1. What Happens?
 - 2. How and Why Does It Happen?
 - a. Addition Reactions. [CGWW CH 6, 10, 27 & 28]
 - b. Addition-Elimination Reactions. [CGWW CH 14]
 - c. Acyl Substitution Reactions. [CGWW CH 12]

Organic Structure: A Closer Look

- A. Stereoisomerism [CGWW CH 16]
- B. Bond Rotations and Conformational Analysis [CGWW CH 18]

Kinetically Controlled Reactions:

- A. Review of Equilibrium Controlled Reactions [CGWW CH 13: pp. 305-314]
- B. Kinetics vs. Thermodynamics [CGWW CH 13: pp. 315-323]
- C. Nucleophilic Substitution at Saturated Carbon [CGWW CH 17]
- D. Elimination Reactions [CGWW CH 19]
- E. Addition Reactions [CGWW CH 20]
- F. Electrophilic Aromatic Substitution [CGWW CH 22]
- G. Free Radicals and Their Reactions [CGWW CH 39]

REQUIRED MATERIAL

- Organic Chemistry*; by Jonathan Clayden, Nick Greeves, Stuart Warren and Peter Wothers; Oxford University Press, 2001 (ISBN: 0-19-850346-6) (CGWW)
- *Operational Organic Chemistry: A Problem-Solving Approach to the Laboratory Course 3rd Edition*, by John W. Lehman, Prentice-Hall 1999 (ISBN: 0-13-841917-5) (Lehman)
- Foundation Model Set for General and Organic Chemistry*, (Models)

OPTIONAL MATERIAL

- Solutions Manual to Accompany ORGANIC CHEMISTRY Clayden, Greeves, Warren, and Wothers*, by Stuart Warren (Sol Man)

COURSE GOALS

This course is designed to help you to discover important aspects of the area of science identified as Organic Chemistry to develop fundamental concepts that help us organize and understand organic reactions and to be able to apply fundamental concepts to unfamiliar examples of organic chemical reactions. We define understanding of concepts as the ability to use them effectively in a variety contexts. The process of discovery begins with chemical data and requires that you apply your previous experience to analyze the data and propose reasonable explanations for trends in each new data set. The sequence of topics is designed such that each new data set builds on the understanding that you developed in earlier analyses.

ADMINISTRATIVE POLICIES

Class Activities, Study Groups and Student Collaboration:

This course will be run in a similar unconventional discussion manner to that used in CHEM 211. Again, the value of class periods will largely depend upon what each student contributes to the discussion. We will again utilize study-discussion groups to help promote exchange of ideas in class. As in CH 211, each day you will be given a specific group study assignment for the following class period. Then at the beginning of each class I will randomly select three or four groups to have their presenters present their group's response to the class. Generally, these presentations will be materials put on the board for consideration by the class as a whole. Then we will have a 5 to 10 minute group discussion period for all groups to develop responses to the initial presentations. After the group discussion period, a few additional groups will be selected to respond to the original groups' presentations, and other volunteer responses will be considered in an effort to reach consensus on the best interpretation of the data under consideration. When the first issue is settled, we will move on to the next problem gradually building our understanding of organic chemistry.

Thus, this semester, the general approach to the material will be the same as last semester. The structure is designed to encourage and reward you for **working together outside of class in preparing daily class assignments and analyzing materials** (See below).

Group Composition and Dynamics:

Again this semester, each member of the group has a specific role to play in making your collective learning experiences profitable. The definitions of the specific roles to be assigned are listed below. The initial memberships of the groups are based upon course grades from CHEM 211. Subsequent group assignments will be determined from quiz and exam grades. Group assignments are designed to give each group similar average grades from previous work. Groups will usually be comprised of four students, a manager, a reporter, a presenter and a reflector-technician. In the few cases when there are five group members, the reflector and technician duties will be assigned different students. You have been assigned a specific role for the first class. For the next class you will rotate such that the manager becomes the next technician, the reporter becomes the next manager, the presenter becomes the next reporter, the reflector becomes the next presenter and the technician becomes the next reflector. (In short, the rotation goes: manager -> technician -> reflector -> presenter -> reporter -> manager)

Laboratory Discussions and Periods:

As in the fall semester, students are required to attend *all* laboratory discussions (Tues. 9:10-10:00, see schedule in the Lab Manual) and all scheduled lab periods unless excused due to a valid medical excuse (verified by the Health Center or Dean of Students) or other accepted *prior* excuse. Make-ups or grade adjustments for excused absences will be arranged. **Grades for work missed due to unexcused absences will be zero.**

Make-up Exams or Quizzes:

Students are required to take all exams and quizzes. There will be **NO MAKE-UPS**. If an exam or quiz is missed without a valid medical excuse (verified by the Health Center or the Dean of

Students' Office) or other accepted *prior* excuse, the grade for that work will be zero. The grade for an exam or quiz missed due to an excused absence will be determined from the grades earned on the remaining exam(s) or quizzes (including the final exam), i.e. more value will be added to subsequent exams or quizzes. The final exam will be given at the time specified by the registrar during the final exam period. Make-up finals for those with verified conflicts will be given on the last day of the final exam period.

NOTE: Travel schedules for weekends or breaks are not acceptable excuses for missing quizzes, exams, lab discussions or lab periods.

Collaboration and Academic Honesty

Collaboration among students in class and in preparation for class discussion is generally encouraged and required for most classes. Educational research indicates that students learn best when they engage in discussions and analyses of class material with their peers. However, the final version of all written work submitted for evaluation must be prepared without consultation with other students. To be fair to all students in the course and to assure maximum learning for each student, we follow all the guidelines for academic honesty spelled out in the *Moravian College Student Handbook 2004-2005* (pages 52-56). Particularly relevant passages are excerpted on the following page.

Academic Honesty at Moravian College

Academic integrity is the foundation on which learning at Moravian College is built. Moravian College expects its students to perform their academic work honestly and *fairly*. In addition, a Moravian student should neither hinder nor unfairly assist the efforts of other students to complete their work successfully. The College's expectations and the consequences of failure to meet those expectations are outlined below.

In an academic community, students are encouraged to help one another learn. In fact, because no two students learn in exactly the same way or take exactly the same things away from a lecture, the College encourages students to *study* together. The boundaries on what is or is not acceptable work *may* not always be clear; thus, if at any point in academic work at Moravian the student is uncertain about his or her responsibility as a scholar or about the propriety of a particular action, the instructor should be consulted. The list below is not to be considered complete but rather covers the most common areas of concern. In general, students should be guided by the following principles.

Plagiarism

A major form of academic dishonesty is plagiarism, which the College defines as the use, whether deliberate or not, of any outside source without proper acknowledgement. While the work of others often constitutes a necessary resource for academic research, such work must be properly used and credited to the original author. This principle applies to professional scholars as well as to students. An "outside source" is any work (published or unpublished) composed, written, or created by any person other than the student who submitted the work. . . . All work that students submit or present as part of course assignments or requirements must be their original work unless otherwise expressly permitted by the instructor. . . . When students use the specific thoughts, ideas, writings, or expressions of others, they must accompany each instance of use with some form

of attribution to the source. Direct quotes from any source (including the Internet) must be placed in quotation marks (or otherwise marked appropriately) and accompanied by proper citation, following the preferred bibliographic conventions of the department or instructor. . . . Student ignorance of bibliographic convention and citation procedures is not a valid excuse for having committed plagiarism. . . . A student may not present oral or written reports written by others as his or her own work. . . . You may not use writings or research obtained from any other student previously or currently enrolled at Moravian or elsewhere or from the files of any student organization (such as fraternity or sorority files) unless expressly permitted to do so by the instructor. . . . Students must keep all notes, drafts, and materials used in preparing assignments until a final course grade is given. . . . All such materials must be available for inspection by the instructor at any time.

Cheating

Students may not submit homework, computer solutions, lab reports or any other coursework prepared by, copied from, or dictated by others. If the student is employing the services of a tutor (whether from the College community or elsewhere), the tutor may not prepare the student's work for class.

Students may not provide or receive unauthorized help in taking examinations, tests, or quizzes or in preparing any other performance requirements for a course. Such restrictions are illustrated by but not limited to the following: Using unauthorized material in an examination, test, or quiz.

- Using crib notes in any form, regardless of who prepared them.
- Using calculators or any other hand-held electronic devices unless authorized by the instructor.
- Using e-mail or text messaging during any exam without the permission of the instructor.
- Stealing, using or transmitting in writing, electronically, or verbally, actual examinations, tests, quizzes or portions thereof prior to or during an exam.
- Reading or observing another's work without his or her consent, whether it be on paper, electronically, or in any other form.
- Soliciting or using a proxy test-taker or acting in that capacity.

False Testimony

Students may not submit or present a falsified excuse for an absence from an examination test, quiz, or other course requirement either directly or through another source.

Students may not falsify laboratory results, research data, or results. They may not invent bibliographical entries for research papers, websites, or handouts. They may not falsify information about the date of submission for any coursework.

EVALUATIONS

Group Work

This semester, evaluation of your contribution to group work will be based upon your group's initial presentations in class, responses to questions in class and daily reports. Group grades will be given out by e-mail upon each change in the compositions of the groups.

Library Project

You will be given the opportunity to become familiar with the organization of chemical literature by searching the literature for original research reports on the synthesis and behavior of a specific complex organic molecule. See the Library Project handout for more details. **Completion of this project is required to receive a passing grade in CH 212.**

Quizzes

Again this semester, there will be short individual in-class quizzes each Friday.

Exams

Again, this semester there will be **two major in-class, closed-book exams** on Wednesday, February 23, and Wednesday, April 6. As was done last semester, **one week prior to each exam** (Wednesday, February 16 and Wednesday, March 30) a set of **questions will be distributed. The set will contain several "simpler questions" and 4-5 "more complex questions"**. The **"simpler questions"** will be **representative of the type of "simpler questions"** that are likely to be **on the exam**. However, the **"more complex questions"** on the exam will be **taken verbatim** from the set of **"more complex questions"** distributed. You will then have one week to **work alone, with your study group members, or anyone else IN THE CLASS to devise answers to the questions**. The exams will be written in class on Wednesday, February 23 and Wednesday, April 6. A periodic table of the elements will be provided and you may bring molecular models, a calculator and writing implements to the exam, but **no notes, books or handouts may be used** and there will be **no consultation or collaboration among students during the exam**. Thus, you can work together in devising answers, but the final copy of your exam should express your own understanding of the material.

Final Exam:

The final exam will be given during the 3 hour final exam period assigned by the registrar. The list of questions for the final exam will be distributed approximately one week before the assigned examination period. Rules for preparing for and writing the final exam are the same as for the other major exams.

Point Distribution:

Your grade will be determined grades on each activity during the semester, as listed below.

Point Distribution:

Library Project (Completion required to pass the course.)	5 %
Quizzes (10) [Jan. 14, 21, 28, Feb. 4, 11, 25, Mar. 4, April 8, 15 & 22]	10 %
Group Work	10 %
Hour Exams (Feb. 23 & April 6) @15 %	30 %
Laboratory (Completion required to pass the course. - See Lab Manual for Details)	25 %
Final Exam	<u>20 %</u>
TOTAL	100 %

CH 212 Spring Term Calendar**January 2005**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
9	10 Classes Begin	11	12	13	14 Quiz 1	15
16	17 MLK Day No Class	18	19	20	21 Quiz 2 -Lib. Proj. sign-up	22
23	24	25	26	27	28 Quiz 3	29

30	31					
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February 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4 Quiz 4	5
6	7	8	9 -Explor. 6 Lab Rpt.	10 -Explor. 6 Lab Rpt.	11 Quiz 5 -Explor. 6 Lab Rpt.	12
13	14	15	16 -Question for Exam I	17	18	19
20	21	22	23 Exam I	24	25 Quiz 6 Mid-Term	26
27	28					

March 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2 -Explor. 7 Lab Rpt.	3 -Explor. 7 Lab Rpt.	4 Quiz 7 -Explor. 7 Lab Rpt.	5 Spring Recess
6 Spring Recess	7 Spring Recess	8 Spring Recess	9 Spring Recess	10 Spring Recess	11 Spring Recess	12 Spring Recess
13 Spring Recess	14	15	16	17	18 -Explor. 8 Lab Rpt.	19
20	21 - Lib. Proj. citations due	22	23 -Explor. 8 Lab Rpt.	24 -Explor. 8 Lab Rpt.	25 Easter Recess	26 Easter Recess
27 Easter Recess	28 Easter Recess	39	30 -Questions for <u>Exam II</u>	31		

April 2005

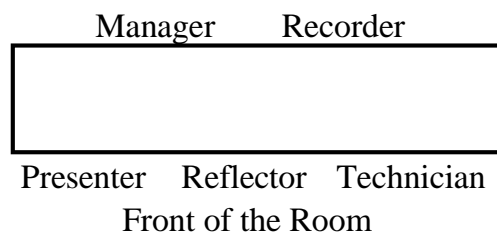
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6 Exam II	7	8 Quiz 8	9
10	11	12	13 -Explor. 9 Lab Rpt.	14 -Explor. 9 Lab Rpt.	15 Quiz 9 -Explor. 9 Lab Rpt.	16
17	18	19	20 Lib. Proj. Due	21	22 Quiz 10	23
24	25	26	27	28 -Wed Explor. 10 Lab Rpt.	29 -Thurs Explor. 10 Lab Rpt. <u>Classes End</u>	30 -Fri Explor. 10 Lab Rpt.

May 2002

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 Final Exams	3 Final Exams	4 Final Exams	5 Final Exams	6 Final Exams	7 Final Exams

CLASS GROUPS

Group Composition and Dynamics: As indicated in the Administrative Policies, much of your class work in CH 212 will be done in groups of four or five students. Each member of the group has a specific role to play in making your collective learning experiences profitable. The definitions of the specific roles to be assigned are listed below. The initial memberships of the groups were determined from your performance in CHEM 211. Again this semester, group membership will change several times during the semester, however, one aspect of group work will remain constant; **each day all members of the group will be assigned new roles and have a specific position at the table.** (See the diagram.)



Group Role Definitions:

Manager

Manages the group. Insures that the group has the **appropriate materials** (class and lab textbooks, lab manual, molecular models, etc.), that **members are fulfilling their roles**, that the **assigned tasks are being accomplished on time**, and that **all members** of the group **participate** in the activities and **understand the concepts**. The Manager **communicates with the instructor** when information or assistance is required and is responsible for seeing that group reports **are submitted in a timely manner**.

Recorder

Obtains the **group folder** and **records group answers and explanations** of the groups conclusions on the class activity for the day. **Submits the group folder** to the instructor at the end of each class period. The Recorder's answers will be considered to be the official group response to each day's activities.

Reflector

Observes and comments to the manager **on group dynamics and behavior** with respect to the learning process, and **the effectiveness of the group** in dealing with daily assignments. The Reflector may be called upon to report to the group, the instructor, or the entire class concerning how well the group is operating or what needs improvement and why. **For each class** the Reflector completes a Reflector's Report with an assessment of the group's performance for the day. The assessment has three specific parts:

1. A **strength** of the group's collaboration on the class group activity.
2. An **improvement** that would increase the group's success.
3. An **insight** the Reflector had from observing the group interactions on the day's activity.

Presenter

Presents group conclusions to the class when requested by the instructor. These presentations may be oral or written on the blackboard, and will be the bases for whole class discussions. The Presenter is also the one who **shares information with other groups** when the Manager deems it appropriate.

Technician

Performs technical duties such as model building, calculations, looking up information in the text or reference books, etc. **For each class** the Technician completes the group's Response Report with group members' names, roles, and **general comments and questions** concerning the day's activities.

NOTE: In groups of four people, one student will fill both the Presenter and Technician roles.

ROTATION OF ROLE ASSIGNMENTS: For the second class day, today's Recorder will become tomorrow's Manager, today's Reflector will become tomorrow's Recorder, today's Presenter will become tomorrow's Reflector, and so on. A similar rotation will be followed each class day.

(i. e. Recorder ->Manager -> Technician -> Presenter -> Reflector -> Recorder)