

ORGANIC CHEMISTRY

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|--|--|---|
| Dan. Libby 213 Collier Ext. 1436 E-mail: rdlibby@cs.moravian.edu | Class Hours | Office Hours |
| | MWF 9:10-10:00 Tues. 9:10-10:00 Room 117 PPHAC | Tues. 10:00 AM ->11:00AM Wed. 10:00 AM ->11:00AM Thurs. 11:30 AM ->12:30PM Fri. 11:30 AM ->12:30PM Or any time, just call X1436 |

SCHEDULE OF CLASS TOPICS FOR CH 211 & 212

Introduction to the Structure of Organic Molecules

- A. Isomerism [Experiment & CGWW 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: pp. 305-317]
 - 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 & 28]
 - 3. How are They Related?

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. 305-317]
- 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]

Applications:

Biomolecules and Biological Reactions [CGWW CH 49 & 50]

REQUIRED MATERIAL

- Organic Chemistry*; by Jonathan Clayden, Nick Greeves, Stuart Warren and Peter Wothers; Oxford University Press, 2001 (ISBN: 0-19-850346-6) (CGWW)
- The Student's Lab Companion*; by John W. Lehman, Pearson Prentice Hall 2004 (ISBN: 0-13-017867-5 - paperback) (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

Again this semester the 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 organic structures or reaction conditions**. We define **understanding of concepts** as the **ability to use them effectively in a variety of 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**.

COURSE ORGANIZATION AND CLASSROOM ACTIVITIES

Groups and Student Collaboration:

To aid you in your study of organic chemistry, each of you will be assigned to a **class discussion group**. Each group will consist of four or five students. For most of the laboratory experiments, you will also work in **research groups**. There may be some personnel overlap between class groups and lab groups, but usually, they will operate independently. Each member of your group will have specific duties to assure that the workload is evenly distributed and help each student develop a range of process skills. Educational research indicates that students who work in groups with their peers tend to learn more in their courses. I hope that you will find that working with the members of your group will give you better insight in your analyses of the daily assignments. Most of the **initial exploratory data analysis** will be done **within your groups outside of class** (See *Class Format* below). Then initial group responses will be discussed in the class as a whole so that we will generally reach a consensus as to the best interpretation of the data. The course structure encourages you to **take responsibility for and an active part in your education** in organic chemistry. The compositions of groups will be changed periodically throughout the semester. Regardless of changes in group composition, specific role assignments will change each class period (See CLASS GROUP STRUCTURE on p. 3.). **You will be expected to work together outside of class in preparing daily class assignments, analyzing lab data and devising answers to questions for exams** (See *Evaluation* pp.4-5). I believe that you will find that small group discussions are very useful in generating ideas that stimulate learning.

Class Format:

This course employs a discussion format that is unconventional for science courses. The value of class periods is largely dependent upon what each student contributes. Each day you will be given specific data and a group exploration assignment for the following class period. Then at the beginning the following class, I will randomly select three or four groups to present their group responses to the assignment. Generally, these presentations will form the basis for whole class discussion. Consequently, **you will be asked to draw initial conclusions from data BEFORE any class discussion of the material has taken place**. This process requires that you rely on your own logic rather than something you have gotten from a lecture or textbook. From your work last semester you should have begun to develop a "sense" of organic chemistry and some confidence with presenting your ideas. After the initial group presentations, 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 consideration gradually building our understanding of organic chemistry. Each assignment will provide you with a particular set of data to analyze and some questions to guide your analysis.

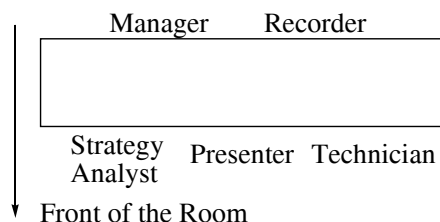
Communication Between Class Members and Professor

Often students immediately request names of potential tutors for this course. I have no problems with your seeking assistance from people who have had the course before, but my experience indicates that, in general, students who have problems in this course benefit much more from **seeking my help outside of class**. I realize that you might have significant concerns about going to the professor's office when you have problems. "If I tell him that I have problems, he'll think I'm stupid." This course is designed to initially determine what class members understand and don't understand, and then to work together to help everyone gain facility with the material. To this end, **any information I can get concerning problems students have is beneficial to the class as a whole**. The **best place to express your confusion is in class**. I recognize that you may be uncomfortable expressing a lack of understanding to the whole group. However, because the **course continually builds upon itself**, it is **critical that you solve your problems of understanding as soon as possible**. So, I recommend that you come and talk with me about problems that you feel uncomfortable about expressing in class. Finally, you can always contact me by e-mail.

CLASS GROUP STRUCTURE

Group Composition and Dynamics:

As indicated in the Administrative Policies (pp. 4-5), most 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. 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 specific positions at the table.** (See the diagram and note that **the manager is facing the front of the room.**)



Group Role Definitions:

Manager

Manages the group. Insures that the group has the **appropriate materials** (class and lab textbooks, molecular models, etc.), **members are fulfilling their roles**, the **assigned tasks are being accomplished on time**, and **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 tablet laptop** and **records group answers and explanations** of the group's conclusions on each question in the class activity for the day. Is **responsible for determining that all group members understand and agree on the group's response to an activity question before moving on** to the next question. **Submits the group recorder's report** electronically to the chemistry server at the end of each class period and returns the group tablet laptop to the computer cart assuring that it is plugged in for charging. The Recorder's answers will be considered to be the official group response to each day's activities.

Strategy Analyst

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 Strategy Analyst 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 Strategy Analyst completes a Strategy Analyst's Report with an assessment of the group's performance for the day.

Presenter

Obtains the group folder at the beginning of class. **Presents group conclusions** to the class when requested by the instructor. These presentations will be oral and may include interpretations of a portion of the recorder's report projected for class consideration. Such presentations will be the bases for further whole class discussions. **Shares information with other groups** when indicated by the instructor. Returns the group folder to the instructor at the end of class.

Technician

Performs technical duties such as model building, calculations, looking up information in the text or reference books, the Internet, etc. as indicated by the manager. **For each class**, 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.

ADMINISTRATIVE POLICIES

Laboratory Discussions and Periods:

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 other health professional) 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.**

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 other health professional) 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) (including the final exam) or quizzes, 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: **Trips scheduled for other courses or travel schedules for weekends or breaks are NOT acceptable excuses** for missing classes, quizzes, exams, lab discussions or lab periods.

Evaluation

Grades:

All grades will be determined on an absolute letter grade scale, so there is no disadvantage to any student for helping another. In fact, often students develop a much better understanding of the concepts and material in the course by **dealing with the different problems and viewpoints of other students.** Student collaboration is an important basis for the design of this course.

Grade Distribution:

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

Grade Distribution:

| | |
|---|-------|
| Library Project (Completion required to pass the course.) | 5 % |
| Quizzes (11) [Jan. 18, 28, Feb. 4, 11, 18, 29, Mar. 14, 26, April 2, 16 & 23] | 10 % |
| Group Work | 10 % |
| Hour Exams (Feb. 22 & April 9) @15 % | 30 % |
| Laboratory (Completion required to pass the course. - See Lab Manual for Details) | 20 % |
| Final Exam | 25 % |
| TOTAL | 100 % |

Group Work

At the end of each class each group electronically submits a recorder's report and places **three reports** in the group folder:

1. Activity Report including the group responses to activity questions (See Recorder on p. 6)
2. Response Report with the group's general comments and questions (See Technician on p. 7).
3. Strategy Analyst's Report assessing the group's work for the day. (See Strategy Analyst on p. 7)

Group Work Grade: Evaluation of your contribution to group work will be based upon:

- Your group's initial presentations in class and responses to questions in class (1/3 of daily grade)
- Your group's Daily Recorder's, Activity and Response Reports (1/3 of daily grade)
- Your individual voluntary contributions to class discussions (1/3 of daily grade).

Group Work Grades will be posted each Friday on the course Blackboard site. **It should be noted that an absent student cannot earn a contribution to a group grade on the day of an absence.**

Quizzes

There will be 5 minute **individual in-class quizzes** each week. The quizzes are designed to provide some encouragement for everyone to get involved in the group activities and stay up with the development of new material throughout the semester. They also serve to give me feedback on what each student understands.

Mid-term Exams

The two **major exams** during the semester will be **in-class closed-book exams** on Friday, February 22 and Wednesday, April 9. The exams will consist of some specific "simpler" questions, and 2 to 4 "more complex" questions, which will require you to apply concepts developed in class to new situations. However, **one week prior to each exam** (Friday, February 15 and Wednesday, April 2) a packet with some "simpler" questions, and 5 or 6 specific "more complex" questions will be distributed. 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 packet** distributed. You will then have one week to work alone, **with your group members, or anyone else in the class to devise answers to the questions**. During your deliberations, you may ask me questions, but you are not allowed to consult any student assistant in the course or anyone not involved in the course this semester. The exams will be written in class on Friday, February 22 and Wednesday, April 9. 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, handouts or electronic material 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 packet 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 those for the mid-term exams.

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 2006-2007* (pages 26-28). Particularly relevant passages are excerpted below.

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. . . . Ignorance on the student's part of bibliographic convention and citation procedures is not a valid excuse for having committed plagiarism. . . .

Students may not present oral or written reports written by others as their own work. .

They 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 fraternities or sororities) 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, an electronic form, or in any other medium.
- Soliciting or using a proxy test-taker or acting in that capacity.

False Testimony

Students may not offer a falsified excuse for an absence from an examination test, quiz, or other course requirement 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.

**CHEM 212 Spring Term Calendar
January 2008**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|-------------------------|---------|-----------|----------|------------------------------|----------|
| 15 | 14 | 15 | 16 | 17 | 18 Quiz 1 | 19 |
| 20 | 21 MLK No classes | 22 | 23 | 24 | 25 -Lib. Proj. sign-up | 26 |
| 27 | 28 Quiz 2 | 29 | 30 | 31 | | |

February 2008

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|---------------------|---------|----------------------------|----------------------------|---|----------|
| | | | | | 1 | 2 |
| 3 | 4 Quiz 3 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 Quiz 4 | 12 | 13 -Expt. 1 Lab Rpt. | 14 -Expt. 1 Lab Rpt. | 15 -Question for Exam I -Expt. 1 Lab Rpt. | 16 |
| 17 | 18 Quiz 5 | 19 | 20 | 21 | 22 Exam I | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 Quiz 6 Mid-Term | |

March 2008

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|-----------------------|-------------------------------------|-----------------------|---|----------------------------|--|------------------------|
| | | | | | | 1 Spring Recess |
| 2 Spring Recess | 3 Spring Recess | 4 Spring Recess | 5 Spring Recess | 6 Spring Recess | 7 Spring Recess | 8 Spring Recess |
| 9 Spring Recess | 10 | 11 | 12 -Expt. 2 Lab Rpt. | 13 -Expt. 2 Lab Rpt. | 14 Quiz 7 -Expt. 2 Lab Rpt. | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 Easter Recess | 22 Easter Recess |
| 23 Easter | 24 Easter Recess | 25 | 26 Quiz 8 -Expt. 3 Lab Rpt. | 27 -Expt. 3 Lab Rpt. | 28 Last withdrawal- Expt. 3 Lab Rpt. | 29 |
| 30 | 31 - Lib. Proj. citations due | | | | | |

April 2008

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

May 2008

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|------------------|---------------------|------------------|------------------|---------------------|---------------------|
| | | | | 1 Final Exams | 2 Final Exams | 3 Final Exams |
| 4 | 5 Final Exams | 6 Final Exams | 7 Final Exams | 8 Final Exams | 9 | 10 |