

**ORGANIC CHEMISTRY**

Dan. Libby 213 Collier Ext. 1436 E-mail: rdlibby@chem.moravian.edu	Class Hours MTWF 8:55-9:45 PPHAC 117	Office Hours Mon. 10:00 -> 11:00 AM Tue. 10:00 -> 11:00 AM Wed. 12:00 -> 1:00 PM Thurs. 11:30 -> 12:30 PM Or any time, just call X1436
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**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]
- H. 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**)

-*Making the Connections: A How-To Guide for Organic Chemistry Lab Techniques*; by Anne B Padías, Hayden McNeil 2007 (ISBN: 978-0-7380-1985-7 - paperback) (**Padías**)

-*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 the FUNDAMENTAL CONCEPTS** and **REASONING SKILLS** that help us organize and understand organic reactions and to **be able to use your skills 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 activity 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 research 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 **to help each student develop the required range of process skills necessary to be successful**. 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. Much 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 first set of groups has been assigned alphabetically but 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** pp. 4-5.). **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* p. 3). I believe that you will find that small group discussions are very useful in generating ideas that stimulate your 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 an activity with specific data and some questions to guide your analysis for the following class period. Then at the beginning the following class, I will randomly select a few groups to present their group responses to the assignment. Generally, these presentations will form the basis for whole class discussions. Consequently, **your group will be asked to draw initial conclusions from data BEFORE any class discussion of the material has taken place**. This process may be a bit uncomfortable at first, since you will have to rely on your group's combined logic rather than something you have gotten from a lecture or textbook. However, as the semester progresses, you will develop a "sense" of organic chemistry and your confidence will increase making you more comfortable with presenting your ideas. After the initial group presentations, we will have a 5 to 10 minute group discussion for all groups to develop responses to the initial presentations. After the group discussion, 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. After each class each group submits **three reports**:

1. **Group Electronic Activity Report** including the group responses to activity questions (See Recorder on p. 5)
2. **Daily Group Strategy Analyst's Report** assessing the logic of the day's activity. (See Strategy Analyst on p. 5)
3. **Daily Group Reflector's Report** with the group's general conclusions for the day and any remaining group questions (See Reflector on p. 5).

### *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 class. 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. To further facilitate communications, I will set up a personal blog folder for each class member on the course Blackboard site. (See Personal Blog below)

### ADMINISTRATIVE POLICIES

#### *Laboratory Discussions and Periods:*

Students are required to attend **all** AM laboratory discussions (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 a personal physician) 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.**

#### *Missed 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 an accepted **prior excuse** or a valid medical 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, 1:30 PM on Tuesday, December 15. 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 reasoning skills needed 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 **grades** on all work in this course will be given as **letter grades**. Grades of F are counted as a full letter grades below D- (So the average of a C- and an F is a D-). The contributions of all course activities to your final grade are listed below.

Library Molecule Project (See Handout) (Completion Required to pass the course)	3 %
Submission of weekly personal blog comments	3 %
Quizzes (11) [Sept. 4, 11, 18, 25, Oct. 2, 16, 23, 30, Nov. 6, 20, Dec. 4]	12 %
Group Work	12 %
Mid-term Exams (2) [Oct. 7 & Nov. 13]	30 %
Laboratory (See the Lab Syllabus for an explanation)	20 %
Final Exam [1:30 PM on Tuesday, December 15]	20 %
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TOTAL	100 %

##### *Personal Blog*

Each week by Saturday at mid-night, you are required to submit a “comment on the course” in your Personal Blog Folder on the course Blackboard site; it will be available only to you and me. There is no fixed length or format for your blog submissions; I just want each of you to share your feeling about or reactions to the course with me each week. Instructions for submitting your blog comments are provided under “Course Information” on the course Blackboard Site. A topic for each week’s blog will be provided. In weeks when group lab reports are submitted your blog will be dedicated to evaluation of the efforts of each group member to the data analysis for and production of the report. Your personal blog comments will not be graded except that you get credit for submitting something thoughtful each week.

### *Molecule Library Project*

This project is designed to give you a chance to apply your developing understanding of organic molecules to learn about an interesting substance and acquire a feeling for the diversity of structures and properties among organic compounds. (See **Molecule Library Project** document.)

### *Group Work*

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 submission of individual assigned electronic Group Activity, Strategy Analyst's or Reflector's Reports (1/3 of daily grade)
- Your individual voluntary contributions to class discussions (1/3 of daily grade).

Group Work Grades for each week will be available in the Grade Center 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 Wednesday, October 7 and Friday, November 13. 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** (Wednesday, September 30 and Friday, November 9) a handout 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 handout** 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 questions of me, 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 Wednesday, October 7 and Friday, November 13. 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.

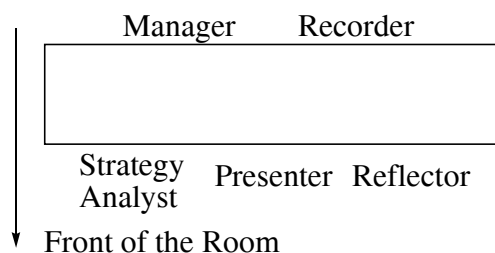
### *Final Exam:*

The final exam will be written during the 3 hour final exam period beginning at 1:30 PM on Tuesday, December 15. The question handout for the final exam will be distributed Tuesday, December 8. Rules for preparing for and writing the final exam are the same as those for the mid-term exams.

## CLASS GROUP STRUCTURE

### *Group Composition and Dynamics:*

As indicated in the Administrative Policies, much of your class work in CHEM 211 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 alphabetical. Group membership will change at times during the semester, however, one aspect of group work will remain constant; for **each class group activity 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 work through activities step-by-step together 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 for each question in the electronic 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. **Copies the group's Electronic Activity Report to the network server** at the end of each class period. The Electronic Activity Report will be considered to be the official group response to each day's activities.

#### *Strategy Analyst*

At the direction of the manager, **reads each activity question to the group** to help the group stay together. As the activity develops, **focuses on how the sequence of questions leads the group to develop particular concepts.** At the end of each activity, completes the electronic **Group Strategy Analyst's Report** with the group's analysis of the logic behind the sequence of questions of the activity.

#### *Presenter*

**Obtains the group folder** at the beginning of class. **Explains group conclusions** to the class when requested by the instructor; these explanations will usually be presented in conjunction with the recorder's report projected on the screen in front of the class, and will be the bases for 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.

#### *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. 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. Assures that all **group members recognize the concepts developed** in each activity. At the end of each activity, completes the electronic **Group Reflector's Report** identifying the key concepts developed by the group and identifying the group's remaining questions.

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

## 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* (<http://www.moravian.edu/studentLife/handbook/academic2.htm>). 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 211 Fall Term Calendar  
August 2009**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	31 Classes Begin Wk 1 PreLab Disc					

**September 2009**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4 Quiz 1 Wk 2 PreLab Disc	5
6	7 Labor Day No Class	8	9	10 - Mol Lib Proj Sign-up	11 Quiz 2 - Lib Mol Proj Sign-up	12
13	14 Wk 3 PreLab Disc	15	16	17	18 Quiz 3	19
20	21 Wk 4 PreLab Disc	22 -Expt. 1 Lab Rpt.	23 -Lib Mol Proj Library Training -Expt. 1 Lab Rpt.	24 -Expt. 1 Lab Rpt.	25 Quiz 4 -Expt. 1 Lab Rpt.	26
27	28 Wk 5 PreLab Disc	29 -Expt. 2 Lab Rpt.	30 -Question for Exam I -Expt. 2 Lab Rpt.			

**October 2009**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 -Expt. 2 Lab Rpt.	2 Quiz 5 -Expt. 2 Lab Rpt.	3
4	5 Wk 6 PreLab Disc	6	7 Exam I	8	9 Wk 7 PreLab Disc	10 Fall Break
11 Fall Break	12 Fall Break	13 Fall Break	14	15	16 Quiz 6	17
18	19	20 Wk 8 PreLab Disc	21 -Expt. 3 Lab Rpt.	22 -Expt. 3 Lab Rpt.	23 Quiz 7 -Expt. 3 Lab Rpt.	24
25	26 -Mol Lib Proj phase 1 due	27 Wk 9 PreLab Disc -Expt. 3 Lab Rpt.	28 -Expt. 4 Lab Rpt.	29 -Expt. 4 Lab Rpt.	30 Quiz 8 -Expt. 4 Lab Rpt.	31

**November 2009**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3 Wk 10 PreLab Disc -Expt. 4 Lab Rpt.	4 -Expt. 5 Lab Rpt.	5 -Expt. 5 Lab Rpt	6 Quiz 9 -Expt. 5 Lab Rpt. -Questions for Exam II	7
8	9	10 Wk 11 PreLab Disc -Expt. 5 Lab Rpt.	11	12	13 Exam II	14
15	16	17 Wk 12 PreLab Disc	18 -Expt. 6 Lab Rpt.	19 -Expt. 6 Lab Rpt.	20 Quiz 10 -Expt. 6 Lab Rpt.	21
22	23	24 -Expt. 6 Lab Rpt.	25 Thanksgiving Break	26 Thanksgiving Break	27 Thanksgiving Break	28 Thanksgiving Break
29 Thanksgiving Break	30 Wk 13 PreLab Disc -Mol Lib Proj phase 2 due					

**December 2009**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 -Expt. 7 Group Lab Rpt. Presentations	2 -Expt. 7 Group Lab Rpt. Presentations	3 -Expt. 7 Group Lab Rpt. Presentations	4 Quiz 11 -Expt. 7 Group Lab Rpt. Presentations	5
6	7	8 -Questions for FINAL	9 Classes End:	10 Reading Day	11 FINAL EXAMS	12 Reading Day
13 Reading Day	14 FINAL EXAMS	15 CHEM 211 FINAL 1:30 PM	16 FINAL EXAMS	17 FINAL EXAMS	18 FINAL EXAMS	13