

**ORGANIC CHEMISTRY**

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Class Hours  
MTWTF 8:55-9:45 AM  
PPHAC 102

Lab Hours  
TR 12:45 – 3:45 PM  
WF 1:15 – 4:15 PM  
211 Collier

**SCHEDULE OF CLASS TOPICS FOR CH 211 & 212****Introduction to POGIL and the structure of Scientific Arguments**

What is POGIL? – First class

Data Interpretation – First week lab discussion

**Introduction to the Structure of Organic Molecules**

- A. Molecular Representations and Isomerism [CGW CH 1 & 2: pp. 1-22]
- B. Functional Groups, Double Bond Equivalents and Nomenclature [CGW CH 2: pp. 23-34, CH 3: pp. 74-76]

**Equilibrium Controlled Reactions:**

- A. Organic Reactions: Thermodynamics vs. Kinetics [CGW CH 12: pp. 240-249]
- B. Acid Base Reactions [CGW CH 8 pp. 163-181]
- C. Reactions of Carbonyl Compounds. [CGW CH 5]
  - 1. What Happens?
  - 2. How and Why Does It Happen?
    - a. Addition Reactions. [CGW CH 6 all, 22: pp. 498-510, CH 20 all & 26: pp. 614-639]
    - b. Addition-Elimination Reactions. [CGW CH 11 all]
    - c. Acyl Substitution Reactions. [CGW CH 10 all & CH 26: pp. 640-654]
  - 3. How are They Related?

**REQUIRED MATERIAL**

-*Organic Chemistry*; by Jonathan Clayden, Nick Greeves and Stuart Warren; Oxford University Press, 2012 (ISBN: 978-0-19-927029-3) (CGW)

-*Making the Connections: A How-To Guide for Organic Chemistry Lab Techniques*; Second Edition, by Anne B Padías, Hayden McNeil 2011 (ISBN: 978-0-7380-4135-3 - paperback) (Padías)

-1002A/Organic Chemistry Introductory A-Set (Models)

**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**. 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.).

*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 of the following class, we 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**. 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. Following the group discussions, 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 an **electronic Recorder's Report**, which includes the group responses to activity questions (See Recorder on p. 5) **After each class activity there will be out of class reading assignments and application questions. Also, 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). This process may be a bit uncomfortable at first, since initially 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. The course structure encourages you to **take responsibility for, and an active part in your learning** in organic chemistry. Educational research indicates that students who work in groups with their peers tend to learn more in their courses. We 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.

*Communication Between Class Members and Instructors*

Often students immediately request names of potential tutors for this course. We have no problems with your seeking assistance from people who have had the course before, but our experience indicates that, in general, students who have problems in this course benefit much more from **seeking our help outside of class**. We realize that you might have significant concerns about going to an instructor's office when you have problems. (e. g. "If I tell him that I have problems, he'll think I'm not very smart.") But this course is designed as a "community of scholars" 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 we can get concerning problems students have is beneficial to the class as a whole. The best place to express your confusion is in class**. We recognize that you may be uncomfortable expressing a lack of understanding to the whole class. However, the **course continually builds upon itself**, so it is **critical that you solve your problems of understanding as soon as possible**. We recommend that you come and talk with us about problems that you feel uncomfortable about expressing in class.

## 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, 8:30 AM on Tuesday, December 9. 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**. Collaboration is an important basis for the design of this course and of science in general.

#### *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.

On-line homework	9 %
Quizzes (11) [Aug. 29, Sept. 5, 12, 19, 26, Oct. 10, 17, 24, 31 Nov. 7, 14]	11 %
Group Work	10 %
Mid-term Exams (2) [Oct. 1 & Nov. 19]	30 %
Laboratory (See the Lab Syllabus in the Lab Manual for an explanation)	20 %
Final Exam [8:30 AM on Tuesday, December 9]	<u>20 %</u>
TOTAL	100 %

#### *On-line Homework:*

After we complete most activities you will have an electronic homework application assignment through the Sapling Learning System (<https://www.saplinglearning.com/>) Sapling's chemistry questions are delivered in a web browser to provide real-time grading, response-specific coaching, improvement of problem-solving skills, and detailed answer explanations. Dynamic answer modules enable one to interact with 3D models and figures, utilize drag-and-drop synthetic routes, and draw chemical structures - including stereochemistry and curved arrows. Altogether, Sapling is cheaper than a tutor, provides more value than a solutions manual, and goes beyond a mere assessment exercise to give a learning experience. See the First Class Assignment Sheet for instructions to enroll in Chem 211 on Sapling; the cost is \$29.99 for the semester.

#### *Quizzes*

There will be 5 minute **individual in-class quizzes** most weeks. (See above and CHEM 211 Fall Term Calendar, pp. 6-7) The quizzes are designed to provide some encouragement for everyone to get involved in the group activities, to stay up with the development of new material throughout the semester and to complete out of class application assignments. They also serve to give us feedback on what each student understands.

*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 group's submission of Electronic Recorder'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.**

*Mid-term Exams*

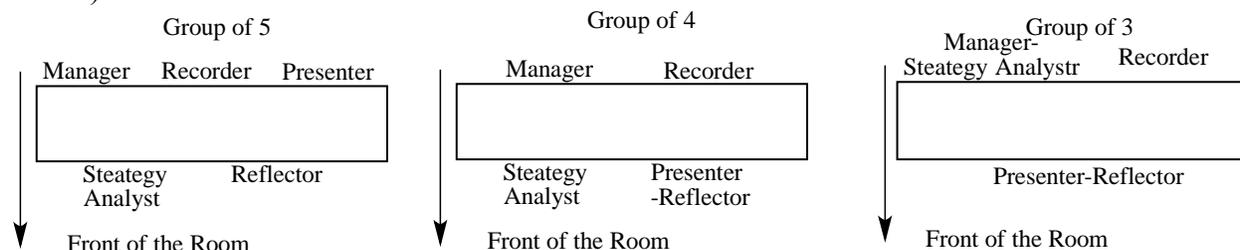
The two **major exams** during the semester will be **in-class closed-book exams** on Wednesday, October 1 and Wednesday, November 19. The exams will consist of some specific "simpler" questions, and 2 to 4 "more complex" questions, which will require you to apply concepts developed in class to new situations. However, **one week prior to each exam** (Wednesday, September 24 and Wednesday, November 12) 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 us, 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 1 and Wednesday, November 19. 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 8:30 AM on Tuesday, December 9. The question handout for the final exam will be distributed after class on Tuesday, December 2. 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 period 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 recorder's reports **are submitted in a timely manner.**

#### *Recorder*

Obtains the **group tablet laptop**, **downloads the electronic activity from the course Google Drive**, **renames the activity with the group name** and **records group answers and warrants** for the group's claims 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. At the end of each class period, **copies the group Electronic Recorder's Report back to the course Google Drive** and returns the **group tablet laptop** to the cart **assuring that it is properly plugged in for charging.** The Electronic Recorder's 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 in the activity leads the group to develop particular concepts.** At the end of each activity, leads the Strategy Analyst's Report Discussion of the logic behind the sequence of questions of the activity and assures that the sense of the group is documented by the recorder.

#### *Presenter*

**When necessary, obtains the group folder** at the beginning of class. **Presents group claims and warrants** to the class when requested by the instructor; these claims and warrants 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 manager or instructor. **Returns the group folder and group name sign** 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, leads the Reflector's Report Discussion identifying the group's consensus on the key concepts developed by the group, their warrants for the development and identifying the group's remaining questions.

NOTE: In groups of **four people**, one student will fill both the **Presenter and Reflector** roles. In groups of **three people**, the **Manager** will also fill the **Strategy Analyst** role.

## **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* (See College Website <http://www.moravian.edu/studentLife/handbook/academic/academic2.html>).

## **DISABILITY SUPPORT**

Students who wish to request accommodations in this class for a disability should contact Elaine Mara, assistant director of learning services for academic and disability support on the 1st floor of Monocacy Hall or by calling 610-861-1401. Accommodations cannot be provided until authorization is received from the Academic Support Center.

**CHEM 211 Fall Term Calendar  
August 2014**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
24	25 Classes Begin -Wk 1 PreLab Disc	26	27	28	29 <b>Quiz 1</b>	30
31						

**September 2014**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Labor Day Wk 2 PreLab Disc	2 Last Day for Course Changes	3	4	5 <b>Quiz 2</b>	6
7	8 Wk 3 PreLab Disc	9	10	11	12 <b>Quiz 3</b>	13 Family Day
14	15 Wk 4 PreLab Disc	16	17	18	19 <b>Quiz 4</b>	20
21	22 Wk 5 PreLab Disc	23 -Expt. 1 Lab Rpt.	24 -Questions for <u>Exam I</u> -Expt. 1 Lab Rpt.	25 -Expt. 1 Lab Rpt.	26 <b>Quiz 5</b> -Expt. 1 Lab Rpt.	27
28	29 Wk 6 PreLab Disc	30				

**October 2014**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 <b>Exam I</b>	2	3 mid-term	4
5	6 Wk 7 PreLab Disc	7 -Expt. 2 Lab Rpt.	8 -Expt. 2 Lab Rpt.	9 -Expt. 2 Lab Rpt.	10 Wk 8 PreLab Disc <b>Quiz 6</b> -Expt. 2 Lab Rpt.	11 Fall Break
12 Fall Break	13 Fall Break	14 Fall Break	15 -Expt. 3 Lab Rpt.	16 -Expt. 3 Lab Rpt.	17 <b>Quiz 7</b> -Expt. 3 Lab Rpt.	18 Homecoming
19	20 Wk 9 PreLab Disc	21 -Expt. 3 Lab Rpt.	22 -Expt. 4 Lab Rpt.	23 -Expt. 4 Lab Rpt.	24 <b>Quiz 8</b> -Expt. 4 Lab Rpt.	25
26	27 Wk 10 PreLab Disc	28 -Expt. 4 Lab Rpt.	29 -Expt. 5 Lab Rpt.	30 -Expt. 5 Lab Rpt	31 <b>Quiz 9</b>  Drop with W Date	

**November 2014**

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

**December 2014**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2 -Expt. 7 Group Lab Rpt Presentations - Questions for <u>FINAL</u>	3 -Expt. 7 Group Lab Rpt Presentations	4 -Expt. 7 Group Lab Rpt Presentations	5 -Expt. 7 Group Lab Rpt Presentations Classes End:	6 <b>Reading Day</b>
7 <b>Reading Day</b>	8 <b>FINAL EXAMS</b>	9 <b>CHEM 211 FINAL 8:30AM</b>	10 <b>FINAL EXAMS</b>	11 <b>FINAL EXAMS</b>	12 <b>FINAL EXAMS</b>	13