

Syllabus

CHE 141

Organic Chemistry I

Spring Semester 2012

Section 04

MTWF 11:30 – 12:20 PM

201 Nobel Hall

Lecturer

Dr. Aron Anderson

office: 308 Nobel Hall (Office hours: M, T: 9:30-10:30, W: 1:30 – 3:00 in the Nobel Hall Atrium other times available by appointment)

e-mail: aander16@gustavus.edu

phone: 507.933.6051

Required Textbook: *Organic Chemistry with Biological Applications* by John McMurry (Second Edition) Brooks/Cole, 2011. ISBN: 978-0-495-39144-9

Lab Texts: *Organic Chemistry I: CHE 141 Laboratory Experiments Spring 2012*; and *The Organic Chem Lab Survival Manual* by James W. Zubrick (Eighth Edition) Wiley, 2011. ISBN 978-0-470-49437-0

Other Paraphernalia: One good molecular model kit (strongly recommended): for example, *Molecular Visions* by Darling Models; Safety goggles (required); a bound laboratory notebook with duplicate page functionality (required).

Course web page on Moodle: <https://moodle.gac.edu/course/view.php?id=478597>

Sapling homework site: <http://www.saplinglearning.com/ibiscms/course/view.php?id=6292>

Course Objectives

As you progress through this course you should learn and understand these concepts:

Basics of atomic structure and how to depict atoms and molecules

Acid and base chemistry as it relates to organic molecules

The nature of polar bonds

Resonance structures and their importance to organic structures and reactions

How organic molecules form bonds

Isomers

Common organic functional groups

Structures, conformations, and chemistry of alkanes and cycloalkanes

Reactions of organic molecules

Depiction of chemical reaction mechanisms

Stereochemistry, including chirality, stereoisomers, enantiomers, and diastereomers

Structures and reactions of alkenes

Structures and reactions of organic molecules containing aromatic rings

Basics of infrared spectroscopy, mass spectrometry, and NMR spectroscopy

Nucleophilic substitution reactions, including S_N1 and S_N2 mechanisms

Elimination reactions, including E1, E1cB, and E2 mechanisms

Examinations

There will be four (4) midterm exams and one (1) final exam. There will be no makeup exams. Personal notes are not allowed to be used during examinations. Calculators may occasionally be needed on exams, but usually not. The midterm exams together will count for about **50%** of the final grade. The final exam is cumulative for the entire course and will count for about **20%** of the final grade.

Homework

You must do a significant amount of homework problems to do well in this class. When you are reading the book and encounter the practice problems within the chapters, you should stop and take the time to work through them. Also, homework problems from the textbook will be recommended for each chapter. Homework problems from the textbook will not be collected or graded, but you will be expected to understand the concepts and be able to demonstrate this capability on the exams. Indeed, completion of practice problems and homework problems is critical for satisfactory performance on the midterms and the final exam. You are encouraged to complete extra problems beyond those recommended. Please don't underestimate the importance of this.

Sapling Homework System. You will be responsible for completing the online homework on the Sapling System, as it will be part of your course grade. Problem sets will be due approximately weekly. Each homework set will have a **due date/time** by which the set **must** be completed to receive points. The link for this homework is provided above and will also be available on the course Moodle site. The Sapling Homework scores will constitute **10%** of the final grade.

Grading

The points for the course will be captured as follows. The midterm exams will be worth 100 points each for a total of 400 (which will be prorated to 500 points) and the comprehensive final exam will be worth 200 points. The labs and lab reports will account for 200 points (attendance at **all** labs is **mandatory**. One missed lab = failure for the course). The homework will be worth 100 points. This gives a total of 1000 points which are possible for the entire course.

Coursework	Contribution to course grade
Midterm Exams	50%
Homework	10%
Lab	20%
Final Exam	20%

To earn the following grades, you must achieve the total minimum percentages noted here:

Grade	Minimum percent of points
A-	88%
B-	75%
C-	62%
D	50%

This table is provided to allow you to estimate your performance as the semester progresses. The precise final grades will be determined based on the distribution of scores at the end of the semester.

Lecture Schedule (approximate trajectory)

We will plan to navigate the first 12 chapters in the textbook, in the slightly-erratic, non-sequential fashion noted below.

Dates	Topic	Book Chapter
Feb 6-10	Introduction; Structure and bonding	1
Feb 13-17	Polar Covalent Bonds; Acids and Bases	2
Feb 20-22	Alkanes and their Stereochemistry	3
Feb 24	Midterm Exam 1 (Chapters 1-3)	
Feb 27-Mar 2	Cycloalkanes and their Stereochemistry	4
Mar 5-9	Stereochemistry at Tetrahedral Centers	5
Mar 12-14	Tetrahedral Centers; Chemical Reaction Overview	5, 6
Mar 16	Midterm Exam 2 (Chapters 4-6)	
Mar 19-23	Chemical Reaction Overview; Alkenes	6, 7
Mar 26-30	Alkenes; Reaction of Alkenes	7, 8
Mar 31-Apr 9	Midterm Break.....No Classes	
Apr 10-11	Reactions of Alkenes	8
Apr 13	Midterm Exam 3 (Chapters 6-8)	
Apr 16-20	Infrared Spectroscopy (IR), UV Spectroscopy and Mass Spectrometry (MS); NMR	10, 11
Apr 23-27	NMR Spectroscopy;	11
Apr 30-May 2	Aromatic Compounds	9
May 4	Midterm Exam 4 (Chapters 10, 11, 9)	
May 7-11	Alkyl Halides; Nuc Subs and Elims	12
May 14-16	Alkyl Halides; Substitutions and Eliminations	12
May 17	Reading Day	
May 18-22	Finals Week	
May 22	Final Exam: Tuesday, May 22, 3:30-5:30 PM in Nobel 105	

[Note: The Lab Schedule will be described in the individual laboratory sections.]

Academic Honesty

Don't cheat, OK. The honor code and the college's policies on cheating and plagiarism are described elsewhere and will be upheld in this class. Homework and Lab Reports you submit should be based primarily on your personal effort, with any collaborative discussion you have with other students focused on concepts and methods. You should not copy anyone else's work. This may seem like an easy solution to your busy class schedule or your interest in other subjects (like internet-based video games), but cheating at this point in your career only leads to the development of undesirable habits (such as: taking credit for other people's accomplishments) and illegal behaviors (think: Bernie Madoff-inspired Ponzi schemes). Would you want to go to the neurosurgeon who cheated their way through Organic Chemistry (or their medical school classes)?

Full descriptions of the Academic Honesty Policy and the Honor Code can be found in the catalogue on the web at: https://gustavus.edu/general_catalog/current/acainfo

Chemistry Tutors

Chemistry tutors are available Sunday through Thursday evenings, 7:00–10:00 PM in Room 305 Nobel Hall. They will be quite helpful in addressing your questions about enantiomers, nucleophiles, multi-step organic reactions, and other aspects of the course.

Peer Mentoring Program

To help you develop stronger learning skills and to better understand the ethos of scientific inquiry you will be participating in a Peer Mentoring program during the semester. This program is funded with a grant from the Howard Hughes Medical Institute (HHMI). The goal of this program is to help you be more successful in biology and chemistry, as well as other scientific courses.

Each week, you will meet with a small group of peers also enrolled in BIO102 and/or CHE141. The sessions are led by a junior or senior majoring in biology, chemistry, or biochemistry. The sessions involve activities where you will practice application and synthesis of concepts, and gain an enhanced understanding. There are three main types of activities:

- Lecture and Laboratory content reinforcement and practice
- Skill building
- How to think and act like a scientist

You are required to **sign up** for a peer-mentoring group in 121 Nobel Hall on **Tuesday, Feb. 7** or **Wednesday, Feb 8** between **5:00 - 9:00 pm**. If you are enrolled in either BIO 102 Organismal Biology or CHE 141 Organic Chemistry, you will sign up for a group that will focus solely on that class. If you are enrolled in both BIO 102 and CHE 141, you will sign up for a group that does activities for both courses. Please bring your class and event schedule with you when you sign up for a peer mentoring group to help determine which time will work best for you. Peer mentors will be available at that time to answer your questions.

You will meet with your group once a week in Nobel 121 or Nobel 106B. Bring a notebook and a pen or pencil to your session, and possibly a textbook. You will not be allowed to use personal electronic devices (such as phones, smartphones, flip-phones, dumb-phones, iPods, Tomagotchis,...) during your peer mentoring session. Ten sessions are planned for the weeks of: Feb. 12, 19, 26; Mar. 4, 11, 18; April 15, 22, 29; and May 6. There will be no session before or after Easter Break (weeks of March 25 and April 8). A list of the Peer Mentoring activities for the semester is on Moodle. If you do not attend *and actively participate* in eight (8) of the ten (10) peer mentoring sessions, **you will lose 5%** of your final course points. If you have any questions, please contact Pamela Kittelson, HHMI Peer Mentoring Coordinator at pkittels@gustavus.edu.

Disability Services

Gustavus Adolphus College is committed to ensuring the full participation of all students in its programs. If you have a documented disability (or you think you may have a disability of any nature) and, as a result, need reasonable academic accommodation to participate in class, take tests or benefit from the College's services, then you should speak with the Disability Services Coordinator, for a confidential discussion of your needs and appropriate plans. Course requirements cannot be waived, but reasonable accommodations may be provided based on disability documentation and course outcomes. Accommodations cannot be made retroactively; therefore, to maximize your academic success at Gustavus, please contact Disability Services as early as possible. Disability Services (<https://gustavus.edu/advising/disability/>) is located in the Advising and Counseling Center.

Help for Students Whose First Language is not English

Support for English Language Learners (ELL) and Multilingual students is available via the College's ELL Support staff person, Andrew Grace (agrace@gustavus.edu or x7395). He can meet with individual students for tutoring in writing, consulting about academic tasks, and helping them connect with the College's support systems. The ELL Support person can also consult with faculty members who have ELL and multilingual students enrolled in their classes. The College's ELL staff person can provide students with a letter to a professor that explains and supports academic accommodations (i.e. additional time on tests, additional revisions for papers). Professors make decisions based on those recommendations at their own discretion. In addition, ELL and multilingual students can seek help from peer tutors in the Writing Center.