

ORGANIC CHEMISTRY II - CHEM 3422

Spring 2019; TR 12:30-1:45, TLC 1203

Instructor: Dr. Vickie Geisler

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Office: TLC 2120

Office Hours: T & R 10-12, M 1-4, W 1-2; other times by appointment

Problem-Solving Sessions: M 4-5:30, T 5-6, W 5-6 all in TLC 2105

Textbook: *Organic Chemistry*, John McMurry, 9th Ed.

Suggested Material: "Preparing for your ACS Exam in Organic Chemistry: The Official Guide"

Online resources: www.khanacademy.org/science/organic-chemistry

Required Equipment: I-clicker (1 or 2); this is the UWG sanctioned clicker that is used in Biology and other UWG courses. **Bring your clicker to class every day!!** The link to register your I-Clicker can be found in the content on CourseDen. I will drop the two lowest clicker quizzes and the two lowest participation grades so you will not be penalized if you forget your clicker, miss class, or your clicker does not work.

Pre-requisite: Completing CHEM 2411 with a "C" or better. Those registering without the prerequisite may be assigned a grade of W.

Co-requisite: Due to the co-requisite nature of CHEM 3422 and CHEM 3422L students withdrawing one of the two courses **MUST** also withdraw from the other.

Course Den: Enrolled students will have access to CourseDen where I will post grades, updated syllabus, PowerPoint presentations, and other material.

Course Description: The second course of a two-semester sequence that will systematically explore reactions of carbon-containing compounds and the mechanistic pathways involved in these processes. Reactions that will be discussed include functional group transformations, oxidations, reductions, condensations and carbon-carbon bond formation. The course begins to teach the student how to systematically design a multi-step synthesis of organic compounds.

Objectives: To introduce the language of organic chemistry; to educate students to think independently about organic chemistry; to reason and think analytically in solving problems and making decisions in matters involving organic chemistry. To look for patterns and recognize qualitative similarities between seemingly unrelated facts. To develop a practical understanding for the causes of chemical change; to identify organic compounds using NMR; to predict reactivity from structure; and to learn to predict the outcome of a reaction never seen before and to communicate organic chemistry with clarity.

Grading:	Clicker Quizzes (one at start of each lecture)	6%
	Clicker Participation (CP) during each lecture	3%
	Problem Sets	7%
	Exams: 1/29, 2/21, 3/14, 4/18	64%
	Cumulative Final Exam – May 2 nd 11-1	<u>20%</u>
		100 %

Note on Quizzes and Exams: **All clicker quizzes and exams will be taken individually.**

- Successful students report spending at least 12 hours each week. This entails:
 - Reading and taking notes from the textbook,
 - Completing the ChemActivities (including exercises),
 - Completing assigned problems in McMurry and problem sets

Clicker Quizzes (CQ): At the start of each lecture there will be a 5 point CQ (clicker quiz) over the material covered in the previous class period. Clicker quizzes will be taken individually. Please remain quiet until time is called. **The two lowest quiz scores will be dropped.** You will not be excused from any quizzes; there are no make-up quizzes. A quiz missed for any reason will earn a zero.

Clicker Participation (CP): After the clicker quiz and during each class there will be several clicker questions. Unlike the clicker quizzes, you are encouraged to work with your group to answer these clicker questions. When you have arrived at an answer you must each individually key in your response. 3% of your grade is determined by your answers to these clicker questions according the following scheme: full credit for a correct response, 75% credit for an incorrect response, 0% for no response. **The two lowest CP scores will be dropped.**

Exams: There will be four exams given on January 29, February 21, March 14 and April 18. No make-up exams will be given. An exam missed for any reason will result in your final exam counting in its place. Each exam will specifically test class material covered since the previous exam. However, since the nature of chemistry is cumulative, I will assume that you have mastered all previous material.

Final Exam: The final exam will be a national ACS exam. It is a comprehensive exam over the entire course including material from CHEM 2411. The exam will be given on Thursday, May 2nd, 11:00 am-1:00 pm

Problem Sets: Problem sets will be posted on coursedem on a regular basis to help you prepare for exams. Selected problem sets will be collected and graded. PS must be handwritten and submitted as hard copies during class on the day on which they are due. Problem sets equal 7% of your final grade. Copying any part of a problem sets will result in a grade of zero for that assignment. Late problem sets will not be accepted.

Problem Sessions: (Attend PS and earn up to two dropped clicker quizzes)

- M 4-5:30, T 4-5 and W 5:15-6:15 all in TLC 2105
- During PS you will work on HW problems. This can earn you “PS points”.
- Earn 1 PS point for each PS you attend and participate. You will earn a dropped clicker quiz for your 4th, 9th and 15th PS point earned.

Practice problems: problems from the book (McMurry) are listed in the syllabus with answers in the solution manual. A copy of the solution manual is in the chemistry office to look at.

Academic Honesty:

- Entering clicker answers for another student or getting another student to enter answers into your clicker is a violation of the honor code and both/all students involved will automatically lose all possible clicker points for the class (at a minimum see below).
- All exams and clicker quizzes will be closed book/closed notes, and will be taken individually (no help from your group members during quizzes or exams.) Except for extra credit quizzes given on the day after exams.
- During exams you may not use your own paper or other materials except your pen or pencil.
- Visible cell phones during an exam may result in the grade of zero for that exam.
- Academic dishonesty will not be tolerated. Academic dishonesty includes unauthorized use of any materials, notes, sources of information, or study aids or tools during a quiz or exam. It also includes the unauthorized assistance of any person other than the course instructor during a quiz

or exam, the unauthorized viewing of another person's work during a quiz or exam, or the unauthorized securing of all or part of any quiz or exam before submission by the instructor.

- Violation of academic honesty will generate disciplinary action that may include a course grade of F. A student who is suspected of cheating must confess to all wrongdoing at the first opportunity (when first confronted), or risk a harsher penalty. If you believe that there are situations in the course that foster academic dishonesty, please bring them to my attention. Likewise, if you have observed cheating, bring the details to my attention as soon as practical. Insofar as it is possible, your anonymity will be protected.

Calculation of Overall Average:

- Method 1. All grades will be averaged together according the grading scale above.
- Method 2. The lowest exam is dropped from the calculation and the final exam will count in its place.
- **Grading Scale:** A: 100-85; B: 84-75; C: 74-60; D 59-50; F: 49-0%
- **Note:** Last day to withdraw with a "W" is February 27th after the second exam.

Classroom and Outside-of-classroom Expectations:

- This course will be taught using the Process Oriented Guided Inquiry Learning (POGIL) method instead of a traditional lecture.
- The majority of class time will be spent working in self-managed learning groups of three. I will assign group membership and reshuffle groups on a regular basis.
- You are expected to work together as a team to answer the questions posed. Thus, you are highly encouraged and expected to discuss, with your group members, the concepts and the answers to the questions.
- Each class will begin with a 5-point quiz, individually taken, covering material from the previous class.
- The quiz will be followed by a short lecture then group work on a ChemActivity with clicker questions along the way. During the group work time I will walk around class, observe, ask and answer questions. You must bring your ChemActivities to class every day.
- The POGIL material is designed to use leading questions to guide you towards the formation of your own knowledge.
- My job is to facilitate learning. That means creating learner-centered experiences.
- In many instances, I may not answer a question directly but may ask you a question that will lead you to discovering the answer for yourself.
- You must complete each day's ChemActivity sheets, including the exercises at the end of the activity and the assigned readings and problems in McMurry before the next class period, as they will form the basis of the quiz.
- This course will require *no less than* 12 hours of study time each week, beginning in the first week of the semester. The best way to study is to work problems.
- It is highly suggested that you use a binder to store and organize all classroom-related materials. A suggested organization might be to group each day's work as follows: worked out ChemActivity exercises, any notes taken during class, worked out problems from McMurry. These might be ordered in chronological or reverse chronological order.

Additional Policies:

- Students are expected to attend all classes. A large part of the learning process in this course is based on the in-class activities. If you are not here you will not have a chance to participate in

those activities. There will be no makeup quizzes – if you miss a quiz you will earn a zero. If you miss a class it is your responsibility to get class material from another student in the class.

- If you must bring your cell phone to class, make sure the ringer is **OFF** during class. Any cells phones seen during an exam will result in an automatic F for the exam.
- This syllabus outlines the policies for the course. You are responsible for understanding them. Any changes in course policy will be announced in class or on the class Course Den site.
- Qualified students with disabilities should contact me as soon as possible to ensure that appropriate accommodations can be made.
- Refer to the vpaa website for information on academic support, honor code, email policy, credit hour policy and HB 280 campus carry policy
<https://www.westga.edu/administration/vpaa/common-language-course-syllabi.php>

Course Outline:

Exam 1

- Chapter 13 NMR
Chapter 14 Diels Alder
Chapter 15 and 16 Aromatics: Aromaticity, Nomenclature, reactions at the benzylic position, and Electrophilic Aromatic Substitution

Exam 2

- Chapter 17 Alcohols and Phenols
Chapter 18 Ethers and Epoxides
Chapter 19 Aldehydes and Ketones; Nucleophilic Addition Reactions

Exam 3

- Chapter 20 & 21 Carboxylic Acids and their Derivatives: Nomenclature, acidity, spectroscopy, reduction, reactions with nucleophiles, interconversion of derivatives
Chapter 22 Carbonyl Alpha-Substitution Reactions, Enolate Anions, alkylation, decarboxylation,

Exam 4

- Chapter 22 and 23 Carbonyl Alpha-Substitution and Condensation Reactions: Enolate Anions; Aldol, Claisen, and Michael Condensations, conjugate addition to α,β -unsaturated carbonyl compounds

Useful web sites

Khan Academy videos: <https://www.khanacademy.org/science/organic-chemistry>

Schedule

Date	Chem Activity/Topic	McMurry Sections	Relevant Problems in McMurry
January 8	Review of NMR	13.3-13.13 and 15.7	13.44-45, 50, 53-55, 58, 61-62, 15.41, 47
January 10	Diels Alder	14.4-14.6	14.7-9, 31-40
January 15	Aromatic Compounds	15-15.6	15.2-3, 9-12, 18, 19, 32, 37-38, 43-44
January 17	Electrophilic Aromatic Substitution	16-16.5	16. 4-9, 14, 29-34
January 22	Substituent Effects	16.4-16.6	16.10, 12-14, 36, 49, 52, 53
January 24	Synthesis Workshop I	16.9-16.11	16.22-23, 35, 45-48, 55, 68, 72
January 29	Exam I		
January 31	Acidity of Phenols + Alcohols	17-17.3	17.1-6, 25, 52
February 5	Nucleophilic Addition to C=O	17.4-17.5, 19.4, 21.6	17.7-10, 30-33, 19.36, 21.19
February 7	Reactions of Alcohols	17.6-17.7	17.13-15, 34-40, 60-61, 65
February 12	Preparation of Aldehydes and Ketones	19.1-10	19.1-14, 30, 32, 34, 39, 41, 57, 60
February 14	Protection groups and Synthesis C=O	17.8, 19.10-19.11	19.16, 35, 37, 40, 47
February 19	Reactions of ethers	18.1-2, 18.5-6	18.23, 25-26, 28, 30, 32-33, 35-36, 55
February 21	Exam II		
February 26	Carboxylic Acids	20-20.7	20.1-3,6-12,15,21,23,25,31-32,36,43-44,46-47,49-50,56-59
February 28	Nitriles	20.6, 21-21.2	20.13-14, 24, 45, 21. 4, 54,
March 5	Reactions of Acid Chlorides	21.3-21.4	21.1-5, 9-12, 14-15, 31,32, 45, 46, 48, 52, 67
March 7	Reactions of Anhydrides	21.5-7	21-16-21, 33, 34, 49, 50, 53-54, 71-73
March 12	Reactions of Esters and Amides	22-22.7	22.1-2, 4-8, 20-22, 30, 37-40,51
March 14	Exam III	22.7	22.10-11, 13-14, 16, 23, 25, 29, 42-47, 54, 58
March 18-23	Spring Break		
March 26	Acidity of the alpha-Hydrogen	22-22.7	22.1-2, 4-8, 20-22, 30, 37-40,51
March 28	Decarboxylation and Synthesis	22.7	22.10-11, 13-14, 16, 23, 25, 29, 42-47, 54, 58
April 2	Aldol	23-23.7	23.1-5, 8-10, 27-28, 43, 48-52, 56
April 4	Claisen Reaction	23.8-23.10	23.11, 14-15, 29, 58-59
April 9	Conjugate addition and Michael Rxn	19.13 and 23.10	19.21-22, 62 b-d, 64 a-d, 23.16, 17, 21, 22, 30, 62
April 16	Amines	24	24.1-2, 4-6, 8-9, 11, 17-18, 30-34, 36-37, 40-41, 43-44,47c, 52-53, 55
April 18	Exam IV		
April 23	Review for final		
April 25	Review for final		
May 2	ACS Final		