

**Instructor:** Dr. Nolan Carter

**Office:** 201B Laney Hall

**Phone:** 450-5941

**Email:** Ncarter@uca.edu (put CHEM 3411 in subject line)

**Webpage:** Course materials are posted on Blackboard

**Lecture:** M,W, F 11:00 - 11:50 AM Laney 102

**Lab:** Th 8:00-10:40 AM (CRN 28261) Laney 306  
10:50-1:30 PM (CRN 25983)

**Office hours:** M, F 9:00-10:45 AM  
W 2:00-3:15 PM  
Or by appointment

If I'm not in the office during office hours, check my research lab (Laney 204).

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### Required course materials:

*Organic Chemistry, 5<sup>th</sup> ed.*, Janice Gorzynski Smith, McGraw-Hill, 2017.  
Turning Point RF-LCD Response Pad ("clicker")  
CHEM 3411 Laboratory Procedures (posted on Blackboard)  
Laboratory notebook  
Safety goggles

### Optional Course Materials:

*Student Study Guide/Solutions Manual for use with Organic Chemistry (5<sup>th</sup> ed.)*, Janice Gorzynski Smith.  
Molecular model set

### Course Description and Objectives:

CHEM 3411 (Organic Chemistry 2) is the second part of a two-semester sequence that begins with CHEM 2401 (Organic Chemistry 1). Students are expected to gain an understanding of topics that include oxidation/reduction, radical reactions, structure and reactivity of aromatic compounds, carbonyl compounds, carboxylic acid derivatives, and amines. Interpretation of <sup>13</sup>C NMR and <sup>1</sup>H NMR spectra will be covered in both lecture and lab. Emphasis will be placed on understanding the mechanisms of organic reactions.

### Prerequisite:

A grade of "C" or better in CHEM 2401 (Organic Chemistry 1) is required to take CHEM 3411 (Organic Chemistry 2).

### Attendance Policy:

Lecture attendance is strongly encouraged. Given the large amount of material we will cover, it will be extremely difficult to be successful in this class if your attendance is poor. Prolonged non-attendance (>4 consecutive class periods) may result in being dropped from the course. Makeup exams and quizzes will not be given unless the reason for absence is an officially sanctioned UCA activity (it is your responsibility to provide me with documentation at least one week prior to the exam or quiz so it can be taken early). For all other absences, if you contact me prior to an exam with a valid excuse (documented serious illness, etc.) that exam will be dropped and your exam grade will be based upon your other exam scores (including the final exam). Missing an exam without an acceptable excuse (as determined by the instructor) will result in a grade of "0".

Class disruptions will not be tolerated. Phones must be turned to silent prior to class. Text messaging or other phone use, talking, and consistent tardiness are also considered disruptive. Penalties for disruptive behavior may range from a deduction of points to dismissal from the course.

Laboratory attendance is required. If a laboratory experiment is missed for acceptable reasons (official UCA activity, serious documented illness, etc.), the missed lab experiment will be made up or dropped at the instructor's discretion. If a laboratory experiment is missed without an acceptable excuse, a grade of "0" will be assigned. **Tardiness to lab, inattention, or phone use during the prelab lecture may result in a deduction of points or a grade of "0".**

## Other UCA Policies:

You should familiarize yourself with policies listed in the UCA Student handbook (<http://uca.edu/student/student-handbook/>), particularly those relating to academics and sexual harassment.

The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the *Student Handbook*. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.

An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at <http://uca.edu/mysafety/bep/>. Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.

If a student discloses an act of sexual harassment, discrimination, assault, or other sexual misconduct to a faculty member (as it relates to "student-on-student" or "employee-on-student"), the faculty member cannot maintain complete confidentiality and is required to report the act and may be required to reveal the names of the parties involved. Any allegations made by a student may or may not trigger an investigation. Each situation differs and the obligation to conduct an investigation will depend on those specific set of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: <https://uca.edu/titleix>. *\*Disclosure of sexual misconduct by a third party who is not a student and/or employee is also required if the misconduct occurs when the third party is a participant in a university-sponsored program, event, or activity.*

Student evaluations of a course and its professor are a crucial element in helping faculty achieve excellence in the classroom and the institution in demonstrating that students are gaining knowledge. Students may evaluate courses they are taking starting on the Monday of the thirteenth week of instruction through the end of finals week by logging in to myUCA and clicking on the Evals button in the top right.

The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the UCA Disability Resource Center, 450-3613.

## How to Be Successful in This Class:

1. **Come to class prepared.** Read through the material we will cover in lecture **before** class. Identify the material that you think is hard to understand and come prepared to ask questions about it. Slides will be posted on Blackboard-print these out and bring them to class.
2. **Participate in class.** Class should be a dialogue not a monologue. In other words, don't be afraid to ask questions and answer questions I ask. Your clicker responses are important because they let me know if I am moving too rapidly or too slowly.
3. **You must work the homework problems.** In order to truly grasp the material we cover, you will need to develop your skills by working problems from your textbook. The problems may seem easy when you watch me work them in class, but if you don't practice on your own they won't seem very easy on the day of the exam. Don't get behind! **This course is more difficult than Organic Chemistry 1 and will likely require more work outside of class.**
4. **Keep in mind that chemistry courses are comprehensive.** Although the only exam that is officially "comprehensive" is the final exam, you can't forget the early material and expect to understand what is going on at the end of the semester.
5. **Know when to seek help.** If you are having trouble with the course or have a question, stop by my office. If you are having trouble, don't wait until April to ask for help-by then it will be too late!

## Grading:

Your grade in this course will be based upon your performance in lecture and laboratory. **The lecture portion of the course is worth 75% of the total grade and the laboratory portion is worth 25%.** Your lecture grade will be based upon your scores on 4 exams, a comprehensive final, 4 quizzes, and clicker participation. The laboratory grade will be based upon your prelab quizzes, lab notebook, attendance, effort, technique, and the interpretation of your experimental results (see laboratory grade section for further details). The point values and numbers of assignments in the table below are tentative and are subject to change.

Lecture	Points	Laboratory	Points
4 Exams (100 pts each)	400	6 one-week experiments (25 points each)	150
Best 4 of 5 Quizzes (25 points each)	100	2 two-week experiments (30 points each)	60
Final Exam (Comprehensive)	200	2 dry labs (15 points each)	30
Participation	50	Orientation/Policy Review	5
<b>Total</b>	<b>750</b>		<b>245</b>

$$\text{Your Grade} = \left( \frac{\text{Your Lecture Points}}{\text{Total Lecture Points}} \right) (75) + \left( \frac{\text{Your Lab Points}}{\text{Total Lab Points}} \right) (25)$$

### Tentative Grading Scale

Percentage	Letter Grade
90-100	A
80-89	B
70-79	C
60-69	D
≤ 59	F

**Exams:** The four exams will consist of questions similar to the suggested problems and material covered in class. Material from the laboratory may also be covered on exams. The best way to prepare for the exams is to work as many problems as you can. The suggested problems posted on Blackboard are the minimum amount you should work. Use the old exams posted on Blackboard to get an idea of exam length and what types of questions will be asked. No exam will be dropped. Calculators may not be used.

**Quizzes:** Quizzes will be announced at least one class period in advance. The lowest quiz will be dropped. If you are absent the day of a quiz, that will count as your dropped quiz (unless the reason for absence is an officially sanctioned UCA activity).

**Final Exam:** The cumulative final exam will be given on Monday, April 29 from 2:00 to 4:00 PM.

## Clicker Participation Grade:

The participation component of your lecture grade (50 points) will be based upon the percentage of clicker questions you answer during the semester regardless of whether your answers are correct or incorrect. For example, if we go over 100 clicker questions during the course of the semester and you answer 90 of these questions, your participation grade will be 45 (90% of the 50 points possible). If you forget to bring your clicker to class or are absent, you will not receive participation credit for that day of lecture. **There are no excused absences except for official UCA-sanctioned activities.**

**Participation bonus:** A 10 point bonus will be added to the lecture grade of those who actively participate in class. The extent of participation will be defined by the number of days you answer at least one question in class with the clicker. Missing class (or not bringing your clicker) more than 2 times during the course of the semester results in a loss of these bonus points. The 10 point bonus is all-or-nothing.

**You must provide me with your clicker device ID in order to receive participation credit. This number can be found on the back of your clicker. Either provide this information in the survey at the end of this document or send it to me via email.**

### **Laboratory Safety:**

During the course of the semester, you will be working with a wide variety of organic chemicals. Many organic chemicals are hazardous—they can be toxic, carcinogenic, caustic, or flammable. You should handle all organic chemicals carefully. Disregarding safety practices will result in dismissal from lab and a grade of “0” for the day. The most important aspect of safety in an organic chemistry laboratory is eye protection. Safety glasses must be worn at all times. You will not be allowed to attend lab if you do not have safety glasses. Open-toed shoes such as sandals may not be worn in lab. You will not be allowed to attend lab if you are dressed inappropriately. The balances and other common areas should be kept clean and orderly. Failure to maintain an orderly laboratory may result in a deduction of points from the entire class.

All students must sign the course safety agreement prior to participation in laboratory activities.

### **Laboratory Policies and Grading:**

- 1. Prior to most experiments (see lab schedule on page 6), a short quiz will be given at the beginning of the laboratory period.** The prelab quizzes are designed to make sure that you do the required reading before the lab. You should read the entire handout prior to lab to ensure that you are prepared for the quiz. The prelab quiz will start promptly at the scheduled start time of the lab and will only take about 5 minutes. Quizzes cannot be made up, so arriving to laboratory late will result in a grade of “0” for the quiz.
- 2. Note that some sections of the laboratory notebook write up (purpose, chemical reaction/structures, chemical information) must be completed prior to lab (see table on page 5).** The yellow sheet(s) containing these sections must be turned in at the beginning of the laboratory period. This section of the notebook is worth 5 points. This section must be turned in immediately after you arrive. Late papers will not be accepted.
- 3. The procedure, observations, and postlab questions are due one week after the experiment is completed.** Notebook pages should be stapled together in order followed by the postlab questions (which are answered directly on the handout). **All spectra (NMR, IR, etc.) should be included.**
- 4. Part of your lab grade will be based on technique.** In the lab, you need to be paying attention to what you are doing. During lab, you will be evaluated on your degree of preparation; adherence to safety rules; ability to follow directions; ability to set up and use the apparatus properly; the degree to which you are able to isolate pure product in a reasonable yield. Points may be deducted for deficiencies in this area.

### **Blackboard:**

Class materials such as lab procedures, suggested problems, slides, and exams from previous semesters will be posted on the Blackboard page for this course.

**Lab Notebook Requirements**
**Approximate  
point values**

<b>Page Headers</b>	The title of the experiment is shown on every page.	<b>~ 1 point</b>
	Your lab day/time is written on every page.	
	The correct date is written on every page.	
	The full name of your lab partner is written on every page.	
	Your name is written on every page.	

These sections must be completed prior to laboratory and turned in at the beginning of the lab period. Failure to complete these sections will result in a deduction of 5 points.

<b>Purpose</b>	A purpose for the experiment is written as the first item. What is the overall goal of the experiment? How will you accomplish this goal? Briefly (several sentences) summarize this in your own words.	<b>~ 1 point</b>
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<b>Chemical Information</b>	If you are doing a separation or characterization, show the structures of the compounds you are separating.	<b>~ 3 points</b>
	If you are doing a reaction, the ACTUAL reaction should be shown. Don't show a generic or unrelated example of the reaction.	
	Safety concerns should be summarized in your notebook.	
	Physical constants (molar mass, bps, mps, etc) provided in the lab module should be copied into your notebook.	

<b>Procedure</b>	Write on the left side of the center dividing line in your notebook. Double space your entries. The procedure should be written as a summary of steps taken. You do not need to write in complete sentences.	<b>~ 5 points</b>
	Write down the steps as you perform them. Your procedure should be detailed enough that another person could repeat your experiment without referring to a lab manual. Write in past tense.	

These sections must be completed during the experiment. All information should be recorded directly into the notebook, not elsewhere then transferred to the notebook later. These sections will be worth more points (20 total) for two-week experiments.

<b>Observations</b>	Record observations on the right side of the center dividing line in your notebook. Write down what you see: color changes, bubbling, precipitate formation, product color and texture, etc. Another person repeating your work would want to know this information.	<b>~ 5 points</b>
	Use correct spellings ("percipitate" and "yeild" are not words).	
	Do not use nonstandard abbreviations you made up.	
	Record the units of all measurements. Clearly identify what all quantities refer to (e.g., don't just write 10g, write 10g of NaCl).	
	Show all work for calculations so readers can follow your reasoning. Use significant figures correctly and record EVERY digit from the balance when you determine a mass. All numbers in your calculations should include the appropriate units and chemical names.	

<b>Postlab Questions</b>	All postlab questions should be completely answered on the sheets provided in the lab module. Do not write answers in your notebook.	<b>~ 5 points</b>
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This section should be completed after the experiment.

<b>Miscellaneous</b>	Use correct spelling and grammar.	<b>point deductions vary</b>
	Your notebook should be neat and organized.	
	Staple the report in the correct sequence: notebook pages in numerical order followed by postlab questions then spectra.	
	Do not write directly on the yellow sheets.	
	You should use proper lab technique and follow all safety rules.	
	Your product should be pure and isolated in a reasonable yield.	
Staple all spectra (NMR, IR, etc.) to your notebook pages.		

## Tentative Lecture and Lab Schedule

Week	Lecture	Lab
1/10,1/11	Ch. 12 Oxidation and Reduction	No Lab
1/14-1/18	Ch. 12 cont.	Orientation, Lab Policy Review, Clicker troubleshooting (notebook not required, no prelab quiz)
1/22-1/25	Ch. 14 NMR Spectroscopy	Cannizzaro Reaction
1/28-2/1	Ch. 14 cont. Ch. 15 Radical Reactions	Mass Spectrometry (notebook not required)
2/4-2/8	Ch. 15 cont. <b>Exam 1 Wednesday 2/6 (Ch. 12, 14, 15)</b> Ch. 16 Conjugation, Resonance & Dienes	NMR (notebook not required, no prelab quiz)
2/11-2/15	Ch. 16 cont. Ch. 17 Benzene and Aromatic Compounds	Diels-Alder Reaction, Part 1
2/18-2/22	Ch. 17 cont. Ch. 18 Electrophilic Aromatic Substitution	Diels-Alder Reaction, Part 2 (no prelab quiz)
2/25-3/1	Ch. 18 cont. <b>Exam 2 Friday 3/1 (Ch. 16-18)</b>	Electrophilic Aromatic Substitution: Iodination of Salicylamide
3/4-3/8	Ch. 19 Carboxylic Acids/Ch. 25 Amines Ch. 20 Intro to Carbonyl Chemistry	Heck Reaction
3/11-3/15	Ch. 20 cont. Ch. 21 Aldehydes and Ketones	Wittig Reaction
3/18-3/22	<b>Spring Break</b>	No Lab
3/25-3/29	Ch. 21 cont. <b>Exam 3 Friday 3/29 (Ch.19-21)</b>	Polymers, Part 1
4/1-4/5	Ch. 22 Carboxylic Acid Derivatives	Polymers, Part 2
4/8-4/12	Ch. 23 $\alpha$ -Substitution of Carbonyl Cmpds. Ch. 24 Carbonyl Condensation Reactions	Pechmann Condensation
4/15-4/19	Ch. 24 cont. <b>Exam 4 Wed 4/17 (Ch. 22-24)</b> Ch. 31 Polymers	Reductive Amination
4/22-4/26	Ch. 31 cont.	No Lab
	<b>Final Exam 2:00-4:00 PM Monday, April 29</b>	

**Note that exam dates are tentative and will likely change**

**Last day to drop is Friday, March 29**