

**CHM 304 – Organic Chemistry Theory II**

Fall 2017 | Section 1 | 3 Credits

Instructor Information

- Instructor: Dr. Nicholas A. McGrath
- Office Location: 4009 Cowley Hall
- Physical Office hours: Monday 9:00-10:30 AM, Thursday 11:30-1:00
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Course Description

A study of organic synthesis, common functional groups, carbanions, reaction mechanisms, lipids, carbohydrates, proteins, and polymers.

Overview

The main goal of this class is to provide you with an understanding of some of the more in-depth concepts of organic chemistry. We will continue to discuss many of the topics from CHM 303 such as the namings, structure, properties, and reactions of organic molecules with a special emphasis on nucleophilic carbon-containing compounds. Topics will be organized and presented on the basis of organic functional group families.

Prerequisites

CHM 303

Course Learning Outcomes

By the end of this course, you will be able to:

1. Predict the physical properties of organic molecules
2. Understand chemical reactivity of the various functional groups found in organic molecules
3. Follow the rationale and predict the flow of electrons in chemical reaction mechanisms

Materials & Tools

Textbook: Carey, Francis A., and Giuliano, Robert M., *Organic Chemistry*. 9th edition. New York: The McGraw-Hill Companies, Inc., © 2014. {Available from Textbook Rental}

Optional Materials: The accompanying solutions manual {Available from Textbook Rental}

Format

This is a face-to-face course. You may be asked to reference materials or participate online through the learning management system, Desire2Learn (D2L). If that is the case, you will need your UWL NetID to login to the course from the D2L homepage <http://www.uwlax.edu/d2l/>.

Grading Policies**Calculations**

Your overall grade consists of the following assessments, arranged by type and value.

Assignment	Points (per assignment)	#	Total % Final Grade
Homework	25 Points Each	4	16.67%
Exams	100 Points Each	4	66.67%
Final Exam	100 Points	1	16.67%
Total Value			100%



Late Assignments, Missed Exams

Assignments are due on the dates indicated in the Course Schedule. For extenuating circumstances that impact your ability to meet deadlines or participate in class activities, you are responsible for alerting me as soon as possible.

If an exam has to be missed, arrangements must be made with me ahead of time to schedule a make-up exam. An absence without prior notice will result in a score of 0 points on that exam.

Attendance and Participation

Attendance is expected; however, if you have to be absent from lecture please make arrangements to get the materials from a classmate so that you don't fall behind. Visitors are welcome and seating is on a first-come-first-served basis.

Expectations for Graded Work

I provide students feedback and/or scores on assignments that require individualized grading before a further assignment of a similar format is due. Generally, I return work that requires individual feedback within seven days from the date the work was due. I will notify you if I am unable to grade the work within the proposed timeframe, and will identify a revised return date.

Your graded coursework will be returned in compliance with FERPA regulations, such as in class, during my office hours, or via the course management system through which only you will have access to your grades.

Grading Scale

Letter Grade	Point Value	Percentage Equivalent
A	540-600	90-100%
AB	528-539	88-89%
B	480-527	80-87%
BC	468-479	78-79%
C	420-467	70-77%
D	360-419	60-69%
F	0-359	59% - below

UWL Policies & Supports

Academic Integrity & Misconduct

Academic misconduct is a violation of the UWL Student Honor Code (<http://catalog.uwlax.edu/undergraduate/academicpolicies/studentconduct/>) and is unacceptable. I expect you to submit your own original work and participate in the course with integrity and high standards of academic honesty. When appropriate, cite original sources, following the style rules of our discipline.

Plagiarism or cheating in any form may result in failure of the assignment or the entire course, and may include harsher sanctions. Refer to the Student Handbook #14.02 <https://www.uwlax.edu/student-life/student-resources/student-handbook/#tm-academic-misconduct--chapter-uws-14->) for a detailed definition of academic misconduct.

For helpful information on how to avoid plagiarism, go to "Avoiding Plagiarism" on the Murphy Library website (<http://libguides.uwlax.edu/plagiarism2>). You may also visit the Office of Student Life (<https://www.uwlax.edu/student-life/>) if you have questions about plagiarism or cheating incidents. Failure to understand what constitutes plagiarism or cheating is not a valid excuse for engaging in academic misconduct.

Concerns or Complaints

If you have a concern or a complaint about the course, or me, I encourage you to bring that to my attention. My hope would be that by communicating your concern we would be able to come to a resolution. If you are uncomfortable speaking with me, or you feel your concern hasn't been resolved after bringing it to my attention, you can contact my department chair, Professor Aaron Monte (amonte@uwlax.edu).

The Student Academic Non-Grade Appeals process can be found in the Student Handbook (<https://www.uwlax.edu/student-life/student-resources/student-handbook/#tm-non-academic-misconduct--chapter-uws-17->). For more information on appealing a final grade, see the online University Catalog found at the following link: <http://catalog.uwlax.edu/undergraduate/academicpolicies/gradesgradingtesting/#appeal-final-grade>



Course Access

Access to course materials in D2L may cease after the term ends. If you wish to archive materials for your personal records or portfolio you should do so as you progress through the course. As a general rule, you should always save local copies of course-related work. To avoid disasters, you should also save important files to external media or cloud storage.

Eagle Alert System

This class will be participating in the Eagle Alert System <https://www.uwlax.edu/academic-advising-center/eagle-alert/student-resources/> through WINGS. The system is designed to promote student success. If I notice that you are experiencing difficulties early in the semester (e.g., low assignment scores or limited participation), I may note this information and you will receive an email indicating that I have entered feedback. I may also enter positive feedback encouraging you to consider additional learning opportunities. The link in the email will take you to WINGS where you can login to see the feedback. I encourage you to meet with me and/or refer to the helpful campus resources listed below under Academic Services and Resources and on UWL's Student Success page <https://www.uwlax.edu/info/student-success/>.

Inclusive Excellence

UWL's core values include "Diversity, equity, and the inclusion and engagement of all people in a safe campus climate that embraces and respects the innumerable different perspectives found within an increasingly integrated and culturally diverse global community" (<https://www.uwlax.edu/chancellor/mission/>). If you are not experiencing my class in this manner, please come talk to me about your experiences so I can try to adjust the course if possible.

Student Evaluation of Instruction (SEI)

UWL conducts student evaluations electronically. Approximately 2 weeks prior to the conclusion of a course, you will receive an email at your UWL email address directing you to complete an evaluation for each of your courses. In-class time will be provided for students to complete the evaluation in class. Electronic reminders will be sent if you do not complete the evaluation. The evaluation will include numerical ratings and, depending on the department, may provide options for comments. The university takes student feedback very seriously and the information gathered from student evaluations is more valuable when a larger percentage of students complete the evaluation. Please be especially mindful to complete the surveys.

Academic Services and Resources at UWL

Below are several student services available to students:

- Academic Advising Center: <http://www.uwlax.edu/advising/>
- ACCESS Center (formerly Disability Resources): <http://www.uwlax.edu/access-center/>
- Career Services: <http://www.uwlax.edu/careerservices/>
- Counseling and Testing Center: <http://www.uwlax.edu/counseling/>
- Financial Information: Financial Aid Office <https://www.uwlax.edu/finaid/> and It Makes Cents <https://www.uwlax.edu/it-makes-cents/>
- Murphy Learning Center (Walk-in tutoring): <http://www.uwlax.edu/murphy-learning-center/>
- Murphy Library: <http://www.uwlax.edu/murphylibrary/>
- Multicultural Student Services: <http://www.uwlax.edu/mss/>
- Public Speaking Center: <https://www.uwlax.edu/murphy-learning-center/subject/public-speaking-center/>
- Records and Registration: <http://www.uwlax.edu/records/>
- Student Handbook: <https://www.uwlax.edu/student-life/student-resources/student-handbook/>
- Student Support Services: <https://www.uwlax.edu/student-support-services/>
- Veteran Services: <http://www.uwlax.edu/veteran-services/>
- Writing Center: <http://www.uwlax.edu/writingcenter/>

Technical Support

For tips and information about D2L visit the Information Technology Services (ITS) student support page, at <http://www.uwlax.edu/D2L/Help-for-students/>.

Need help making sure your computer is set up correctly for online coursework? D2L's System Check <https://community.desire2learn.com/d2l/systemCheck> ensures that your computer and web browser are configured to properly access their system.

You can also contact the ITS Support Center at (608) 785-8774 or email them at helpdesk@uwlax.edu for questions about D2L or any other technological difficulties. The hours for ITS are Monday through Thursday from 7:30 am to 6:30 pm, and Friday from 7:30 am to 4:30 pm, Central Time.

Netiquette

Netiquette is a combination of 'net' (from Internet or Network) and 'etiquette' and refers to acceptable Internet behavior. It means respecting others' views and opinions and displaying common courtesy when posting your views and opinions online in discussion forums, email, blogs, and social networking sites, etc. This type of communication does not allow each person to see facial expressions, body language, or hear intonation so it's especially important to watch what and how we say things online. By following



netiquette, online communication becomes clearer and helps you maintain and establish positive online relationships as well as develop a positive online reputation.

All class members should abide by these six simple rules (abridged and modified from the 10 rules of Albion.com):

1. Be kind and forgiving of mistakes (i.e. do unto others as you'd have others do unto you)
2. Adhere to the same standards of behavior online that you follow in real life (i.e. be ethical)
3. Respect other people's time and bandwidth (i.e. avoid long rants and be careful not to monopolize a discussion)
4. Share expert knowledge (i.e. let others benefit from your insights and experience)
5. Help keep flame wars under control (i.e. no personal attacks or ongoing attempts to belittle or antagonize others)
6. Respect other people's privacy

Our Legal Obligations to You

<https://www.uwlax.edu/info/syllabus/>

Course Outline & Schedule

Please note that the timing of activities and topics listed below may change. I will give you timely notice of any major changes in the syllabus by these processes: I will address any changes to the proposed schedule in lecture and post them on the course D2L page.

CHM 304 – Organic Chemistry Theory II: Chapter Coverage & Approximate Daily Lecture Topics

Day	Date	Carey Chapters	Lecture Topics	Learning Objective
1	9/6	Intro/Review CHM 303	Introduction to the course. Start Review of CHM 303	1, 2, 3
2	9/8	Review CHM 303	Finish CHM 303 Review and Pre-Quiz (not graded)	1, 2, 3
3	9/11	14.1-14.5	Organometallic Compounds: Naming, Structure, Preparation, Basicity, ROH Synthesis	1, 2, 3
4	9/13	14.6-14.8, 14.10	Acetylenic Alcohols, Retrosynthetic Analysis, Carbenes, Organocopper Reagents	1, 2, 3
5	9/15	15.1-15.5	Aldehyde/Ketone/Carboxylic Acid Reductions, Epoxides, Diols	1, 2, 3
6	9/18	15.6-15.8	Alcohol Summary, Ethers, Fischer Esterification, Esters via Acid Chlorides/Anhydrides	1, 2, 3
7	9/20	15.9, 15.11, 15.13	Alcohol Oxidation, Diol Cleavage, Spectroscopy	1, 2, 3
8	9/22	16.1-16.3, 16.5-16.7	Ether/Epoxide Nomenclature, Physical Properties, Ether Preparation/Reactivity	1, 2, 3
9	9/25	16.8, 16.10-16.12, 16.17	Epoxide Preparation/Reactivity, Spectroscopy <End E1 material>	1, 2, 3
10	9/27	17.1-17.4	Aldehydes and Ketones: Naming, Structure, Properties, Formation	1, 2, 3
11	9/29	CH 14, 15, 16	EXAM #1 – Organometallics, Ethers, Epoxides, Alcohols	
12	10/2	17.5-17.9	Hydration, Cyanohydrins, Acetals/Ketals: Formation/Hydrolysis, Protecting Groups	1, 2, 3
13	10/4	17.10-17.12	Imines/Enamines: Formation/Hydrolysis, Wittig	1, 2, 3



14	10/6	17.13-17.15	Stereoselective Additions, Oxidation of Primary and Secondary ROH's, Spectroscopy	1, 2, 3
15	10/9	18.1-18.7	Carboxylic Acids: Naming, Properties, Acidity	1, 2, 3
16	10/11	18.8-18.11	Dicarboxylic Acids, Carbonic Acid, Isolation/Formation	1, 2, 3
17	10/13	18.12-18.15	Formation by Hydrolysis, Reactions of Carboxylic Acids, Esters/Lactones	1, 2, 3
18	10/16	18.16-18.17	Decarboxylation, Malonic Acid, Spectroscopy <End E2 material>	1, 2, 3
19	10/18	19.1-19.6	Carboxylic Acid Derivatives, Nucleophilic Acyl Substitution, Esters	1, 2, 3
20	10/20	CH 17, 18	EXAM #2 – Alds./Ketones, Carboxylic Acids	
21	10/23	19.7-19.11	Esters	1, 2, 3
22	10/25	19.12-19.18	Amides, Nitriles, Spectroscopy	1, 2, 3
23	10/27	20.1-20.2	Enols, Enolates	1, 2, 3
24	10/30	20.3-20.5	The Aldol Condensation, The Claisen Condensation	1, 2, 3
25	11/1	20.6	Malonic Ester/Acetoacetic Ester	1, 2, 3
26	11/3	20.7-20.8	Haloform Reactions, Conjugate Additions	1, 2, 3
27	11/6	Review 19/20	Review Day For Exam 3 <End E3 material>	1, 2, 3
28	11/8	21.1-21.3	Amines: Naming, Structure, Physical Properties	1, 2, 3
29	11/10	CH 19, 20	EXAM #3 – C. Acid Derivs. & Enolates	
30	11/13	21.4, 21.6	Amines: Basicity, Formation	1, 2, 3
31	11/15	21.7-21.10	Direct Alkylation, Gabriel Synthesis, Reduction	1, 2, 3
32	11/17	21.11-21.14, 21.16	Reactions of Amines	1, 2, 3
33	11/20	21.17, 21.19	Diazonium Salts, Spectroscopy	1, 2, 3
34	11/22	22.1-22.3	Phenols: Naming, Structure, Physical Properties	1, 2, 3
N/A	11/24	N/A	THANKSGIVING BREAK	1, 2, 3
35	11/27	22.4-22.7	Phenol Acidity, Formation	1, 2, 3
36	11/19	22.8-22.12	Review: EAS Reactions, Acylation, Aryl Ethers	1, 2, 3
37	12/1	22.14-22.15	Oxidation of Phenols, Spectroscopy	1, 2, 3
38	12/4	23.1-23.4	Carbohydrates: Classification, Fischer Projections	1, 2, 3
39	12/6	23.5-23.8, 23.10, 23.14, 23.16	Cyclic & Acyclic, Ketoses, Glycosides, Polysaccharides	1, 2, 3
40	12/8	25.1-25.3	Introduction to Amino Acids <End E4 material>	1, 2, 3
41	12/11	Review 21-23, 25	Review Day For Exam 4, Post Quiz	1, 2, 3
42	12/13	CH 21-23, 25	EXAM #4	
	12/14	-----	STUDY DAY	
	12/16	CH 14-23, 25	Comprehensive Final Exam 2:30 PM – 4:30 PM, Saturday, December 16th	



Suggested End-Of-Chapter Practice Problems

CHAPTER 14: 2-5, 13, 20, 22 (not h), 24, 26-30

CHAPTER 15: 1-10, 16-21, 22 (b-e), 23, 24, 25 (d-j), 26, 28, 29, 32b, 36-38

CHAPTER 16: 3, 5-10, 13, 14, 16, 17, 21, 24-27, 29 (a-b), 34 (a, d), 36, 37, 41, 43, 44

EXAM 1: Chapters 14-16 (100 points)

CHAPTER 17: 1-22, 24, 25, 26 (not o), 27 (not o), 28, 31, 33-36, 39, 40, 43, 44 (not c, d, g), 45-49

CHAPTER 18: 1, 3, 5, 7-9, 11, 12, 13 (not c, d), 15 (not d), 16 (not f, g), 17-21, 23 (not f-i), 25, 26, 28, 33

EXAM 2: Chapters 17-18 (100 points)

CHAPTER 19: 1, 4-7, 10-22, 24-30, 32-35, 37, 38, 43, 48

CHAPTER 20: 1-7, 9-17, 19, 20-23, 25, 26-32, 36, 37, 39, 42-45, 47, 48 (a-c), 49 (a-c), 50-52, 54, 55, 57 (a, c, d)

EXAM 3: Chapters 19-20 (100 points)

CHAPTER 21: 2-4, 6, 7, 11, 15, 18-21, 23-25, 27 (a, b, d), 33-35, 36 (a-j), 37, 38, 39, 40 (not r, s), 43, 44 (a-d), 45, 47-50, 54-55

CHAPTER 22: 1-4, 8, 9, 13, 15 (a-f, i), 16, 18, 19 (a, b, f, h, j), 20, 23, 25, 31

CHAPTER 23: 1-7, 9-11, 26 (a-e), 27, 28 (a), 29, 31, 32, 42

CHAPTER 25: 1-3, 27, 30, 34

EXAM 4: Chapters 21-23, 25 (100 points)

FINAL EXAM: Comprehensive. Chapters 14-23, 25 (100 points)