

Chemistry 326 (4 credits)

Organic Chemistry II, Sections 04 and 05

Lecture: MWF 12:00-12:50, A107 Science

Labs: C134 Science

04 M 08:00-10:50; 05 W 08:00-10:50

Spring 2017

Instructor: Dr. Kathryn A. McGarry

Office: D-131 Science / 715-346-3328

Email: kmcgarry@uwsp.edu

Office Hours: T,Th 11:00-12:00; W 13:00-14:00
and by appointment

Text & Tools:

Required

- Smith, J. *Organic Chemistry*, 3rd edition, McGraw-Hill, 2011. (ISBN-13: 978-0-07-337562-5)
- Lab notebook: Bound notebook with pages numbered (you may do this yourself if you choose).
- Lab manual: Available online on the D2L page for this course.
- Safety goggles

Strongly Recommended

- Smith, J. *Study Guide and Solutions Manual for Organic Chemistry*, 3rd edition. McGraw-Hill, 2011. (ISBN: 978-0-07-729665-0). Available on reserve at the library.
- Padias, A. B. *Making the Connections: A How-To Guide for Organic Chemistry Lab Techniques*, 2nd edition, Hayden McNeil, 2011. (ISBN-13: 978—7380-4135-3). Available on reserve at the library.
- Molecular models – these are *highly recommended* for working problems and visualizing three-dimensional concepts. These are optional and available for purchase at the bookstore or online at www.indigo.com (organic chemistry molecular model set, ~\$21).

Course Outcomes:

Upon completion of the lecture portion of this course, you should be able to:

- Identify and name simple organic molecules and functional groups.
- Draw organic structures and their important resonance contributors
- Assess organic structures for their acidity, stereochemistry, reactivity, and nucleophilicity/electrophilicity.
- Draw curved arrow mechanisms that accurately reflect the flow of electrons between structures
- Predict the major, and in some cases minor, products based on a set of reaction conditions
- Propose a reasonable synthesis of simple organic molecules from given starting materials
- Analyze and interpret IR and NMR spectral data to provide the correct structure

Course Goal:

My goal in this course is for you to develop a chemical intuition regarding organic chemistry. Whether you realize it or not, organic chemistry is a part of your *everyday life*. This is a fascinating field, impacting the world every day with new and different chemical transformations, medicines, and electronic materials. I hope that by the end of this course, you will have an appreciation of this ubiquitous subject.

Tips for Success:

Throughout this semester, I am here to teach and provide you with tools, concepts, and methods that will help you understand this material, but ultimately your development rests on your studying practice. I do not believe you can learn organic chemistry purely by memorization. While there are some aspects to be memorized, overall I believe this material is best learnt through *working as many problems as possible*. Just as with any sport or musical instrument, the more you practice, the better you become. I believe the same is true for organic chemistry.

This course is structured to assist you in staying on top of this material. The text itself is structured with relevant problems at the end of each section and a series of problems at the end of each chapter (with solutions manual) to assist you in practicing and learning. A recommended list of problems that you should complete for each class will be provided to you as well as homework sets that will be collected to encourage you to stay on track. Additional problems for you to work will be provided in lecture to ensure you have ample problems to practice. The quizzes are spaced between the exams to check your understanding and help you recognize areas you may need to spend more time on. Take advantage of these opportunities. I strongly

suggest you work *all* of the problems in the book. Mastery of these problems is crucial for success on quizzes and exams. Avoid cramming for exams.

Suggested class preparation and study routine:

1. Read relevant sections of the text and study notes thoroughly.
2. Take notes in class. (Don't miss class!)
3. Re-write and organize notes in conjunction with reading the chapters.
4. Work many problems daily.
5. Use problem sets as a test of comprehension during the week.
6. Flag sections of the reading, your notes, and problems in which you struggled and follow up either with a fellow student or with the instructor in class, during office hours, or set up an appointment.

Grading:

Homework	7* x 10 points	= 60 points (10%)
Quizzes	4* x 30 points	= 90 points (15%)
Exams	3 x 60 points	= 180 points (30%)
Final Exam	120 points	= 120 points (20%)
Laboratory Grade	(see lab syllabus for breakdown)	= 150 points (25%)
Total		600 points

Tentative Grade Cutoffs: 100-90% = A/A-; 89-80% = B+/B/B-; 79-70% = C+/C/C-; 69-60% = D+/D; 60%-0% = F; Grade cut-offs will not be raised, but may be lowered at the instructor's discretion.

You must achieve 60% of the points in the lecture (270/450 points) and lab (90/150 points) separately in order to receive a passing grade in this course.

Quiz and exam dates can be found in the Course Calendar at the end of the syllabus.

*The lowest score of this item will be dropped, so total is one less than this number.

Course Policies and Procedures for Lecture

Pre-Lecture Questionnaires (PreQs): Throughout the semester online questionnaires will be provided to assess the understanding of the class. These will help me gauge which areas of content to spend more time on in class. These are intended to be a very quick (<5 min) exercise and may range from 3 to 8 questions. These will be available on the D2L course website between lectures beginning on Friday at 9am and will be due on the listed Mondays at 9am. You will earn 1 bonus point for each PreQ you complete (total of 6 bonus points possible).

Homework: It is essential that you spend a significant amount of time solving problems outside of class to be able to successfully solve new problems that you will encounter on quizzes or exams. You will benefit from working all chapter problems from the corresponding chapters in Smith as provided in the Chapter Problem Schedule (available on D2L). After working the problems, you should check your work using the solutions manual which you can purchase or access in library. To encourage you to stay on top of homework throughout the semester, a combination of ~10 of the problems from the schedule and a worksheet will be due on the Fridays written in the course calendar. These homework sets are due at the beginning of lecture and each completed homework set is worth 10 pts. *No make-up or late homework will be accepted.* You must hand in 6 of the 7 scheduled assignments to receive full credit.

325 Review Assignment: Organic Chemistry II builds upon the material learned in Organic Chemistry I. To make sure this material is fresh, an assignment focused on reviewing 325 material will be provided at the beginning of the semester. This will count as a quiz and will be due at the beginning of the first Friday lecture. This assignment is worth 30 points. *Handing in the quiz late will incur a 6-point deduction for each day late.* This quiz counts as one of the four quizzes in the semester.

Quizzes: There will be three 25 min quizzes given on the dates in the course calendar, 30 points each. Quizzes are designed to make sure you have grasped the major concepts and you are keeping up with the material. Quizzes will begin at 12:00. If you arrive late, you will have only the time remaining to complete the quiz. *There will be no make-up quizzes*, but your lowest quiz score will be dropped from the final grade (includes the 325 Review).

Exams: There will be three 50 min exams given on the dates in the course calendar, 60 points each and one 2 hour final exam on Thursday, May 18th 8:00-10:00am, worth 120 points. Exams will focus on material covered since the last exam, but cumulative material will often be included. The exams will cover material from lectures, problems, and textbook reading assignments. The final exam will be cumulative. Exams will begin at 12:00. If you arrive late, you will have only the time remaining to complete the exam.

Make-up Policy: If an exam must be missed due to an excusable circumstance, you are expected to make arrangements for the make-up *prior* to the scheduled exam. The following are excusable circumstances:

- a. UWSP Athletic event (you must provide *written* authorization from your coach)
- b. Armed forces related training / drills (you must provide *written* authorization from your supervising officer)
- c. Medical emergency (you must provide *written* documentation from a physician)
- d. Death in the family (please provide documentation of some type; obituary or service folder is acceptable)
- e. An event related to your religious beliefs in accordance with Chapter 22 of the UWSP Community Rights and Responsibilities (<http://www.uwsp.edu/dos/Documents/CommunityRights.pdf>) (you must inform me of a conflict of this type within the first three weeks of the course)

Missed exams for other reasons (e.g. oversleeping, forgetting, etc.) are not valid excuses for missing a scheduled exam.

Classroom Behavior: UWSP values a safe, honest, respectful, and inviting learning environment. To ensure that each student has the opportunity to succeed, a set of expectations has been developed for all students and instructors known as the *Community Rights and Responsibilities Document* (<http://www.uwsp.edu/dos/Documents/CommunityRights.pdf>).

To create this type of environment in our classroom, I believe it is important to set and discuss expectations at the beginning of the course. Below you will find two columns, one for student expectations of the instructor and one for instructor expectations of the students. Please fill in these expectations as we agree on them as a class.

Student expectations of the instructor	Instructor expectations of the students
<ul style="list-style-type: none"> - On-time and prepared with organized notes - Brings a positive, supportive, and respectful attitude 	<ul style="list-style-type: none"> - On-time and prepared for class - Respectful of instructor and fellow students

Course Policies and Procedures for Both Lecture and Laboratory

D2L: D2L is an online course management system that will be used for posting handouts, powerpoint slides, and other relevant course material. You will also access laboratory related items here. You can access D2L from the UWSP homepage. If you cannot access this course once you are in D2L, please let me know *asap*.

Attendance

For lecture: Absences from lecture will not result in any direct penalties for students. You are not required to inform me of an absence that is not quiz or exam related. It is your responsibility to collect missed material (e.g. lecture notes, assignments, announcements) from students who did attend.

Laboratory: Students are required to attend all laboratory sessions and will only be allowed one unexcused absence for the semester. Showing up late to lab will be considered an unexcused absence, even if you complete the experiment. Absences *may* be excused at the instructor's discretion. In order for an absence from laboratory to count as excused 1) the student must contact the instructor as soon as they know they will miss the lab period and 2) the student must complete the missed experiment at another scheduled laboratory time that is approved by the instructor. A student who has three or more unexcused absences for the semester will receive a failing grade in Chem 326.

Grading: I will not discuss grades on the day I return a quiz or exam. Please look over your quiz/exam along with the answer key carefully. If you have questions concerning the grading, please make an appointment to discuss. I reserve the right to re-grade the entire quiz/exam.

Disabilities: Any student who anticipates they may need an accommodation based on the impact of a disability (including mental health, chronic or temporary medical condition) should contact the Disability and Assistive Technology Center (DATC) at 715-346-3365 or at datctr@uwsp.edu to seek further assistance. Students currently registered with the DATC should provide their Notice of Accommodation letter to me during office hours, electronically via email, or after class as soon as possible so that I can work with DATC to make the necessary arrangements.

Academic Integrity: Academic Standards will be rigorously enforced as outlined in Chapter 14 of the UWSP Community Rights and Responsibilities (<http://www.uwsp.edu/dos/Documents/CommunityRights.pdf>). A violation of this policy will result at a minimum in a zero for the work involved and may lead to an F in the course or further disciplinary action, depending on the nature of the infraction.

Student Resources

The Tutoring-Learning Center: Tutoring in Math and Science (TIMS) in the Tutoring-Learning Center (TLC) offers free group tutoring (schedule found at <http://www.uwsp.edu/tlc/Pages/schedules.aspx>) and drop-in tutoring (in DUC 205, schedule found here: <http://www.uwsp.edu/tlc/Pages/dropInTutoring.aspx>) to support you in your chemistry classes. In addition, TIMS offers the option for individual chemistry tutoring sessions. The tutors are UWSP students who have done well in their classes and who are here to share their successful study habits and chemistry content knowledge to help others succeed. Discussing chemistry concepts and practicing problems together clarifies and solidifies knowledge, and the tutors are eager to study with you. If you have questions about the schedule or would like to make an appointment, please visit the TLC in room 018 ALB, email (tlctutor@uwsp.edu), or call (715) 346-3568 for information.

University Counseling Center: 3rd floor Delzell Hall, M-F 8:00-16:30, 715-346-3553
<http://www.uwsp.edu/counseling>

Emergency Information: Provides information on how to respond to various emergency situations.
<http://www.uwsp.edu/rmgt/Pages/em/procedures/default.aspx>

Chem 326 Lecture Course Calendar Spring 2017

Wk	Monday	Wednesday	Friday
1	1/23 Syllabus/Intro	1/25 Alkynes (Ch 11)	1/27 Alkynes (Ch 11) 325 Review Quiz Due
2	1/30 Redox (Ch 12)	2/1 Redox (Ch 12)	2/3 Redox (Ch 12) <i>Homework 1 Due</i>
3	2/6 Carbonyls (Ch 20) <i>PreQ1 Due</i>	2/8 Carbonyls (Ch 20)	2/10 Carbonyls (Ch 20) Quiz 1
4	2/13 Aldehydes/Ketones (Ch 21)	2/15 Aldehydes/Ketones (Ch 21)	2/17 Carboxylic Acids and Acidity (Ch 19) <i>Homework 2 Due</i>
5	2/20 Carboxylic Acids and Acidity (Ch 19) <i>PreQ2 Due</i>	2/22 Carboxylic Acids and Acidity (Ch 19)	2/24 EXAM 1 (Ch 11, 12, 20, 21)
6	2/27 Carboxylic Acid Derivatives (Ch 22)	3/1 Carboxylic Acid Derivatives (Ch 22)	3/3 Carboxylic Acid Derivatives (Ch 22) <i>Homework 3 Due</i>
7	3/6 Substitution at Carbonyls (Ch 23) <i>PreQ3 Due</i>	3/8 Substitution at Carbonyls (Ch 23)	3/10 Substitution at Carbonyls (Ch 23) Quiz 2
8	3/13 Carbonyl Condensations (Ch 24)	3/15 Carbonyl Condensations (Ch 24)	3/17 Carbonyl Condensations (Ch 24) <i>Homework 4 Due</i>
	3/20 Spring Break, No Class	3/22 Spring Break, No Class	3/24 Spring Break, No Class
9	3/27 Conjugation, Resonance, Dienes (Ch 16)	3/29 Conjugation, Resonance, Dienes (Ch 16)	3/31 EXAM 2 (Ch 19, 22, 23, 24)
10	4/3 Benzene and Aromatics (Ch 17)	4/5 Benzene and Aromatics (Ch 17)	4/7 Benzene and Aromatics (Ch 17) <i>Homework 5 Due</i>
11	4/10 Electrophilic Aromatic Substitution (Ch 18) <i>PreQ4 Due</i>	4/12 Electrophilic Aromatic Substitution (Ch 18)	4/14 Electrophilic Aromatic Substitution (Ch 18) Quiz 3
12	4/17 Polymers (Ch 30)	4/19 Polymers (Ch 30)	4/21 Polymers (Ch 30) <i>Homework 6 Due</i>
13	4/24 Amines (Ch 25) <i>PreQ5 Due</i>	4/26 Amines (Ch 25)	4/28 EXAM 3 (Ch. 16, 17, 18, 30)
14	5/1 Carbohydrates (Ch 27)	5/3 Carbohydrates (Ch 27)	5/5 Carbohydrates (Ch 27) <i>Homework 7 Due</i>
15	5/8 Amino acids and Proteins (Ch 28) <i>PreQ6 Due</i>	5/10 Amino acids and Proteins (Ch 28)	5/12 Final Review
FINAL EXAM: Thursday, May 18th 8:00-10:00am			

Chemistry 326 Laboratory
Organic Chemistry II Laboratory, Sections 04, 05
Lecture: MWF 12:00-12:50, A107 Science
Labs: C134 Science
04 M 08:00-10:50; 05 W 08:00-10:50

Spring 2017
Instructor: Dr. Kathryn A. McGarry
Office: D-131 Science / 715-346-3328
Email: kmcgarry@uwsp.edu
Office Hours: T,Th 11:00-12:00; W 13:00-14:00
and by appointment

Text & Tools:

Required

- Smith, J. *Organic Chemistry*, 3rd edition, McGraw-Hill, 2011. (ISBN-13: 978-0-07-337562-5)
- Lab notebook: Bound notebook with pages numbered (you may do this yourself if you choose).
- Lab manual: Available online on the D2L page for this course.
- Safety goggles

Strongly Recommended

- Smith, J. *Study Guide and Solutions Manual for Organic Chemistry*, 3rd edition. McGraw-Hill, 2011. (ISBN: 978-0-07-729665-0). Available on two-hour reserve at the library.
- Padias, A. B. *Making the Connections: A How-To Guide for Organic Chemistry Lab Techniques*, 2nd edition, Hayden McNeil, 2011. (ISBN-13: 978—7380-4135-3). You may choose another text or websites to complete your prelab assignments.
- Molecular models – these are *highly recommended* for working problems and visualizing three-dimensional concepts. These are optional and available for purchase at the bookstore or online at www.indigo.com (organic chemistry molecular model set, ~\$21).

Course Outcomes:

The organic chemistry laboratory course will enhance your ability to observe, problem solve, document methods, and communicate scientific results. Whatever career path you choose, be it medicine, scientific research, or a field outside of the sciences, you will need these skills to be successful. The goal in this course is for you to cultivate these skills and to learn laboratory methods and techniques that are specific to the field of organic chemistry. Upon completion of the laboratory portion of this course, you should be able to:

- Safely perform common organic lab techniques
- Identify the appropriate glassware/equipment needed to carry out those techniques
- Collect, properly document and analyze spectral data
- Keep a complete laboratory notebook and effectively communicate scientific results

Grading:

Laboratory grade will comprise 150 points of your CHEM 326 course grade. (Please see lecture syllabus for course grade breakdown and grade cutoffs.) The breakdown of laboratory assignments is as follows:

Master Table of Reagents	6 pts
Experiment 1	38 pts
Experiment 2	25 pts
Experiment 3	31 pts
Experiment 4	25 pts
Experiment 5	25 pts
<hr/>	
Total	150 points

You must achieve 60% of the points in the lecture (282/470 points) and lab (90/150 points) separately in order to receive a passing grade in this course.

Course Policies and Procedures for Laboratory

General Laboratory Safety: Safety in the laboratory is very important. Organic chemicals are often flammable and hazardous. Please follow the requirements below while you are in the lab:

1. Safety goggles must be worn over the eyes at all times. Goggles are provided for you in your equipment drawer.
2. Clothing that is worn should cover your entire torso and protect your feet. Shorts, short sleeve shirts or blouses, sandals, etc. permit the possibility of chemicals coming into contact with your bare skin. Remember to wear closed-toe shoes and either wear “covering” clothing or purchase a lab apron or lab coat. Use gloves when advised or whenever you feel you need them.
3. Come to class prepared and ask questions.
4. You may not work in the laboratory outside of the normal class without permission.
5. Keep your work area and common work areas clean.
6. Report all accidents and spills, however minor. All powders must be disposed in hazardous or non-hazardous waste containers; loose powder in the trash is unacceptable.
7. Neither food nor drinks are allowed in the laboratory. The use of gum is prohibited in the laboratory.
8. Headphones and cellphones are not to be used in the laboratory. If you must use your phone (texting include) secure the work area and leave the lab.
9. Any woman who is pregnant or thinking of becoming pregnant should consult with her doctor before participating in this class.

Lockers: On the first day of lab, each student checks into a glassware drawer and becomes responsible for the drawer contents from the day of check-in until locker check-out at the end of the semester. The drawers will be unlocked at the beginning of each lab meeting, and it is the student’s responsibility to make sure his/her drawer is locked at the end of each lab.

Laboratory Notebook: You will be expected to maintain a proper and complete notebook throughout the lab course (complete guidelines can be found in the “Laboratory Notebook Guidelines” handout). This will consist of: prelab preparation, during lab procedure and observations, and postlab results and discussion. Prelab preparation will be graded at the beginning of the experiment on the designated lab day; during lab and postlab sections will be handed in on the due date (found in the course calendar) and graded after each completed experiment.

Late Work: I hope that you will avoid turning in an assignment late. If you must turn in work late, it will be accepted with a 10% grade point penalty up until I have returned the graded assignment to the class, after which point late work will no longer be accepted.

Make-Up Policy: If a lab class will be missed due to an excusable circumstance, you are expected to make arrangements for the make-up *prior* to the scheduled lab. If I do not hear from you prior or during the lab period you miss, the absence will be unexcused. The following are excusable circumstances:

- a. UWSP Athletic event (you must provide *written* authorization from your coach)
- b. Armed forces related training / drills (you must provide *written* authorization from your supervising officer)
- c. Medical emergency (you must provide *written* documentation from a physician)
- d. Death in the family (please provide documentation of some type; obituary or service folder is acceptable)
- e. An event related to your religious beliefs in accordance with Chapter 22 of the UWSP Community Rights and Responsibilities (<http://www.uwsp.edu/centers/Pages/policies.aspx>) (you must inform me of a conflict of this type within the first three weeks of the course)

Missed labs for other reasons (e.g. oversleeping, forgetting, etc) are not valid excuses for missing a scheduled lab class. You will not be allowed to make up missed work for an unexcused absence. Students with three or more unexcused absences will receive a failing grade in Chem 325.

Students arriving late to lab (15 minutes or more) will incur a 2-point deduction for the experiment (only if you arrive with enough time to finish the lab). If you arrive late to lab and will not have enough time to finish the experiment, it will be considered an unexcused absence.

Laboratory Behavior: UWSP values a safe, honest, respectful, and inviting learning environment. To ensure that each student has the opportunity to succeed, a set of expectations has been developed for all students and instructors known as the *Community Rights and Responsibilities Document* (<http://www.uwsp.edu/dos/Documents/CommunityRights.pdf>). I believe mutual respect between students and instructors creates the best learning environment for everyone. Organic chemistry laboratory presents a unique learning environment in which you will encounter new techniques and hazardous chemicals. It is important that each of us take responsibility for our own safety as well as assisting in the safety of others. This means that you should be aware of your surroundings at all times and pay attention to chemical contamination on your skin, gloves, and clothing. To assist in your awareness and to prevent the transfer of chemicals, the use of headphones and cellphones are not permitted in the laboratory as stated in the safety guidelines. You are expected to comply with the safety regulations outlined in the syllabus and the experiment handouts. Anyone found not in compliance may incur a 2-point deduction from their Postlab Write-Up for the experiment.

Course Policies and Procedures for Both Lecture and Laboratory

Attendance

For lecture: Absences from lecture will not result in any direct penalties for students. It is your responsibility to collect missed material (e.g. lecture notes, assignments, announcements) from students who did attend.

Laboratory: Students are required to attend all laboratory sessions and will only be allowed two unexcused absences for the semester. Showing up late to lab may be considered an unexcused absence (see Make-Up Policy). Absences will be excused according to the Make-Up Policy. In order for an absence from laboratory to count as excused 1) the student must contact the instructor as soon as they know they will miss the lab period and 2) the student must complete the missed experiment at another scheduled laboratory time that is approved by the instructor.

D2L: D2L is an online course management system that will be used for posting handouts, powerpoint slides, and other relevant course material. You will also access laboratory related items here. You can access D2L from the UWSP homepage. If you cannot access this course once you are in D2L, please let me know *asap*.

Grading: I will not discuss grades on the day I return a quiz or exam. Please look over your quiz/exam along with the answer key carefully. If you have questions concerning the grading, please make an appointment to discuss. I reserve the right to re-grade the entire quiz/exam.

Disabilities: Any student who anticipates they may need an accommodation based on the impact of a disability (including mental health, chronic or temporary medical condition) should contact the Disability and Assistive Technology Center (DATC) at 715-346-3365 or at datctr@uwsp.edu to seek further assistance. Students currently registered with the DATC should provide their Notice of Accommodation letter to me during office hours, electronically via email, or after class as soon as possible so that I can work with DATC to make the necessary arrangements.

Academic Integrity: Academic Standards will be rigorously enforced as outlined in Chapter 14 of the UWSP Community Rights and Responsibilities (<http://www.uwsp.edu/centers/Pages/policies.aspx>). A violation of this policy will result in a zero for the work involved or an F in the course and may result in further disciplinary action, depending on the nature of the infraction.

CHEM 326 Laboratory Course Calendar

Week	Monday	Wednesday	Lab
1	1/23	1/25	Check-in, Master Table
2	1/30	2/2	Benzoin Reduction Day 1
3	2/6	2/7	Benzoin Reduction Day 2
4	2/13	2/14	Benzoin Reduction Day 3
5	2/20	2/21	Preparation of Alcohol Day 1 LNb Due for Benzoin
6	2/27	2/28	Preparation of Alcohol Day 2
7	3/6	3/7	Preparation of Alcohol Day 3
8	3/13	3/14	Esterification of Unknown Day 1 LNb Due for Alcohol
	3/20	3/21	Spring Break, No Lab
9	3/27	3/28	Esterification of Unknown Day 2
10	4/3	4/4	Acetyl Ferrocene Day 1
11	4/10	4/11	Acetyl Ferrocene Day 2 LNb Due for Esterification
12	4/17	4/18	Acetyl Ferrocene Day 3 Polymer Lab Day 1
13	4/24	4/25	Polymer Lab Day 2 LNb Due for Acetyl Ferrocene
14	5/1	5/2	Polymer Lab Day 3
15	5/8	5/9	Check-out LNb Due for Polymer Lab