

**Course Syllabus for
Organic Chemistry for Majors II
Chem 144 – Spring 2014**

- Instructor:** Stephen P. Waters
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Office Hours: Mon 2:30 – 3:30 pm; Thurs 10:00 – 11:00 am
Class Meetings: 10:40 am – 11:30 am MWF, Votey 209
UVM Holidays: Classes will not be held on: January 20th, February 17th, March 3rd–7th.
- Required Text:** Solomons, T. W. G.; Fryhle, C. B. *Organic Chemistry*, 11th ed., Wiley.
- Recommended:** Solomons, T. W. G.; Fryhle, C. B. *Student Study Guide and Solutions Manual for Organic Chemistry*, 11th ed., Wiley.
Molecular Structure Model Kit
- Course Outline:** Chapter 13. Conjugated Unsaturated Systems
Sections 13.1, 13.2B, 13.3, 13.4, 13.5, 13.6A, 13.6B, 13.7, 13.9, 13.10
- Tools for Structure Determination of Organic Molecules
Section 2.15–2.16: Infrared Spectroscopy for Detecting Functional Groups
Chapter 9. Nuclear Magnetic Resonance (NMR) and Mass Spectrometry
All sections except 9.10, 9.12, 9.18, 9.19
- Chapter 14. Aromatic Compounds
All sections except 14.7A, 14.11
- Chapter 15. Reactions of Aromatic Compounds
All sections except 15.14A, 15.16
- Chapter 16. Aldehydes and Ketones: Nucleophilic Addition to the Carbonyl Group
All sections except 16.8C, 16.10B, 16.13, 16.14
- Chapter 17. Carboxylic Acids and Their Derivatives
All sections except 17.2J, 17.9, 17.10A, 17.11, 17.12
- Chapter 18. Reactions at the α -Carbon of Carbonyl Compounds: Enols and Enolates
All sections except 18.3D, 18.9
- Chapter 19. Condensation and Conjugate Addition Reactions of Carbonyl Compounds: More Chemistry of Enolates
All sections
- Chapter 20: Amines
All sections except 20.3F, 20.4E, 20.6A, C, & D, 20.11

Text boxes within the chapters entitled “The Chemistry of” and “Why Do These Topics Matter?” are optional. You can read them if you think this stuff is cool.

Course Grading: Course grading will be based on three midterm exams, a cumulative final, and your laboratory grade. No exam or lab grades are dropped, so take them seriously. Proposals for “extra credit” will not be considered. The only valid excuses for missing an exam are medical or other true emergency situations. If you miss an exam for such a reason, you must inform me of it promptly, present appropriate documentation of your excuse, and receive formal approval to take a make up exam. If you miss an exam for any other reason, you will receive a grade of zero for that exam.

The answers to exam problems will be posted after each exam. If you have any questions concerning the grading of an exam, you must see me within one week after the day the exam is returned to the class.

Laboratory Grade	20%		
Midterm Exam 1	20%	Wednesday, February 12	6:00–8:00 pm Votey 209
Midterm Exam 2	20%	Wednesday, March 19	6:00–8:00 pm Votey 209
Midterm Exam 3	20%	Wednesday, April 16	6:00–8:00 pm Votey 209
Cumulative Final	20%	Friday, May 9	10:30 am – 1:15 pm Votey 209

Multiple Choice, Alternate ACS Standardized Final: Lab Week of April 22nd – 24th

One goal of our department is to assess student learning in our courses by gathering data that indicates how much a student has learned in a given subject. To do this in a scientific way, a cumulative, standardized 70 multiple-choice question exam will be administered during the final week of lab. The exam covers concepts from both CHEM 143 and 144.

This exam is **optional** and is given as an alternative to my normal final exam. If you choose to take this exam, you have the choice of using the grade you receive on this exam as your final exam grade (i.e.; you do not need to take the normal final exam). However, if you take this exam and you are not satisfied with the grade you receive on this exam (raw, un-normalized score), you are still welcome to take the normal final exam. If you take both exams, only the higher exam score will be used as your final exam score. You will be informed of your score on this exam well in advance of the normal final.

Assigned Chapter Problems: The textbook and study guide have tons of homework problems to help you. For each chapter you should work as many of the suggested problems as possible. **I strongly urge you to keep up with your reading and problem solving.** The study of Organic Chemistry is a highly structured cumulative intellectual enterprise. Cramming does not work well in this subject! I will suggest some problems in each chapter each week for you but will not grade them. You should do as many as possible!

Academic Conduct: The only valid excuses for missing an exam are medical, family crisis, or other true emergency situations. Get it in writing. Any other excuse will result in a numerical score of zero for that exam. Cheating or plagiarism will be considered grounds for failing the course. All graded documents must be your own work. Cases of cheating or plagiarism will lead to further disciplinary action, which may include dismissal from the University according to the rules set forth in the University of Vermont’s *Code of Academic Integrity*.

Course Syllabus for CHEM 144 Laboratory - Spring 2011

Let's make things out of stuff! Organic lab part 2 is awesome and was definitely a life-changing event for me. There is something very powerful about the ability to manipulate matter and transform one substance into another. There will be brilliant colors, boiling flasks, sloshing and swirling, beautiful crystals, and lots of smells - mostly good but some nasty.

Required Text: Ault, A. *Techniques and Experiments for Organic Chemistry*, 6th ed., University Science Books, 1998.

Required Materials: Bound lab notebook with carbon paper and numbered pages
Lab safety glasses, ink pen, ruler, calculator

General Considerations:

Read the assigned reading before doing the experimental work. The experiments designated within each chapter describe the procedures that you will actually carry out in the laboratory.

Please carefully read and digest the assigned pages *before* you arrive for lab.

Schedule of Transformations:

1/21,23	Introduction, Safety, Check-In
1/28,30	Synthesis of triphenylmethanol from methyl benzoate: The Grignard reaction Experimental procedure: E39: pages 448-451 Pre-lab reading: pages 439-451
2/11,13	Grignard reaction continued
2/18, 20	Synthesis of rings: the Diels-Alder reaction of butadiene and maleic anhydride Experimental procedure: E66: pages 508-510 Pre-lab reading: pages 507-510
2/25,27	Synthesis of methyl <i>m</i> -nitrobenzoate: Electrophilic aromatic substitution Experimental procedure: E44: pages 464-466 Pre-lab reading: 463-466
3/3-7	SPRING RECESS – NO LABS
3/11,13	Synthesis of 2,4-dinitrophenylpiperidine: Nucleophilic aromatic substitution Experimental procedure: E50: pages 477-478 Pre-lab reading: pages 472-478
3/18,20	Synthesis of trans, trans-1,4-diphenylbutane: The Wittig reaction. Experimental procedure: E71: pages 524-527 Pre-lab reading: pages 517-527

3/25,27	Synthesis of oil of wintergreen (methyl salicylate): The Fisher esterification Experimental procedure: E77: pages 538-540 Pre-lab reading: pages 538-540
4/1,3	Synthesis of tetraphenylcyclopentadienone: The aldol condensation Experimental procedure: E95: pages 595-597 Pre-lab reading: pages 589-591, 595-597
4/8,10	Synthesis of <i>p</i> -(4-nitrobenzeneazo)-phenol: A synthetic dye Experimental procedure: E63: pages 502-503 Pre-lab reading: pages 480, 482-483, 502-503
4/15,17	Synthesis of vanillin oxime from vanillin and CHECK-OUT Experimental procedure: E58: pages 490-491 Pre-lab reading: pages 485, 490-491
4/22,24	STANDARDIZED EXAM

Grading: The laboratory grade will be based on your general ability to carry out the experiments, the accuracy with which you record and interpret your results, your performance on laboratory quizzes, and an evaluation by the TA of your overall technique and ability as an experimentalist.

Further details of lab grading are presented in a separate Laboratory Guidelines Document that you will receive at the Check-In session.

Attendance: There are no make-up lab sessions. If you miss a lab for a valid reason (a true emergency), you must provide your TA with a documented excuse for the absence. Unexcused absences will result in a numerical score of zero for that experiment. If you miss more than 2 labs *for any reason*, you will receive a grade of F for the whole course.

Laboratory Safety: Organic laboratories are safe places to work provided that you operate with caution and forethought. Careful knowledge of the properties of what you are working with is necessary to avoid accidents and injuries. Potentially dangerous equipment and flammable, toxic, and/or corrosive materials are sometimes used. Please observe the following rules.

1. You must wear OSHA approved safety glasses in the laboratory.
2. Dress properly. Do not wear open-toed shoes or sandals. Long hair must be tied back.
3. Avoid personal contact with chemicals. It is best to wear protective gloves. If you spill any chemical on your skin, wash it off at once with soap and water and tell your TA.
4. Performance of unauthorized experiments is not allowed.
5. Horseplay or goofing around in the laboratory is strictly forbidden.
6. Drinking and eating in the laboratory are prohibited.

7. Removal of chemicals and equipment from the laboratory is forbidden.
8. Extraneous sources of sound in the laboratory are not allowed.
9. Do not work in the laboratory while under the influence of drugs or alcohol.
10. Report all accidents and injuries, however minor, to the instructor.
11. Do not pipette by mouth. Do not inhale or ingest any chemicals.
12. When leaving the laboratory be sure that all gas, air, water, steam, and electricity are off.
13. Know the location of exits, safety showers, and eye wash fountains.
14. The working space, drawers, cabinet, and shelf above your bench should be neat and clean at all times. A clear work area should be maintained. Minimize clutter.
15. The balances and balance area should be cleaned of any chemical spill.
16. Place glass in the broken glass disposal box; not in the trash.
17. Always point test tubes, flasks, and separatory funnels away from you and others.
18. Follow the instructions in your laboratory text for proper waste disposal.
19. Listen to your TA!

In case of accident:

- 1. Fire.** Personal safety is most important. Make sure everyone gets out of the room and the building. After the safety of all is assured, you may extinguish the fire. If a person's clothing catches fire, he or she is in need of immediate help. Prevent the person from running. Put him or her under the safety shower and pull the chain. It is less effective to smother flames with a fire blanket. Never spray a person with a carbon dioxide fire extinguisher.
- 2. Chemicals.** If corrosive chemicals are spilled on clothing, immediate showering is the best remedy. If chemicals are spilled on the skin, wash them off with large volumes of water. If a chemical is spilled in the eyes, wash your eyes immediately at the eye wash fountain.
- 3. Injuries.** All injuries, no matter how minor, must be treated immediately by competent medical staff at the University infirmary. Report the injury to your lab instructor.

My signature below indicates that I have read, understood, and will comply with the safety rules. I understand that my lab grade will be penalized and I may be dismissed from lab if I do not comply.

Name: _____

Email: _____

Signature: _____

Date: _____