

CHEM 347, LABORATORY METHODS IN ORGANIC CHEMISTRY SPRING 2014

Faculty Instructor: Professor Philip Garner, Fulmer 337, 5-7620, ppg@wsu.edu

Teaching Assistant: Ms. Chongjie (Jackie) Zhu, Fulmer 416, 5-7280, zhuzicj@wsu.edu

Teaching Assistant: Mr. Charlie Murray, Fulmer 470, 5-7338, charles.murray@wsu.edu

Pre-Lab Lecture: T,H 10:35-11:50 am, Fulmer 438

Laboratory: T,H 12:00-2:40 pm, Fulmer 426 & 427

Learning Outcomes: This course is designed to train students in the basic techniques and logic used in the modern Organic Chemistry laboratory. The focus of the first four experiments will be organic synthesis while the final experiment will be concerned with the separation and identification of a mixture of unknown organic compounds. Skills to be acquired include: setting-up experiments, performing and analyzing organic reactions, working-up organic reaction mixtures, purification and characterization of organic compounds, and interpretation of the experimental results.

Required Materials: (1) Student Lab Notebook – Hayden McNeil (2) *The Student's Lab Companion: Laboratory Techniques for Organic Chemistry; Standard and Microscale, 2nd Edition*, Lehman, J. W.; Pearson Prentice Hall, 2008 (ISBN: 0-13-159381-1).

Course Web Site: <http://347.chem.wsu.edu/> (Manager: Mr. Ryan Joseph, ryan.joseph@email.wsu.edu)

Assessment: This course will be graded on the basis of five written lab reports (50%), completed pre-labs (5%), laboratory technique assessment (5%), weekly quizzes (10%), and a comprehensive final exam (30%).

COURSE SYLLABUS & SCHEDULE

Orientation, Safety, and Check In (Week 1)

- Lehman: Introduction, Safety, Chemistry and the Environment, Operation 1, Appendix II

Experiment 1: Fischer Esterification Reaction (Weeks 2-3)

- Lehman: Operations 7, 18, 31, 39, & 40
- MIT videos: 17, 5, 6, & 16
- Reusch's Virtual Text: Introduction to Spectroscopy, Infrared Spectroscopy, NMR Spectroscopy
- Lab Report 1 Due on February 4!*

Experiment 2: Green Suzuki Reaction (Weeks 4-5)

- Lehman: Operations 16, 28, 39 & 40
- MIT videos: 7 & 9
- Reusch's Virtual Text: NMR Spectroscopy
- Lab Report 2 Due on February 18!*

Experiment 3: Diels-Alder Reaction (Weeks 6-7)

- Lehman: Operations 16, 22, 28, 39 & 40
- MIT videos: 3, 7, & 9
- Reusch's Virtual Text: NMR Spectroscopy
- Lab Report 3 Due on February 25!*

Experiment 4: Cross Metathesis Reaction (Weeks 7-9)

- Lehman: Operations 22, 21, 28, 39 & 40
- MIT videos: 3, 10, & 9
- Reusch's Virtual Text: NMR Spectroscopy
- Lab Report 4 Due on March 25!*

Week 10: Spring Break

Experiment 5: Separation & Characterizations of Unknowns. (Weeks 11-16):

- Lehman and MIT Videos as needed
- Reusch's Virtual Text: Mass Spectrometry, Infrared Spectroscopy, NMR Spectroscopy
- *Lab Report 5 Due on May 1! Check out!*

Final Exam: Wednesday, May 7, 10:10 am - 12:10 pm

Academic Integrity: Academic dishonesty, such as cheating, plagiarism, fabrication, and fraud is prohibited. The work will receive a failing grade and this action will be reported to the Office of Student Conduct. Consult the Office of Student Conduct (<http://www.conduct.wsu.edu>) for additional information.

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. Location: Washington Building 217; Phone: 509-335-3417. Contact: Meredyth Goodwin (m.goodwin@wsu.edu)

ADDITIONAL INFORMATION:

Notebooks And Record Keeping

- You must keep all of your laboratory records (data, calculations, observations) in your laboratory notebook and properly labeled paper copies of your characterization data (spectra) in a three-ring binder. Do not keep your data on loose pieces of paper.

Lab Etiquette and Safety

- **Safety Glasses.** You MUST wear safety glasses or goggles at all times when you are in the laboratory. You should invest in some comfortable safety glasses that you won't feel like taking off every five minutes. It is not a good idea to wear contact lenses in a chemical laboratory even though your vanity makes you want to. If you insist on not using safety glasses we will dis-enroll you from the course.
- **Gloves.** "Chemically Resistant" disposable gloves are provided to all students. Be aware that the protection offered by gloves is only temporary. If you have a serious spill you should wash the gloves, and then remove and dispose of them properly. Be sure to wash your hands before putting on a fresh pair of gloves. GLOVES CAN AND DO LEAK!
- **Health Problems.** Please let Dr. Garner know (privately) if you have health issues that might affect you in the lab so that if a problem arises we will have a plan in place.
- **Clothing.** Many students wear lab coats; these are available for purchase through the chemistry club. Long pants and long sleeved shirts are recommended for working in the laboratory; please do not come to lab wearing shorts. Even if you are using a lab coat you need to have long pants. Be advised that many synthetic fibers are soluble in organic solvents. Wear natural fibers or at least natural fiber blends. Cotton reacts with acid spills and you might find that holes develop after you wash your cotton lab clothing. Wool is the most resistant.
- **Shoes.** Open toed shoes and sandals (flip-flops) are not suitable for laboratory use. You will be asked to change into appropriate footwear should you show up for lab wearing inappropriate foot protection.
- **Electronic Devices.** There will be no cell phones, radios or recorded music in the lab. If you need to make or receive a call, step out of the lab to do so. Also turn off your cell phones during lectures, and especially during examinations – failure to do so may result in a lower grade.