
Chemistry 405 Laboratory Spring 2015

Lab Room: Cowley 460

Lecture Room: Cowley 301

Professor: Nicholas McGrath, Ph. D.

Office: 4009 Cowley Hall

Class Time: Tue 9:55-10:50, Fri 11:00-2:05

Office Hours: Mon 9:00-10:30, Tue 11:30-1:00

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Lab Materials

- ❖ Lab Goggles
- ❖ Composition Lab Notebook

Course Overview:

The synthesis of small molecules is important for a variety of fields of study, including chemistry, biochemistry, genetics, and molecular biology. The purpose of this course is to equip students with organic chemistry synthesis techniques that can be applied to many areas of research, and expose them to diverse fields of study to prepare them for graduate school or other scientific careers. The course will place lab experiments in context by providing background information about general strategies and transformations commonly employed by organic chemists. The course will culminate with a project in which each pair of students will devise and carryout a multi-step synthesis using primary literature and SciFinder searching, and present their work as a short journal communication and oral presentation.

Graded Work:

1. Lab Notebooks (10 pts)

Lab notebooks will periodically be checked for neatness, completeness, and proper formatting.

2. Problem Sets (60 pts)

Experiments and lecture topics will be accompanied by a corresponding problem set. These questions will be related to the lab/lecture and require the students to think beyond how they carried out the experiment.

3. Midterm Exam (40 pts)

A midterm exam will be given that covers the lecture and lab experiments from the first half of the semester.

4. Literature Presentation (30 pts)

Each pair of students will be asked to present a current journal article to the class. The presentations should highlight all relevant background information, the novelty of the work, the major conclusions of the paper, and what the next steps might be in that area of research.

5. Final Synthesis Project (60 pts)

Each pair of students will be asked to brainstorm during the first half of the semester to come up with a topic for their final synthesis project. After the midterm, students will work on completing the synthetic route.

a) ACS Communication (30 pts)

The successful completion of the synthesis project will be summarized in the form of a short 1-page JACS (Journal of the American Chemical Society) communication.

b) Final Presentation (30 pts)

Students will use the final lab periods to present their final project to the rest of the class.

Lab Grade Breakdown:

A: 93-100

AB: 90-92

B: 86-89

BC: 80-85

C: 70-79

D: 60-69

F: ≤59

Absences

Attendance to every scheduled lab period is mandatory. If you are unable to attend lab due to illness or an emergency, you must contact me before the start of the lab period. In emergencies when this is not possible, you need to contact me within 24 hours of the start of your scheduled lab time. Any missed work for unexcused absences will not be accepted for credit. Missed work for excused absences will need to be made up by the student in a timely fashion.

Academic Dishonesty

You are expected to maintain a high level of academic honesty and integrity, and any indication that these standards are not being met will be confronted. **Plagiarism, cheating, and copying the work of fellow (past or present) students will invoke severe penalties and may lead to dismissal from the University.** For complete details of UW-L's policy on student conduct, please refer to the following website: http://www.uwlax.edu/studentlife/academic_misconduct.htm.

Disabilities

Any student with a documented disability (e.g., physical, learning, psychiatric, vision, hearing, etc.) must contact the instructor and the Disability Resource Services (DRS) office in 165 Murphy Library at the start of the semester to arrange any reasonable accommodations. Students who are currently using the DRS will have a copy of a contract that verifies they are qualified students and have documentation on file in the DRS office.

Semester Schedule

Week	Date	Day	Lecture Topic/Experiment
1	1/27	Tue	Course Intro./Syllabus/Lab Notebook/Groups/SciFinder/ChemDraw
1	1/30	Fri	Experiment 1: The Chlorobenzaldehyde Challenge
2	2/3	Tue	TLC/Flash Chromatography/Stains/Eluents
2	2/6	Fri	Experiment 2: The Vanillin Challenge
3	2/10	Tue	Oxidation and Reduction: Selectivity/Stereochemistry
3	2/13	Fri	Experiment 3: Anhydrous Asymmetric Epoxidation of Geraniol
4	2/17	Tue	Oxidation and Reduction: Selectivity/Stereochemistry
4	2/20	Fri	Experiment 4: Hydrogenation Reactions
5	2/24	Tue	Use of Phosphorous in Organic Chemistry
5	2/27	Fri	Experiment 5: The Wittig Reaction
6	3/3	Tue	Pericyclic Reactions: Emphasis on Cycloaddition Reactions
6	3/6	Fri	Experiment 6: An Interesting [4+2] Cycloaddition Reaction
7	3/10	Tue	Retrosynthetic Analysis: Synthesis of Natural Products
7	3/13	Fri	Midterm Exam
N/A	3/17	Tue	SPRING BREAK
N/A	3/20	Fri	SPRING BREAK
8	3/24	Tue	Group 1 Presents Paper
8	3/27	Fri	Work on Final Project
9	3/31	Tue	Group 2 Presents Paper
9	4/3	Fri	Work on Final Project
10	4/7	Tue	Group 3 Presents Paper
10	4/10	Fri	Work on Final Project
11	4/14	Tue	Group 4 Presents Paper
11	4/17	Fri	Work on Final Project
12	4/21	Tue	Group 5 Presents Paper
12	4/24	Fri	Work on Final Project
13	4/28	Tue	How to Use a JACS Template
13	5/1	Fri	Work on Final Project
14	5/5	Tue	Final Edits on Communication
14	5/8	Fri	PowerPoint Presentations/Communications Due