

CHEMISTRY 374

Spring 2020

Instructor: Dr. Daniel Stelck
Office: Renfrew Hall 305
Phone: 885-2146
E-mail: daniels@uidaho.edu

Office Hours: 1:30 PM – 2:30 PM on Monday, Wednesday and Friday.

WWW: <https://danstelck.weebly.com/chemistry-374.html>

Textbook: Organic Chemistry Laboratory II, J. H. Cooley and R.V. Williams

Chemistry 374 is the second semester of a two-semester organic chemistry lab course. The intent of this course is to provide a setting where the student can develop their own experiment with the principles and theories of organic chemistry under the supervision of their teaching assistant. Specifically, this course will make use of those techniques the students learn in first semester of organic to identify unknown organic compounds. The students will also be expected to synthesis organic compounds and collect data to determine the mechanism by which the reaction proceeded.

GENERAL COURSE INFORMATION

Web Site (<http://danstelck.weebly.com/chemistry-374.html>)

An essential component of this course is the course web site. Familiarize yourself with this site as soon as possible. A schedule of the laboratory experiments, portions of the experiment to be performed and supplemental material will be found here.

Laboratory:

The beginning of each laboratory experiment will begin with brief lecture from your teaching assistant, which will outline that week's lab. New techniques and/or training on organic equipment and relevant safety considerations will be given at this time. The second semester of organic chemistry laboratory much of the experiment development and approach is left to the student.

Safety:

Safety goggles and appropriate clothing must be worn at all times in the laboratory. Failure to do so will result in your dismissal from the lab.

Attendance:

Attendance is mandatory. Missing more than one experiment for an unexcused reason will result in a failing grade. Due safety considerations, missing more than two experiments for excused reasons will result in a failing grade.

Grading:

Your grade in this course will be determined by your attendance, the quality of your laboratory report for each experiment and the identification of assigned unknowns. Attendance is defined by showing up to each experiment prepared, having the procedure

transcribed into your lab book, following all safety protocols and correctly disposing of any chemicals used or produced.

Learning Outcome:

Since some of the students taking this class have not taken the Organic Chemistry Laboratory I (Chem 278). Many of the learning outcomes will be identical to those of this semester of organic chemistry laboratory. However, additional learning outcomes are noted at the end of the list.

By the end of this course, students should be able to:

- Use a refractometer and interpret the values obtained.
- Correctly set up and use a boiling point apparatus.
- Experimentally determine the melting point of an organic compound.
- Analyze a mixture using thin layer chromatography.
- Collect the infrared spectrum of an organic compound.
- Isolate a pure organic product using recrystallization.
- Construct a distillation apparatus and use it to separate compounds of differing boiling points.
- Use solubility and/or acid-base to develop a method to successfully extract one of the compounds from a mixture.
- Use infrared spectroscopy to analyze organic compounds.
- Use proton and carbon NMR spectroscopy to propose the correct structures of organic compounds.
- Synthesize organic products and correctly elucidate their structure.
- Synthesize organic products under refluxing conditions.
- Develop an understanding of the principles of chemical safety and know how to apply these principles in a working laboratory.
- Recognize common laboratory hazards and be familiar with the hazard rating system.
- Assess the risk of possible laboratory hazards.
- Use of Safety Data Sheets to determine possible risks.
- Be knowledgeable of proper hazardous waste disposal.
- Develop laboratory methods to identify the functional group on assigned organic unknowns using wet tests
- Determine the exact identity of assigned organic unknown using wet tests, experimentally determined physical properties and NMR spectra.
- Synthesize a derivative of an organic compound and isolate it via recrystallization.
- Determine the reaction mechanism of a reaction using kinetics.
- Work as part of a team of researchers to devise the relative reactivity of bromine with group of alkyl benzenes.