

B.S. Junior Year – Fall Semester Lab

CEM 356 Organic Laboratory II

Description: Multi-step organic synthesis. Chemical literature assignment. Qualitative organic analysis. Separation, identification, and characterization of unknowns.

Credit: 2 Credits (6 hours lab per week)

Prerequisite: CEM 355

Experiments:

Most of the lab reports are informal, however both literature assignments require formal reports in the style of the Journal of American Chemical Society (JACS) articles.

1. Multi-Step Organic Synthesis

- a. Synthesis of sulfanilamidopyridine: a three-step synthesis starting with aniline.
- b. Synthesis of benzil from benzoin followed by preparation of five benzil derivatives: benzilic acid, meso-hydrobenzoin, cis-stilbene diacetate, tetracyclone, and 5,5-diphenylhydantoin.

2. Chemical Literature Assignments

- a. Beilstein assignment.

Each student is given a structure of an organic compound on an index card (marked with letter "B"). He/she is responsible to come up with the IUPAC name, boiling point/melting point of the compound, and a journal reference for its synthesis. Also a brief description of the synthesis is required.

- b. Chemical abstract assignment.

Each student is given a structure of an organic compound on an index card (marked with letter "C"). He/she is responsible to come up with the IUPAC name, boiling point/melting point of the compound, and a journal reference for its synthesis. Students must give a detailed description of the synthesis including journal reference for each intermediate that is not available commercially as required by JACS.

3. Qualitative Organic Analysis/Separation

- a. Identification and characterization of a pure unknown sample. Each student is given a unique unknown sample and she/he is required to use ^1H NMR (300Mhz) and FTIR spectroscopy to identify the compound. Also, students are required to make a solid derivative of their unknown.
- b. Separation, Identification, and characterization of a three component unknown mixture. Each student has to separate a three component unknown mixture independently and then use NMR (300Mhz) and FTIR instruments to identify each compound. Also, students are required to make a solid derivative for each of the components.