

CHEM2860 – Integrated Chemistry Laboratory I

Course Description:

This laboratory course covers the basic laboratory techniques and essential laboratory safety practices for carrying out organic and inorganic chemistry experiments. The experiments provide comprehensive training for students on (1) safe handling of chemical reagents and chemical waste; (2) proper usage of laboratory apparatus and equipment; (3) basic techniques of analyzing, isolating and purifying organic and inorganic compounds from a mixture; (4) common techniques for carrying out simple organic and inorganic reactions; (5) simple experimental techniques for identifying organic and inorganic compounds; (6) recording experimental data and writing experimental report, and; (7) conduct search on scientific literature. This course allows students to acquire experiences on fundamental organic and inorganic experimental practices.

List of Experiments (for reference only):

Part A – Basic Inorganic Chemistry

- Learning Experiment Techniques
- Infrared Analysis of Copper(II) Chloride-DMSO Complex
- Synthesis of Iron(III) Acetylacetonate
- Chemical Transformation of Copper (Long Report)
- Preparation of Borane-Amine Adduct
- Preparation of Tri-*n*-Propylborate
- Silicon Oxygen Compounds and Silicon Polymers
- Synthesis and Analysis of Polyiodides Me_4NI_x

Part B – Basic Organic Chemistry

- Purification of Compounds by Recrystallization and Melting Point Determination
- Preparation of Cyclohexene by Dehydration of Cyclohexanol
- Separation of Mixtures by Column Chromatography
- Williamson Ether Synthesis – The Preparation of Aryl Ether from Phenol
- Stereochemistry of the Addition of Bromine to *trans*-Cinnamic Acid
- Resolution of *trans*-1,2-Diaminocyclohexane
- Electrophilic Aromatic Substitution – Alkylation of 1,4-Dimethoxybenzene with 2-Methyl-2-butanol
- Preparation of *N*-Octylphthalimide (Phase Transfer Catalysis)