



Chem 505 / CBE 505: Aspects of Industrial Chemistry and Business Fundamentals

Instructors: Dr. Ivo Hermans and Dr. William Banholzer

Time: Spring 2016; Tuesdays & Thursdays from 1:00 to 2:15 pm

Location: Room B371 Chemistry

Credits: 3 credits

Course Description

The objective of this course will be to educate students in the chemistry and chemical engineering that defines societies' standard of living. Commercial chemical processes will be reviewed. Practical realities of how a discovery moves from research to a commercial product will be taught through examples and case studies. Financial concepts that guide investment will be reviewed including market adoption, the "technology S" curve, venture capital vs. corporate models, and intellectual property.

Prerequisites

Prerequisites are junior level or higher standing and Chem 345 or equivalent. Both undergraduate and graduate students are welcome.

Topics

1. Chemical industry integration, feedstock, product flow.
2. Industrial important inorganic chemistry (e.g., Chlor-alkali, nitric, sulfuric, and phosphoric acid)
3. Industrial important organic chemistry including:
 - a. Organic Feedstocks (petroleum, natural gas, bio-derived)
 - b. C1-chemistry (methane, syn-gas, methanol and formaldehyde)
 - c. C2-chemistry (ethane, ethene, ethylene oxide, ethylene glycol and key derivatives)
 - d. C3-chemistry (propane, propene, propylene oxide, propylene glycol)
 - e. C4-chemistry (butane, butenes and butadiene)
 - f. C6 - aliphatic (from cyclohexane to nylon)
 - g. Aromatics (benzene, toluene and xylenes (BTX) and their key-derivatives like phenol, benzoic acid and therephtahlic acid)
 - h. Long chain linear acids, alcohols and surfactants
 - i. Plastics (overview of the most important crystalline and amorphous polymers and their applications)
4. Industrial Business fundamentals including:
 - a. Financial fundamentals (NPV, IRR, Cash Flow)
 - b. Source of Competitive Advantage (IP)
 - c. Large Corporations, Small Company, Start-up VC
5. Business simulation, and a variety of case studies

To Enroll

This course is cross-listed with both Chemistry and CBE. Students may enroll in either Chem 505 or CBE 505.