

FALL 2009-2010

Orgo-Bio Chem: Molecular Architecture

This is a semester-long introductory survey course covering organic chemistry and relative biochemistry; the interconnections are unavoidable. The cast of organic compounds is a virtual who's who of chemicals, including foods, medicines, drugs, and cellular components. Their compositions and structures determine how they perform their functions. O Chem is considered to be one of college's most mysterious and troublesome science courses, and one aim of this course is to at least partially allay these notions before you go to college. Organic chemistry is *very* different from inorganic chemistry, which is covered in the school's required chemistry course. How so? It's one of those things that must be experienced in order to fully appreciate the question.

As much as possible, the course will be run as a seminar; "learning for the sake of learning" will be the operating mantra. I envision a "book club" atmosphere where each student will be responsible, to a significant degree, for one another's learning of the material through active participation in class. Much of the work in the course will be done collaboratively. This will not be a lab course per se, but lots of hands-on activities will be done.

We will meet four days per week. Assignments can be found at <http://faculty.college-prep.org/~jack>

A basic outline looks like this:

1. The chemistry of carbon

Quick review of pertinent chemistry – bonding, hybridization, and resonance, for examples.

2. Hydrocarbons

Closer look at the aliphatic compounds: alkanes, alkenes, alkynes, various types of isomers, and nomenclature

3. Functional groups and organic reactions

"Reactivity centers" including alcohols, aldehydes, ketones, carboxylic acids, esters, and amines

4. Determining molecular structure

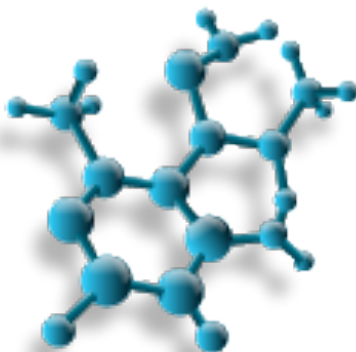
The tools of the detective trade: Combustion analysis, Mass spectrometry, Infrared spectroscopy, NMR

5. A Taste of Mechanisms & Biochemicals

Texts: Organic Chemistry I for Dummies, Arthur Winter; Wiley Publishing, 2005

Napoleon's Buttons, Le Couteur & Burreson; Tarcher/Penguin Publishing, 2004

In addition to the aforementioned mandatory participation in class, you will also be expected to present a "Chemical of the Week" and guide the discussion of a chapter from Napoleon's Buttons. There will be regular quizzes. You will also be responsible for completing a research paper assignment, complete with an oral report. Your grade will be based on a point scale. An estimated breakdown of the point values: class participation 30%, quizzes 15%, homework 10%, project 30%, course discussion guiding/chemical of the week 15%. Late work receives half credit; after one week of lateness, no credit is given.



Chem is cool!