

Chemistry 604-Cellular Metabolism and Regulation
Winter-Spring, 2019
David Petering, Professor

Course Overview

Text: Biochemistry, Voet, Voet, 4th Edition, Wiley, 2011, including Kinemage program to image macromolecules. (See Dr. Petering for files if a used book is purchased.)

Stereopticon 707 stereoviewer

Course conduct

Class

2 exams - midterm and final (each 3-4 hours outside of class time)

Office hours (Chem 345) - by appointment

Studying for the course (see handout)

Course Content

Introduction to Metabolism

The transition from non-life to life and cell metabolism

Cell structure-function context

What are cells like?

Mechanisms of Regulation of Metabolism

Intracellular regulation

Transcriptional control: DNA-protein-modulator interactions in the *lac* operon

Enzyme catalytic control: (a) allosteric regulation in hemoglobin

Primary Metabolism

Energy and Biomaterial Metabolism and Regulation

Glucose: (a) glycolysis, Krebs cycle, oxidative phosphorylation, and gluconeogenesis, (b) photosynthesis

Lipids: fatty acid and triglyceride synthesis and degradation; phosphoglyceride synthesis; steroid biosynthesis (optional)

Amino acids: degradation, synthesis, nitrogen metabolism

Nucleic acids: purine, pyrimidine and nucleotide biosynthesis

Optional

Plant and Microorganism Metabolism

Nitrogen metabolism: nitrogen fixation

Heme and chlorophyll biosynthesis

Examples of secondary metabolism

Workload

At least 2 hours outside of class for every hour in class.