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.