Student Learning Objectives for CHEM4571, 4570 (lecture), 7571- Biochemistry I

- gain understanding of the identity and properties of chemicals in biological systems; gain understanding of the various types of electrostatic (non-covalent) interactions between chemical species; improve skills for calculation of the composition of solutions of acids/bases and buffer solutions; interpret titration curve data

- gain understanding of the thermodynamics of processes occurring under constant V or constant P; gain understanding of chemical equilibria for typical reactions and coupled reactions. Gain understanding of the application of free energy equation to biochemical reactions

- learn about the structure, reactions and functions of carbohydrates including storage polysaccharides; learn about glycoproteins structure/function

- gain understanding of how structural features of nucleic acids govern functional properties; learn basic chemical properties of nucleic acid subunits and macromolecules including hypochromicity; examine and understand features of enzymatic replication of DNA. Gain understanding of DNA synthesis including phosphoramidite reactions; gain understanding of modern sequencing methodologies; gain insights into ribosome structure, function and mechanism of protein biosynthesis

- learn the structural/functional classification of the 20 amino acids; learn the three-letter code names (and single letter codes for extra credit at some point on exams); predict the overall charge on peptides as a function of pH

- learn details of the geometry of the peptide bond, the α-helix, and β-sheet; interpret Ramachandran plots; learn the features of various structural proteins; learn the structural features of globular proteins; understand the thermodynamics of protein folding and the hydrophobic effect

- gain a quantitative understanding of ligand binding; gain an understanding of the mechanisms of allosteric effects in hemoglobin

- understand the development of the Michaelis-Menten equation from basic principles; gain an understanding of the relationship between *in vitro* measurements and their physiological relevance.