



<b>Course Number</b> <b>Course Name</b>	CHEM 4421 Biochemistry
<b>Credit Value</b> <b>(Breakdown of theory and lab credits)</b>	4 Theory
<b>Catalog Course Description</b>	You will study the fundamentals of general and organic chemistry to understand the complex array of structures and chemical processes that occur in living organisms.
<b>Course Student Learning Outcomes/Objectives /Competencies</b>	<p>Objectives - course content upon which a student's level of mastery will be assessed includes the ability to know...</p> <ol style="list-style-type: none"> <li>1. Biologically important molecular structures. Covalent bond (nonpolar and polar), noncovalent bond (hydrophobic effect, hydrogen bond, van der waals interaction and electrostatic interaction) and ionic bond. Definition of acids and bases, dissociation constant and equilibrium constant, Le Châtelier's principle, Henderson-Hasselbalch equation, buffers, entropy and enthalpy, Gibbs free energy, and thermodynamics vs. kinetics.</li> <li>2. Physical and chemical properties of proteins and enzymes, DNA and RNA, lipid bilayer membrane, and relate the structure to its function.</li> <li>3. Mechanisms for regulation of the metabolic processes. Bioenergetics deals with energy flow during biosynthesis (anabolism) and breakdown (catabolism) of biomolecules and how they are regulated.</li> <li>4. The central dogma of information flow from DNA to RNA to protein. How genes in cells are turned on or turn off in response to stimulates such as hormones?</li> <li>5. Using glucose as an example to demonstrate how chemical energy is transformed to ATP through catabolic processes.</li> <li>6. Principles of common techniques used in biochemistry</li> </ol>
<b>College-Wide Student Learning Outcomes measured (General education courses only)</b>	
<b>Program Student Learning Outcomes measured</b>	<ol style="list-style-type: none"> <li>1. The student should be able to communicate effectively using oral and written reports containing technical data.</li> </ol>