BIOL A281: BIOCHEMISTRY

Item	Value
Curriculum Committee Approval Date	11/17/2021
Top Code	040100 - Biology, General
Units	2 Total Units
Hours	36 Total Hours (Lecture Hours 36)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

An introduction to the chemistry of biology. This course is designed to satisfy transfer requirements for some biology majors. PREREQUISITE: BIOL A180 and CHEM A220. Transfer Credit: CSU; UC.

Course Level Student Learning Outcome(s)

1. Explain what is read in primary and secondary scientific literature within the field of biochemistry.
2. Use knowledge of bioenergetics and metabolic pathways to solve biological problems.
3. Understand and cite examples of the evolutionary effects on the genome and proteome of organisms due to changes in lifestyle and ecology.

Course Objectives

- 1. Define chemical components of living systems.
- 2. Describe the interaction of water and weak forces.
- 3. Describe the structure of proteins and their interacting processes.
- 4. Describe protein metabolism.
- 5. Describe the enzyme structure and function.
- 6. Discuss the interactions of enzymes and the control of enzymatic activity.
- 7. Describe the functions of myoglobin and hemoglobin and their interacting processes.
- 8. Describe carbohydrate structure and function.
- 9. Describe Carbohydrate Metabolism (Glycolysis, gluconeogenesis).
- 10. Describe the Citric Acid (TCA) Cycle and its interacting processes.
- 11. Describe the structure and function of lipids.
- 12. Describe Fatty Acid Metabolism and Synthesis.
- 13. Describe Amino Acid degradation.
- 14. Describe the Urea Cycle.
- 15. Describe Oxidative Phosphorylation.
- 16. Describe Photosynthesis.
- 17. Describe the regulation of metabolic pathways.
- 18. Apply metabolic pathways to the functioning of cells.

Lecture Content

Water and weak interactions Protein structure and function Exploring proteins Myoglobin and hemoglobin Enzymes Control of Enzymatic Activity Protein Metabolism Carbohydrate structure and function Carbohydrate Metabolism (Glycolysis, gluconeogenesis) Citric Acid (TCA) Cycle Lipids: Structure and Function Fatty Acid Metabolism Amino Acid degradation Urea Cycle Oxidative Phosphorylation Photosynthesis

Method(s) of Instruction

- Lecture (02)

Instructional Techniques

Traditional lectures and group problem solving.

Reading Assignments

Students will spend 3.5 hours per week reading the textbook, reading primary scientific literature, and watch recorded lectures.

Writing Assignments

Students will spend 2 hours a week writing answers to questions regarding the primary scientific literature they read.

Out-of-class Assignments

Students will spend 3.5 hours per week completing weekly quizzes, answering review questions, and completing assignments from the website (ACHIEVE) associated with the textbook.

Demonstration of Critical Thinking

Objective and essay exams and problem sets

Required Writing, Problem Solving, Skills Demonstration

All exams have a written component. Assigments involving the popular science book and journal articles all involved written work.

Eligible Disciplines

Biological sciences: Masters degree in any biological science OR bachelors degree in any biological science AND masters degree in biochemistry, biophysics, or marine science OR the equivalent. Masters degree required. Biological sciences: Masters degree in any biological science OR bachelors degree in any biological science AND masters degree in biochemistry, biophysics, or marine science OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Nelson, D., Cox, M.. Lehninger Principles of Biochemistry, 8th ed. Freeman, 2021