

Survey of General, Organic and Biological Chemistry TCSU CHEM 210

A. Description

This course is a one-semester survey of general, organic, and biological chemistry for nursing majors and other health-related fields. Topics include general chemistry, organic chemistry, and biological chemistry as they apply to chemistry of the human body. The course satisfies the requirements of those health-career programs that require one semester of chemistry. *The laboratory component will support the course topics including both qualitative and quantitative experiments, and analysis of data.*

B. Recommended Preparation

None specified

C. Prerequisites

Intermediate Algebra with a grade of “C” or better

D. Minimum Unit Requirement

5 semester units – 38 hours of lecture, 38 hours of lab, plus 13 to 38 hours of lecture/activity/laboratory.

E. Course Topics

1. Matter – Atoms and Elements
2. Measurement
3. Chemical Bonds
4. Chemical Reactions
5. Energy and States of Matter
6. Gas Laws
7. Equilibrium
8. Aqueous Systems
9. Acids, bases and salts
10. Buffers, including numerical calculations
11. Hydrocarbons
12. Alcohols, ethers and thiols
13. Aldehydes and ketones
14. Carboxylic acids
15. Amines
16. Esters and amides
17. Carbohydrates
18. Proteins
19. Lipids
20. Nucleic acids
21. Biochemical Energetics and Catabolic Processes

F. Student Learning Outcomes

1. Analyze the fundamental features of inorganic chemistry as it applies to organic and biochemistry including measurement, mathematical interconversion of physical properties such as mass, volume, density, pressure, temperature, solutions, concentrations and dilutions;
2. Demonstrate knowledge of the qualitative features of inorganic chemistry as it applies to organic and biochemistry including physical and chemical properties, naming and writing chemical formulas of commonly occurring ionic compounds and evaluating chemical reactions;
3. Qualitatively compare and contrast heat and work, kinetic and potential energy, and the phenomena of diffusion, osmosis and dialysis, solutions, suspensions and colloids based on their physical properties;
4. Differentiate typical acid and base formulas and compare/contrast the behavior associated with acids and bases including the behavior of buffers;
5. Construct and name structures containing common mono-functional organic molecules and differentiate functional groups when they appear in an organic structure, relate the physical and chemical properties of compounds containing these groups with the structure of each functional classification;
6. Distinguish various roles of four major classes of biomolecules in living cells, distinguish and construct key structural features and common reactions of these classes of biomolecules;
7. Compare and contrast the processes of DNA replication and transcription, RNA translation, and common types of mutations; and
8. Demonstrate knowledge of major biochemical components in common catabolic pathways for carbohydrates and fatty acids and compare metabolic products from those processes.