This course consists of a general introduction to organic and biological chemistry. The structure and reactivity of carbohydrates, lipids, proteins and nucleic acids will be described, and then the cellular metabolism of these compounds will be covered. Also discussed will be digestion, acid-base balance, and fluid and electrolyte regulation. The laboratory work consists of experiments designed to illustrate the topics covered in lecture.

C. OUTLINE OF MAJOR CONTENT AREAS:
   1. Inorganic Chemistry Review
      a) Periodic table
      b) Chemical bonding
      c) Equilibrium
      d) Acids and bases
      e) Buffering
   2. Carbon Chemistry Review
      a) Alcohols
      b) Ethers
      c) Aldehydes and ketones
      d) Organic acids and esters
      e) Amines and amides
   3. Carbohydrates
      a) Monosaccharides
      b) Disaccharides
      c) Polysaccharides
   4. Lipids
      a) Triglycerides
      b) Phospholipids
      c) Steroids
      d) Waxes
      e) Lipid composition of cell membranes
      f) Prostaglandins
   5. Proteins
      a) Amino acids
      b) Peptide bonding
      c) Protein structure
      d) Buffering
      e) Hemoglobin
   6. Enzymes
      a) Specificity
      b) Structure
      c) Activity
      d) Medical uses
C. OUTLINE OF MAJOR CONTENT AREAS: Continued...

7. Nucleic Acids
   a) Structure
   b) Replication
   c) Transcription
   d) Translation
   e) Regulation
   f) Molecular diseases

8. Recombinant DNA
   a) Methods
   b) Uses
   c) Possible gene therapy

9. Homeostasis
   a) Digestion
   b) Blood buffering
   c) Transport of respiratory gases
   d) Renal control of fluids and electrolytes
   e) Acid-base regulation

10. Metabolic Interactions
   a) Carbohydrate catabolism, anabolism
   b) Lipid catabolism, anabolism
   c) Diabetes mellitus
   d) Protein catabolism, anabolism
   e) Interconversions

The laboratory activities are used to enhance, correlate and demonstrate a variety of methods and equipment used in scientific inquiry and as verification of various scientific laws and theories. Laboratory measurement are obtained and recorded by students during the lab period. The results are analyzed and certain specified calculations are required to demonstrate and verify related laws and relationships. Reports and/or quizzes are handed in for evaluation.

D. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Understand basic chemistry concepts and laws.
2. Use basic chemical principles and laws to help predict how any given variable may influence a given chemical or physical change.
3. Understand that basic chemical principles underlie reactions occurring in living organisms.

E. LEARNING OUTCOMES (MNTC): NA

F. METHODS FOR EVALUATION OF STUDENT LEARNING:

G. SPECIAL INFORMATION (if any):
The initial lab session explains and familiarizes the student with general safety equipment in the lab and requires students to map all safety equipment in the lab. During the pre-lab discussion, the hazardous characteristics of the chemicals used during the lab are discussed. The students will be instructed on the proper disposal of all products. The instructor directs all students to wear necessary eye protective equipment while working in a situation where there is a potential danger of eye damage. Students with special needs and concerns (i.e., people with allergies, pregnant females, sufferers of diseases which lower the effectiveness of their immune system) may wish to make this known to the instructor so that any chemical which might affect your situation can be avoided. A copy of Material Safety Data Sheets for chemicals used is available in the lab.