BIO 092
BASICS OF CELL BIOLOGY

COURSE DESCRIPTION:

Prerequisites: MAT 060 or DMA 010, 020, 030; and RED 080 or DRE 097, or satisfactory score on placement test
Corequisites: RED 090 or satisfactory score on placement test

This course covers basic cell biology. Emphasis is on biological chemistry, cell structure and function, cellular metabolism, genetics, and other related topics. Upon completion, students should be able to demonstrate preparedness for college-level biology courses. Laboratory exercises focus on basic biological principles and microscope techniques. Course Hours Per Week: Class, 3. Lab, 2. Semester Hours Credit, 4.

LEARNING OUTCOMES:

Upon completion of this course, the student will demonstrate basic knowledge in the following:

a. Basic chemical composition of living matter.
b. Structural characteristics of prokaryotic and eukaryotic cells.
c. Taxonomy and characteristics of the major kingdoms.
e. Basic concepts of bioenergetics, photosynthesis, and cellular respiration.
g. Mendelian genetics and genetic change.
h. Nucleic acids and basic concepts of protein synthesis and gene regulation.

OUTLINE OF INSTRUCTION:

I. Introduction to biological chemistry
   A. Organization of matter
   B. Atomic theory
   C. Bonding between atoms
   D. Water and its properties
   E. Acids, bases, and salts
   F. Carbon compounds
   G. Biochemical Compounds

II. Cell structure and function
   A. Cell theory
   B. Composition and function of cell structures
   C. Cell membranes and membranous organelles
D. Comparison of prokaryotic and eukaryotic cells
E. Comparison of plant and animal cells

III. Classification
   A. Comparison of autotrophs and heterotrophs
   B. Comparison of aerobes and anaerobes
   C. Classification schemes
   D. Kingdoms, their characteristics, and examples

IV. Cellular transport
   A. Structure of cell membrane
   B. Diffusion and osmosis
   C. Facilitated and active transport
   D. Endocytosis and exocytosis

V. Bioenergetics
   A. Metabolism
   B. Enzymes
   C. Energy and ATP
   D. Hydrogen and electron carriers

VI. Cellular respiration
   A. Aerobic respiration
   B. Anaerobic respiration
   C. Fermentation
   D. Mitochondrial structure

VII. Photosynthesis
   A. Nature of light
   B. Pigments
   C. Light-dependent reactions
   D. Light-independent reactions
   E. Chloroplast structure

VIII. Cellular reproduction
   A. Binary fission
   B. Chromosome structure
   C. Cell Cycle
   D. Stages of mitosis
   E. Stages of meiosis

IX. Protein synthesis
   A. Structure of DNA and its replication
   B. Structure of RNA
C. Protein synthesis
D. Chemical basis of mutation

X. Genetics
   A. Gene and chromosome structure
   B. Mendelian genetics
   C. Incomplete dominance
   D. Multiple alleles and multiple gene pairs
   E. Sex linkage and autosomal linkage
   F. Mutations and genetic change
   G. Inherited Disorders

XI. Human Biology
   A. Medical Terminology
   B. Primary Tissues
   C. Basic anatomy of the major human body systems

REQUIRED TEXTBOOKS AND MATERIALS:

The textbook and other instructional material will be determined by the instructor.

SUGGESTED REFERENCES, PERIODICALS AND VISUAL AIDS:

Numerous supplementary texts, programmed materials, and audiovisual packages are available in the Educational Resources Center. These materials may be utilized to reinforce the lecture and lab material or to provide material for independent study by the student.