

Course discipline/number/title: BIOL 1217: Anatomy and Physiology I

A. CATALOG DESCRIPTION

1. Credits: 4
2. Hours/Week: 3 lecture, 2 lab
3. Prerequisites (Course discipline/number): CHEM 1101 or a score of 100 on the CHEM 1117/BIOL 1217 ready test.
4. Other requirements: None
5. MnTC Goals (if any): Goal 3/Natural Sciences

B. COURSE DESCRIPTION: This course is part one of the two-semester Anatomy and Physiology sequence. This course focuses on cell structure and function, tissues, chemistry as it relates to biological function, metabolism, and major organ systems including the integumentary system, muscular and skeletal systems, cardiovascular system and blood and lymphatic and immune systems.

C. DATE LAST REVISED (Month, year): February, 2021

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Introduction to the Human Body:
 - a) Anatomy and Physiology defined
 - b) Levels of structural organization
 - c) Homeostasis: maintaining physiological limits
 - d) Terminology
 - e) Planes, sections and body cavities and membranes
2. Chemical Level of Organization:
 - a) Matter and energy
 - b) Chemical bonds and reactions
 - c) Inorganic compounds
 - d) Acids, bases, pH
 - e) Organic compounds-carbohydrates, lipids, proteins, nucleic acids
3. Cellular Level of Organization:
 - a) Plasma (cell) membrane
 - b) Movement of materials across the plasma membrane
 - c) Cytosol
 - d) Organelles
 - e) Gene action-protein synthesis
 - f) Mitosis
 - g) Meiosis
 - h) Cellular Metabolism
 - i. Anabolic and catabolic reactions
 - ii. Aerobic and anaerobic pathways for ATP production
 - iii. Metabolism of carbohydrates, lipids, and proteins
4. Tissue Level of Organization:
 - a) Epithelial tissues
 - b) Connective tissues
 - c) Muscle tissue
 - d) Nervous tissue
 - e) Tissue repair and homeostasis
5. Integumentary System:
 - a) Functions of the skin
 - b) Epidermal derivatives (hair, skin, nails)
 - c) Homeostatic imbalances

D. OUTLINE OF MAJOR CONTENT AREAS: Continued. . .

6. Skeletal System

- a) Bone Tissue: function and histology
- b) Bone homeostasis: bone formation and bone growth
- c) Classification of bones
- d) Surface markings
- e) Divisions of skeletal system
- f) Articulations
 - i. Classification of joints
 - ii. Movement at joints
- g) Homeostatic imbalances

7. Muscular System

- a) Muscle Tissue: skeletal, smooth and cardiac muscle
- b) Anatomy of whole skeletal muscle
- c) Neuromuscular junction
- d) Skeletal muscle physiology
- e) Skeletal muscle naming
- f) Skeletal muscle actions
- g) Homeostatic imbalances

8. Cardiovascular System

- a) Heart Anatomy
- b) Coronary Circulation
- c) Heart Physiology
- d) Maintenance and Control of Blood Pressure
- e) Blood Vessel structure
- f) Pulmonary circulation
- g) Systemic circulation
 - i. Blood flow to the brain
- h) Blood Composition and Histology
- i) Blood cell production and destruction/recycling
- j) Hemostasis
- k) Blood typing-Transfusion

9. Lymphatic System:

- a) Lymphatic organs, tissue, and vessels
- b) Flow of lymph
- c) Homeostatic imbalances

10. Immune System:

- a) Non-specific resistance mechanisms
- b) Humoral immune response-antibody mediated
- c) Cell-mediated immune response
- d) Homeostatic imbalances

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

- 1. Demonstrate the ability to use vocabulary/terminology appropriately both orally and in writing.
- 2. Demonstrate an understanding of proper microscope use and care.
- 3. Identify major tissues of the body and describe their function(s)
- 4. Relate the structure of major organs/glands of the integumentary, skeletal, muscular, cardiovascular, lymphatic and immune system with their function.
- 5. Explain physiological principles specific to the organ systems listed above.
- 6. Predict how homeostatic imbalances(s) can lead to disease.

F. LEARNING OUTCOMES (MNTC):

Goal 3/Natural Sciences: The student will be able to:

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, the student's laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:

1. Lecture exams-objective and/or subjective
2. Lecture and/or laboratory quizzes
3. Laboratory practical exams
4. Lecture and laboratory assignments and/or reports

H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. SPECIAL INFORMATION (if any):

The initial lab session explains and familiarizes the student with general safety hazards and safety equipment in the lab. During the pre-lab discussion, the hazardous characteristics of any materials used during the lab are discussed. In addition, if the lab involves any potentially infectious material, the students will be instructed about the proper use and disposal. The instructor will direct all students to wear necessary protective equipment while working with any hazardous chemicals. A copy of Safety Data Sheets for chemicals used is available in the lab.