Montgomery County Community College
BIO 103
Introduction to Human Anatomy and Physiology
3-3-0

COURSE DESCRIPTION:
This course is a non-laboratory descriptive study of the structure and function of the human body, using a systems approach.

REQUISITES:
*Previous Course Requirements*
- ENG 010A Basic Writing, ENG 011 Basic Writing II, or ESL 011 Basic Writing
- MAT 010 Fundamentals of Arithmetic or MAT 010B Review of the Fundamentals of Arithmetic
- REA 011 Fundamentals of College Reading or REA 017 Vocabulary and Reading Comprehension Development II

*Concurrent Course Requirements*
None

| LEARNING OUTCOMES<br>Upon successful completion of this course, the student will be able to: | LEARNING ACTIVITIES | EVALUATION METHODS |
|---|---|---|
| 1. Define basic terms regarding orientation, direction, and body regions. | Lecture<br>Discussion<br>Demonstrations<br>Reading Assignments | Tests<br>Comprehensive<br>Final Exam |
| 2. Using examples, describe carbohydrates, proteins, lipids and nucleic acids in terms of elements contained, chemical structure and functions. | Lecture<br>Discussion<br>Demonstrations<br>Reading Assignments<br>Quizzes | Tests<br>Comprehensive<br>Final Exam |
| 3. Discuss the basic structure and functioning of cells, their organelles, and membranes. | Lecture<br>Discussion<br>Demonstrations<br>Reading Assignments<br>Quizzes | Tests<br>Comprehensive<br>Final Exam |
| 4. Identify anatomic components of all eleven body systems and discuss the normal functioning of each, integrating structure with function. | Lecture<br>Discussion<br>Demonstrations<br>Reading Assignments<br>Quizzes<br>Brief Research Paper | Tests<br>Comprehensive<br>Final Exam |

| LEARNING OUTCOMES | LEARNING ACTIVITIES | EVALUATION METHODS |
|---|---|---|
| 5. State examples that illustrate the interrelationships among body systems. | Lecture<br>Discussion<br>Demonstrations<br>Reading Assignments<br>Quizzes | Tests<br>Comprehensive<br>Final Exam |
| 6. Describe the significance of some basic medical procedures. | Lecture<br>Discussion<br>Demonstrations<br>Reading Assignments<br>Quizzes | Tests<br>Comprehensive<br>Final Exam |
| 7. Describe selected pathologies in terms of causes and/or treatment. | Lecture<br>Discussion<br>Demonstrations<br>Reading Assignments<br>Quizzes | Tests<br>Comprehensive<br>Final Exam |

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria*.

SEQUENCE OF TOPICS:

I. Introduction
   - A. Terms Of Orientation And Direction
   - B. Body Cavities
   - C. Homeostasis And Definition Of Negative Feedback

II. Overview Of Chemistry
   - A. Atomic Structure
   - B. pH
   - C. Water – Characteristics And Significance
   - D. Organic Macromolecules – Chemistry And Functions Of:
     1. Carbohydrates
     2. Lipids
     3. Proteins
     4. Nucleic acids

III. The Cell
   - A. Structure And Function Of Membrane And Organelles
   - B. Transport Across A Membrane
   - C. Cell Division – Characteristics Of Mitosis And Meiosis

IV. Integumentary System
   - A. Functions
   - B. Structure Of Skin And Accessory Organs
   - C. Homeostasis Of Body Temperature
   - D. Skin Color

V. Skeletal System
   A. Functions
   B. Structure Of A Long Bone
   C. Bone Tissue – Compact And Spongy; Including Bone Cells: Osteocytes, Osteoclasts, And Osteoblasts
   D. Ossification And Growth
   E. Names Of Major Bones
   F. Fractures – Major Types
   G. Articulations – Structure
VI. Muscle System
   A. Functions
   B. Physiology Of Contraction
   C. Energy Sources And Oxygen Use
   D. Overview Of Slow Red And Fast White Fibers
   E. Effect Of Exercise On Muscle
   F. Location Of Several Major Superficial Muscles
   G. Muscles Commonly Used As Injection Sites
VII. Nervous System
   A. Functions And Divisions
   B. Types of Neurons: Unipolar & Multipolar; Sensory, Motor and Association
   C. Overview Of Membrane Potentials
      1. Resting
      2. Action
   D. Role Of Myelin And Overview Of Multiple Sclerosis
   E. Meninges And CSF Circulation
   F. Brain – Structure And Functions
   G. Spinal Cord – Structure And Functions
   H. Reflex Arc
   I. Synapses
      1. Defined
      2. Neurotransmitter release and binding
   J. Autonomic Nervous System
      1. Functions
      2. Branches – effects of stimulation; neurotransmitters used
VIII. Endocrine System
   A. Hormones
      1. Hormone-target cell specificity
   B. Major Endocrine Glands – Hormones Secreted, Effects, Control Of Secretion, And Major Disorders – Overview
      1. Anterior pituitary
      2. Posterior pituitary
      3. Thyroid
      4. Parathyroids
      5. Adrenal medulla
      6. Adrenal cortex
      7. Pancreas

IX. Cardiovascular System
- A. Blood
  - 1. General characteristics
  - 2. Plasma
  - 3. Cell types
    - a. RBC – characteristics, functions
    - b. WBC – characteristics, functions
    - c. platelets – characteristics, functions
  - 4. Common diagnostic tests
    - a. hematocrit
    - b. differential
    - c. complete blood count
  - 5. Overview of clotting and blood types
- B. Heart
  - 1. Structure – chambers, valves, septum
  - 2. Path of blood flow through heart
  - 3. Overview of cardiac conduction system
  - 4. Overview of cardiac cycle
  - 5. Role of ANS in regulation of rate
  - 6. Major waves or complexes on an EKG
- C. Blood Vessels
  - 1. Arteries – function, characteristics
  - 2. Capillaries – function, fluid movement across wall
  - 3. Veins – function, characteristics
- D. Blood Pressure
  - 1. Definition
  - 2. Factors influencing
- E. Special Circulations – Overview
  - 1. Coronary
  - 2. Systemic
  - 3. Pulmonary
  - 4. Hepatic portal

X. Lymphatic System
- A. Functions
- B. Organs
- C. Lymphedema

XI. Digestive System
- A. Function
- B. Organs – Structure And Functions
- C. Process Of Digestion
  - 1. End-products
  - 2. Absorption
- D. Role Of Liver In Metabolism – Overview

XII. Respiratory System
- A. Functions
- B. Organs – Structure And Function
- C. Breathing Mechanism – Pressure And Volume Changes
  1. Inspiration
  2. Expiration
- D. Gas Exchange
  1. Alveoli of lungs
  2. Body tissues
- E. Blood Transport Of Gases
  1. Oxygen
  2. Carbon dioxide

XIII. Urinary System
- A. Functions
- B. Organs
- C. Nephron Structure
- D. Formation Of Urine
  1. Filtration – defined, examples
  2. Reabsorption – defined, examples
  3. Secretion – defined, examples
- E. Hormonal Regulation
  1. ADH
  2. Aldosterone
- F. Urine – Characteristics, Components

XIV. Reproductive System
- A. Male
  1. Organs – structure, function
  2. Hormonal control
- B. Female
  1. Organs – structure, function
  2. Overview of hormonal control
     a. reproductive cycle
     b. pregnancy
     c. menopause

LEARNING MATERIALS:
Required textbook:
Gunstream, Stanley. (2010). *Anatomy & Physiology with Integrated Study Guide*. McGraw-Hill Publishers.

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

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|---|---|---|---|
| Prepared by: | Judith D. Cunningham<br>Assistant Professor of Biology | Date: | 4/1998 |
| Revised by: | Judy Cunningham, Assistant Professor of Biology | Date: | 3/2009 |
| VPAA/Provost Compliance Verification: | Dr. John C. Flynn, Jr. | Date: | 9/11/2009 |
| Revised by: | Judy Cunningham, Assistant Professor of Biology | Date: | 12/12/2012 |
| VPAA/Provost or designee Compliance Verification: | Victoria L. Bastecki-Perez, Ed.D. | Date: | 2/13/2013 |
| Revised by: | Debbie Dalrymple | Date: | 6/27/2016 |
| VPAA/Provost or designee Compliance Verification: | Victoria L. Bastecki-Perez, Ed.D. | Date: | 6/27/2016 |
| Revised by: | Debbie Dalrymple | Date: | 1/10/2018 |
| VPAA/Provost or designee Compliance Verification: | | Date: | 1/30/2018 |

*This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.*