Virginia Western Community College
BIO 141
Human Anatomy and Physiology I

Prerequisites

BIO 101* with a "C" or better within the last 3 years; or demonstration of NAS 2 concepts of Chemical Concepts, Cytology, and Inheritance through NAS 2* completion; or assessment through the Anatomy Placement Exam; or module completion.

Course Description

The purpose of BIO 141 is to provide students with knowledge of human anatomy and how the major organ systems contribute to homeostasis. Presents the study of anatomy & physiology including anatomical terminology, homeostasis, histology, integumentary system, skeletal system, muscular system, and nervous system. Part I of II. Assignments require college-level reading fluency, coherent written communication, and basic mathematical skills. The course is primarily for health sciences students but is designed so that it provides a good basic background for students in a variety of curricula.

Semester Credits: 4 Lecture Hours: 3 Lab/Clinical/Internship Hours: 3

Required Materials

Textbook:

1) Human Anatomy & Physiology, E.N. Marieb, 12th ed., Pearson Publishing; ISBN 9780138242732
2) Human Anatomy & Physiology Laboratory Manual, Cat Version with PhysioEx 9.1, E.N. Marieb, 13th ed., Pearson Publishing; ISBN 9780134632339
3) Modified Mastering A&P software (access code). ISBN 9780138242671

*NOTE: These materials can be bought as a bundle together under one ISBN through the VWCC bookstore. Students have the option of purchasing hard copy versions of the textbook and lab manual or digital versions.

Other Required Materials:

None

Course Outcomes

At the completion of this course, the student should be able to:

- Obtain a basic background in anatomy and physiology on a cellular, histological, and gross level.
- Determine the nature of disease, explain various diagnostic techniques, and therapeutic measures for disease control.

- Develop a greater appreciation of the human body, of physiological and anatomical concepts, and of the scientific method.
- Develop abilities in dissection, experimentation, use of equipment, observation, recording of data, and organization and interpretation of results in a scientific manner.
- Best achieve their learning potential, exercise their independence and creativity, and further develop confidence in their scientific ability.

Introduction to Anatomy & Physiology

- Define anatomy and physiology and explain the interrelationship between them.
- Define and apply descriptive anatomical and directional terminology to the human body.
- List the major structures/organs and describe general functions of each organ system.

Homeostasis

- Describe the principle of homeostasis and the feedback mechanisms that are used to
- maintain internal balance.

Histology

- Describe the structure of the primary tissue classes, their functions, and representative locations in the human body and visually identify specific examples of each tissue type.
- Describe the structure, location, and function of cell junctions and body membranes.

Organ Systems

- Describe the structure and functions of the integumentary system, to include the process of growth of the integument and repair following an injury.
- Describe the structure and functions of the skeletal system, to include development, growth, remodeling, and repair of bone.
- Explain the role of the skeletal system in the regulation of blood calcium levels.
- Classify articulations structurally and functionally and provide an example location for each.
- List and describe movements at synovial joints.

Topical Description

Chapter 1: Introduction to Anatomy and Physiology

- Different approaches to their study, how their coordination supports homeostasis
- Structural levels of the body
- Organ systems
- Anatomical terminology

Chapter 2: Chemistry & Chapter 3: The Cell (see notes)

Chapter 4: Tissues

- Epithelial
    - General characteristics
    - Classification
- Connective tissue (CT)
    - Matrix
    - CT Proper
    - Specialized CT
- Muscle tissue
- Nervous tissue
- Membranes

Chapter 5: The Integumentary System

- Skin
  - Epidermis
  - Dermis
  - Hypodermis
  - Color
  - Wound healing
- Glands of the skin
  - Sweat
  - Oil
- Hair
- Nails
- Effects of aging on skin

Chapter 6: The Skeletal System I

- Types of Bones
- Gross Anatomy of a Bone
- Bone as a tissue
- Microanatomy of bone tissue cells
- Bone development
  - Endochondral
  - Intramembranous
- Bone modeling and remodeling
- Homeostasis and physiological function of bones
- Effects of aging on bones
- Nature and recovery of fractures

Chapter 7: The Skeletal System II

- Skull
  - Bones of Face
  - Bones of Cranium
  - The Vertebral Column
  - The Thorax
- The Appendicular Skeleton
  - Pectoral girdle
  - Bones of arm, forearm and hand
  - Pelvic girdle
  - Bones of the thigh, leg and foot

Chapter 8: Articulations

- Fibrous joints
- Cartilaginous joints
- Synovial joints
  - Structure
  - Types
  - Movements
- Aging and Pathology

Chapter 9: Muscular Tissue

- Skeletal muscle
    - Cell structure
    - Connective tissue association
    - Blood supply
    - Nerve supply
    - Muscle contraction
        - Energy
        - Types of contractions
        - Types of fibers
- Smooth muscle
- Cardiac muscle (discussed with heart)

Chapter 10: The Muscular System

- Attachments
- Actions
- Principal muscles whose action affects:
    - Facial expression
    - Mastication
    - Head and neck
    - Back (vertebral column)
    - Trunk
    - Upper extremity
    - Lower extremity

Chapter 11: Nervous Tissue

- Organization of the nervous system
- Anatomy of a neve
- Physiology of a nerve
- Associated cells of the nervous system
- Neuronal circuits

Chapter 12: The Brain and Cranial Nerves

- The meninges
- The ventricles and cerebrospinal fluid
- Nutrition of the brain
- Brainstem
- Cerebellum
- Diencephalon
- Cerebrum
- Cranial Nerves I to XII

Chapter 13: The Spinal Cord and Peripheral Nervous System

- Basic anatomy, including sensory receptors and spinal nerves and plexuses
- Functional pathways
- Spinal reflexes

Chapter 14: The Autonomic Nervous System

- Central control
- Sympathetic division
- Parasympathetic division
- Functions of the ANS
- Stress (as it relates to ANS)

Chapter 15: The Special Senses

- Sensory reception
- General senses: touch, temperature, pain
- Specific senses: taste, smell, vision, auditory, equilibrium
- Sensory pathways

Chapter 16: The Endocrine System (see notes)

- Introduction to endocrine organs

Laboratory Topics

Week 1: Introduction to Anatomical Terms and Microscope
Week 2: Classification of Tissues: Epithelial
Week 3: Classification of Tissues: Connective, Muscle, and Nervous
Week 4: Lab Practical 1
Week 5: Overview of the Skeleton: Classification of Bones
The Axial Skeleton (Skull, Vertebrae, and Bony Thorax)
Week 6: The Appendicular Skeleton
Week 7: Lab Practical 2
Week 8: Anatomy and Physiology of the Muscular System
Week 9: Anatomy of the Muscular System
Week 10: Anatomy of the Muscular System
Week 11: Lab Practical 3
Week 12: Anatomy of Brain and Cranial Nerves
Week 13: Spinal Cord and Nerves
Human Reflex Physiology
Week 14: Special Senses: The Eye and the Ear
Week 15: Lab Practical 4

Notes to Instructors

1. Departmental policy dictates that instructors do not allow students to keep tests.
2. A comprehensive final exam counting 15%-20% of the total grade will be given at the end of the semester.
3. The syllabus should state what the course grade will be based on, such as tests, quizzes, a comprehensive final exam, and any other assignments made by the instructor.
4. It will be at the discretion of the instructor if they want to include a review of Chapter 2 (Chemistry/Biochemistry) and Chapter 3 (the Cell). This is material covered in pre-

requisite courses such as BIO 101 or NAS 2. It is at the instructors discretion to review basic endocrine system (chapter 16) topics.

ADA Statement (PDF)
Title IX Statement (PDF)