

JEFFERSON COLLEGE

COURSE SYLLABUS

BIO211

ANATOMY AND PHYSIOLOGY I

4 Credit Hours

**Prepared by:
Dr. Cecil M. Hampton**

**Revised Date: November 18, 2005
by
Ms. Deborah Allen**

**Arts & Science Education
Dr. Mindy Selsor, Dean**

BIO211 ANATOMY AND PHYSIOLOGY I

I. CATALOGUE DESCRIPTION

Prerequisite: One year each of high school biology and chemistry with a grade of C or better and within the previous five years of registration date, or equivalent (e.g. BIO101 and CHM101)

4 semester hours credit

This course examines the structure and function of cells, tissues, organs and organ systems. Although all organ systems are introduced, special emphasis is given to the integumentary, skeletal, muscular, neuronal, sensory and endocrine systems. Three lecture and two laboratory hours per week. (F)

II. GENERAL COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- A. Define anatomy and physiology and give examples of their subdisciplines.
- B. Define and properly use the principle directional terms for the human body.
- C. Explain homeostasis and give examples of these processes.
- D. Identify major bones and muscles of the human body.
- E. Describe basic key cells and histology and anatomy associated with, integumentary, skeletal, muscular, neuronal, sensory and endocrine systems.
- F. Discuss primary function associated with the same systems listed above.
- G. Identify organs associated with these systems.
- H. Explain how these systems are integrated.
- I. Discuss each endocrine gland and explain it's role in regulation.
- J. Explain the special role of cell surface proteins in the function of each of these systems.
- K. Describe key pathophysiology related to these systems.
- L. Describe common clinical tests for determining normal function of bones, muscles, nerves, sensory organs and endocrine glands.
- M. Understand that alteration of structure at any level of organization may adversely

alter the normal function.

III. COURSE OUTLINE (COURSE CONTENT WILL BE DRAWN FROM THIS)

- A. Introduction to Anatomy and Physiology
- B. Levels of Organization
- C. Integumentary System
- D. Skeletal System
- E. Muscular System
- F. Nervous System
- G. Sensory System
- H. Endocrine System

IV. UNIT OBJECTIVES

- A. Introduction to Anatomy and Physiology
 1. Describe the basic functions of living organisms.
 2. Define the various specialties of anatomy and physiology.
 3. Identify the major levels of organization.
 4. Explain the significance of homeostasis.
 5. Use anatomical terms to describe body sections, regions and relative position.
 6. Identify major body cavities.
 7. Compare important radiological procedures in terms of their methods, advantages and disadvantages.
- B. Levels of Organization
 1. Relate atomic structure to the properties of molecules.
 2. Describe the properties of water that make it important to life.
 3. Classify organic molecules into four major categories.
 4. Compare fluid content of a cell with the extracellular fluid.
 5. Explain the structure and importance of the fluid mosaic membrane.
 6. Discuss the ways in which a cell interacts with its environment.
 7. Compare the structure and function of the various cellular organelles.
 8. Describe the cell cycle.
 9. Relate basic energy concepts to cell operations.
 10. Classify the tissue of the body into four major categories.
 11. Discuss the relationship between form and function of the primary tissues.
 12. Describe the different subtypes for each of the primary tissues.
 13. Describe the meaning of glands, organs and organ systems.

C. Integumentary System

1. Compare the structures and functions of the layers of the skin.
2. Discuss the functions of the skin's accessory structures.
3. Explain what accounts for individual racial differences in skin, such as skin color.
4. Describe how the integumentary system helps to regulate body temperature.
5. Discuss effects of ultraviolet radiation on the skin.
6. Explain how the skin responds to injuries and repairs itself.
7. Summarize the effects of the aging process on the skin.
8. Describe the effects of burns on homeostasis.

D. Skeletal System

1. Describe the functions of the skeletal system.
2. Compare the structure and functions of compact and spongy bones.
3. Discuss the processes by which bones develop and grow and account for variations in their internal structure.
4. Classify bones according to their shapes and give examples for each type.
5. Describe the different types of fractures and explain how fractures heal.
6. Discuss the effects of nutrition, hormones, exercise, and aging on bone development and the skeletal system.
7. Distinguish between different types of joints and link structural features to joint functions.
8. Describe the dynamic movements of the skeleton.
9. Identify the components of the appendicular skeleton and their functions.
10. Identify the major structural features and markings of important bones of the appendicular skeleton.
11. Describe the skeletal differences between males and females.
12. Name the components of the axial skeleton and their functions.
13. Identify the bones of the skull and explain the significance of the markings on individual bones.
14. Discuss the bones of the neck and trunk and their distinctive markings.

E. Muscular System

1. Describe the characteristics and functions of three types of muscle tissue.
2. Identify the unique characteristics of skeletal muscle fibers.
3. Explain the process of muscular contraction and the mechanisms that control it.
4. Show how the events of a twitch are related to the development of muscle tension.
5. Compare the different types of muscle contractions.
6. Describe the mechanisms by which muscles obtain and use energy to power contractions.

7. Distinguish between aerobic and anaerobic endurance, and explain their implications for muscular performance.
8. Describe the different classes of levers and how they make muscles more efficient.
9. Predict the actions of a muscle on the basis of its origin and insertion.
10. Explain how muscles interact to produce or oppose movements.
11. Identify the principal axial muscles of the body together with their origins and insertions.
12. Identify the principal appendicular muscles of the body, together with their origins and insertions.

F. Nervous System

1. Describe the anatomical organization and general functions of the nervous system.
2. Distinguish between neurons and neuroglia and compare their structures and functions.
3. Discuss the events that generate resting potentials, local potentials, and action potentials in the membranes of nerve cells.
4. Identify the factors that determine the frequency and speed of nerve impulse conduction.
5. Explain the mechanism of synaptic transmission and describe the types and effects of the most important neurotransmitters.
6. Discuss the structure and functions of the spinal cord.
7. Relate spinal nerves to the regions that they innervate.
8. Describe the process of neural reflex.
9. Classify the different types of reflexes.
10. Name the major regions of the brain and describe their functions.
11. Distinguish between motor, sensory, and association areas of the cerebral cortex.
12. Explain how the brain is protected.
13. Discuss the circulation and functions of cerebrospinal fluid.
14. Identify the cranial nerves and relate each pair of cranial nerves to its principal functions.
15. Discuss important cranial reflexes.
16. Identify the principal sensory motor pathways.
17. Compare the processes and functions of the pyramidal system.
18. Explain the importance of hemispheric specialization.
19. Compare the autonomic nervous system with the other divisions of nervous system.
20. Explain the functions and structures of the sympathetic and parasympathetic divisions.
21. Discuss the mechanisms of neurotransmitter release in the autonomic nervous system.
22. Compare the effects of autonomic neurotransmitters on target organs and

tissues.

23. Discuss the relationship between the sympathetic and parasympathetic divisions and explain the implications of dual innervation.

G. Sensory System

1. Distinguish between the general and special senses.
2. Identify the receptors for the general senses and describe how they function.
3. Discuss the receptors and processes involved in the senses of smell, taste, and equilibrium.
4. Describe the parts of the ear and their roles in the process of hearing.
5. Identify the parts of the eye and their functions.
6. Explain how we are able to see objects and distinguish colors and depth.

H. Endocrine System

1. Compare the endocrine and nervous systems.
2. Compare the cellular components of the endocrine system with those of other tissues and systems.
3. Identify the endocrine organs and the hormones they produce.
4. Explain how hormones exert their effects, and identify the effects of various important hormones.
5. Relate the structure of hormones to their functions.
6. Discuss the results of abnormal hormone production.
7. Explain how hormones interact to produce coordinated physiological responses.
8. Describe how endocrine organs are controlled.
9. Identify five hormones that are especially important to normal growth.
10. Explain how the endocrine system responds to stress.

V. METHOD(S) OF INSTRUCTION

- A. Lectures
- B. Case Studies
- C. Classroom Discussion
- D. Group Work
- E. Textbook Reading
- F. Laboratory Exercises
- G. Classroom and Laboratory Identification Drill Exercises
- H. Tutorial Computer Laboratory
- I. Hands-on laboratory work with microscopes, bones, etc.

J. Course Website

VI. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION

Martini, F., Fundamentals of Anatomy and Physiology, 7th ed., Englewood Cliffs:
Prentice Hall.

Laboratory Manual, Jefferson College

VII. REQUIRED MATERIALS (STUDENT)

None.

VIII. SUPPLEMENTAL REFERENCES

A. Student Applications Manual, CD Atlas, Physiology CD (packaged with textbook)

B. Online Supplemental Website (access with text)

C. Anatomy & Physiology Coloring Book (available in bookstore)

D. Course Website (STARS)

IX. METHOD OF EVALUATION (STUDENT)

A. Written Exams

B. Classroom Quizzes

C. Written Case Studies (some group work)

D. Short Class Presentations

E. Laboratory Exams

F. Laboratory Quizzes and Worksheets

G. Comprehensive Written Exam