

JEFFERSON COLLEGE

COURSE SYLLABUS

BIO211

ANATOMY AND PHYSIOLOGY I

4 Credit Hours

Prepared by:
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Linda Abernathy, Division Chair for Math, Science, and Business
Shirley Davenport, Dean of Arts & Science Education

BIO211 Anatomy and Physiology I

I. CATALOG DESCRIPTION

A. Course pre-requisites:

- High school biology and chemistry or equivalent (BIO101 and CHM101), with a grade of “C” or better within the previous five years of registration date
- Reading proficiency

B. 4 semester credit hours

C. Anatomy and Physiology I 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, nervous, and endocrine systems. Laboratory time is required. Students cannot apply both BIO120 and BIO211 toward graduation (F, S)

D. Curricular alignment:

- Fulfills part of Natural Sciences (Biological Sciences) with lab CORE requirement for AA, AAT, AFA, and select AAS degrees: MOTR LIFS 150L Human Biology with Lab
- Elective course applies toward AA or AAT degree.
- Fulfills AAS – Health Information Technology degree requirement.
- Fulfills AAS – Bi-Level Nursing degree requirement.
- Fulfills Practical Nursing certificate – Bi-Level Nursing requirement.
- Fulfills AAS – Occupational Therapy Assistant degree requirement.
- Fulfills AAS – Physical Therapist Assistant degree requirement.
- Fulfills AAS – Radiologic Technology degree requirement.
- Fulfills AAS – Veterinary Technology degree requirement.

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Describe the characteristics of living organisms; define the various specialties of anatomy and physiology; identify the major levels of organization in the human body; explain the significance of homeostasis; explain mechanisms and give examples of negative feedback and positive feedback; use anatomical terminology to describe planes, directions, cavities, and points of reference associated with specific regions of the body; use proper terminology to describe structure and function of the human body in oral and written communication	Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises

<p>Relate atomic structure to the properties of molecules; explain the clinical importance of isotopes; describe the properties of water that make it important to life; interpret the pH scale; explain the action and importance of buffers; classify organic molecules into four major categories; describe the importance of each of the categories of organic molecules to living organisms; explain the operation of enzymes; discuss the elements of a healthy diet; Interpret a nutrition panel on food</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes</p>
<p>Compare fluid content of a cell with the extracellular fluid; explain the structure and importance of the cytoplasmic membrane; list and explain the various roles of membrane proteins; compare and contrast mechanisms of transport across the cytoplasmic membrane; describe the behavior of red blood cells in an isotonic solution, in a hypertonic solution, and in a hypotonic solution; compare the structure and function of the various cellular organelles; list the steps in the synthesis of a protein intended for secretion from the cell; describe the cell cycle; explain how mutations that affect the cell cycle can cause cancer; relate basic energy concepts to cell operations; give examples of the relationship between structure and function</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes</p>
<p>Classify the tissues of the body into four major categories; discuss the relationship between form and function of the primary tissues; describe the different subtypes for each of the primary tissues; describe where various tissues are found in the human body; describe the meaning of membranes, glands, organs and organ systems</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises</p>
<p>Describe the structures and functions of the layers of the cutaneous membrane; list and discuss the functions of accessory structures of the integument; explain the mechanisms that determine skin color; describe how the integumentary system helps to regulate body temperature; discuss effects of ultraviolet radiation on the skin; explain how damage to the skin is repaired; summarize the effects of the aging process on the skin; describe the effects of burns on homeostasis</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises</p>

<p>Discuss the components and functions of the skeletal system; compare the macroscopic and microscopic structures and functions of compact and spongy bones; discuss the processes by which bones develop and grow and account for variations in their internal structure; classify bones according to their shapes and give examples for each type; describe the different types of fractures and explain how fractures heal; discuss the effects of nutrition, hormones, exercise, and aging on bone development and the skeletal system; identify the components of the appendicular skeleton and their functions; identify the major structural features and markings of important bones of the appendicular skeleton; describe the skeletal differences between males and females; name the components of the axial skeleton and their functions; identify the bones of the skull and explain the significance of the markings on individual bones; discuss the bones of the neck and trunk and their distinctive markings; distinguish between different types of joints and link structural features to joint functions; describe the dynamic movements of the skeleton</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises</p>
<p>Describe the characteristics and functions of three types of muscle tissue; identify the histological and macroscopic features of skeletal muscle fibers; explain the process of muscular contraction, including sliding filament theory; relate the structure of a sarcomere to the action of the sliding filament theory; draw and label the neuromuscular junction and describe the events that occur there; relate motor units and twitches to the development of muscle tension and tetanic contractions; Explain the source of muscle tone; describe the mechanisms by which muscles obtain and use energy to power contractions; distinguish between aerobic and anaerobic endurance, and explain their implications for muscular performance; differentiate between isotonic and isometric contractions; predict the actions of a muscle on the basis of its origin and insertion; explain how muscles interact to produce or oppose movements; identify the principal axial muscles of the body together with their actions, origins and insertions; identify the principal appendicular muscles of the body, together with their actions, origins and insertions</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises</p>

<p>Describe the anatomical organization and general functions of the nervous system; distinguish between neurons and various types of neuroglia and compare their structures and functions; explain the relationship between a nerve and a neuron; discuss the events that generate resting potentials, local potentials, and action potentials in the membranes of nerve cells; explain the process of integration in the nervous system; identify the factors that determine the frequency and speed of nerve impulse conduction; explain the mechanism of synaptic transmission and describe the types and effects of the most important neurotransmitters; explain the physiological basis of addiction and of withdrawal</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises</p>
<p>Discuss the structure and functions of the spinal cord; list the major spinal tracts and explain how they are named; understand the relationship between the spinal nerves and the spinal cord; name and locate the major regions of the brain and describe their functions; distinguish between motor, sensory, and association areas of the cerebral cortex; explain how the brain and spinal cord are protected; discuss the circulation and functions of cerebrospinal fluid; explain the importance of hemispheric specialization</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises</p>
<p>Relate spinal nerves to the regions that they innervate; explain efferent and afferent pathways and the reflex arc; classify the different types of reflexes; identify the cranial nerves and relate each pair of cranial nerves to its principal functions; identify the principal sensory and motor pathways</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises</p>
<p>Compare the autonomic nervous system with the somatic division; compare and contrast the functions and structures of the sympathetic and parasympathetic divisions; compare the effects of autonomic neurotransmitters on target organs and tissues; discuss the relationship between the sympathetic and parasympathetic divisions; explain the concept of autonomic tone</p>	<p>Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises</p>

Distinguish between the general and special senses; identify the receptors for the general senses and describe how they function; discuss the receptors and processes involved in the senses of smell, taste, and equilibrium; describe the parts of the ear and their roles in hearing; identify the parts of the eye and their functions; explain how humans see objects and distinguish colors and depth	Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises
Compare the mechanisms of control used by the endocrine and nervous systems; identify and locate the major endocrine organs and list the hormones they produce; explain how hormones exert their effects on target tissues, and describe the effects of various hormones; relate the structure of hormones to their mechanisms of action; discuss the disorders resulting from abnormal levels of hormone production; describe the mechanisms by which endocrine organs are controlled; describe the relationship between the hypothalamus and the anterior/posterior pituitary glands; compare and contrast diabetes type 1 with diabetes type 2; explain how the adrenal gland responds to short-term and long-term stress; list non-endocrine organs that contain endocrine tissue that produces hormones	Hourly and final exams, quizzes, homework assignments, classroom and online discussion, online assignments and quizzes, and laboratory exercises
Discuss key disorders related to the integumentary, skeletal, muscular, nervous, and endocrine systems; explain why abnormal function of a system is related to cellular changes	Hourly and final exams, quizzes, homework assignments, classroom and online discussion

III. OUTLINE OF TOPICS

- A. Introduction to anatomy and physiology
 - 1. Terminology
 - 2. Organization

- B. Chemistry of life
 - 1. Atoms, molecules, and chemical reactions
 - 2. Water, pH, and buffers
 - 3. Organic molecules

- C. Cells
 - 1. Parts of the cell
 - 2. Movement of substances through cell membranes
 - 3. Cell cycle and cancer

- D. Tissues
- E. Integumentary system
- F. Skeletal system and joints
- G. Muscular system
- H. Nervous system
 - 1. Basic anatomy and physiology
 - 2. Peripheral nervous system
 - 3. Central nervous system
 - 4. Autonomic nervous system
 - 5. Senses
- I. Endocrine system

IV. METHODS OF INSTRUCTION

- A. Lectures and PowerPoint presentations
- B. Online resources (animations, self-testing, etc.)
- C. Classroom and online discussion
- D. Group activities
- E. Textbook assignments
- F. Case studies
- G. Laboratory exercises

V. REQUIRED TEXTBOOKS

Martini, F., & Nath, J. L. *Fundamentals of Anatomy & Physiology* (current edition).
San Francisco: Benjamin Cummings.
(Packaged with access to web resource *Mastering A&P*)

Custom Laboratory Manual (Pearson Publishing)

VI. REQUIRED MATERIALS

- A. Textbook with *Mastering A&P* web support
- B. Laboratory manual
- C. Online access to MyJeffco and Blackboard

VII. SUPPLEMENTAL REFERENCES

- A. Student Applications Manual, Anatomical Atlas, Interactive Physiology CD (packaged with textbook), Anatomy & Physiology coloring book
- B. Library resources: present offerings and anticipated texts, journals, video/audio tapes, software, etc.
- C. Web references and resources

VIII. METHODS OF EVALUATION

- A. Hourly exams 33%
- B. Comprehensive final exam 15%
- C. Homework and quizzes 19%
- D. Laboratory assignments, quizzes, and exams 33%
- E. Grading

scale: 90-

100% = A

80-89% = B

70-79% = C

60-69% = D

Below 60% = F

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.