

<p style="text-align: center;"><b>BSC2084 and BSC2084L</b> <b>Anatomy and Physiology with Lab</b></p>
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*Course Description*

<b>BSC2084</b>	<b>Anatomy and Physiology</b>	<b>(3) P</b>
<b>BSC2084L</b>	<b>Anatomy and Physiology Lab</b>	<b>(1) P</b>

Intended for allied health students requiring a one-semester anatomy and physiology course. This course presents an in-depth review of the body organization and structure. It also introduces the student to basic physiologic concepts as they relate to normal body function and maintenance of health. It is required for students in Dental Hygiene, Radiography, Cardiopulmonary Technology, Nuclear Medicine, Respiratory Care, and EMS programs.

Suggested Pre-requisite: HSC2531 or its equivalent.  
Co-requisite: BSC2084L must be taken concomitant with BSC2084.

*Rationale*

This course helps support the college mission of providing the highest quality post-secondary education, leading to the Associate of Arts and Associate of Science degrees, and further to a baccalaureate degree. Specifically, this course addresses students pursuing science, engineering, biotechnology and pre-professional programs of study. BSC2084 focuses on human anatomy and physiology and the inherent connection between those two broad subjects. Ultimately, this course will help students develop a vocabulary sufficient for successful technical communication, laboratory skills which highlight conceptual relationships and connections, and analytical problem solving skills.

*Impact Assessment*

BSC2084 is designed as a shortened sequence of anatomy and physiology for science majors. Success in the course is highly dependent on terms delivered in HSC2531. Understanding the structures and functions of the human body relies on knowledge of the terms used to describe either of these. The course focuses on normal anatomy and physiology, thus allowing students the opportunity to recognize when it is abnormal, something they would see in their future career in the allied health professions. The laboratory experience is intended to complement the lecture material, thus the lecture and lab courses must be taken together to gain the most from the experience.

*Broad Course Objectives*

This course supports the departmental goal of providing a foundation in the sciences for students aspiring to allied health professions such as Dental Hygiene, Radiography, Cardiopulmonary Technology, Nuclear Medicine, Respiratory Care, and EMS programs. and pre-professional majors. As such, concepts relating anatomy and physiology and their application to such careers will be the focus. Students will be expected to demonstrate proficiency in these concepts, in concepts related to anatomy and physiology, and in the development of laboratory skills that are applicable such careers.

In order to achieve these objectives, the instructor will strive to:

- a. Extend students' vocabulary of anatomical concepts and terms
- b. Have students understand and postulate physiological concepts based on anatomical information
- c. Enable students to develop their critical reasoning skills
- d. Relate concepts in anatomy and physiology to careers in allied health and
- e. Provide perspective on the professional activities of science practitioners

### *Course Outline with Specific Objectives*

The successful student should be able to master the skills and activities listed under each major topic heading. At the end of each section, the student will be able to:

#### **A. Levels of Organization**

##### **1. Introduction to human anatomy and physiology**

- a) Define anatomy and physiology and explain how they complement each other.
- b) Describe each level of structural organization that make up the human body and explain the relationships of all the levels.
- c) List the organ systems of the body, the major organs of each system, and the principal functions of each system.
- d) Define homeostasis and explain its importance in living organisms. Explain the role of the nervous and endocrine systems in controlling homeostasis.
- e) Describe positive and negative feedback, and describe how these processes help to maintain homeostasis.
- f) Define the anatomical position and explain its importance.
- g) Describe body directions, regions and planes, using proper anatomical terminology listed in the lab manual.
- h) Identify body cavities listed in the lab manual and list the major organs in each.
- i) Name the serous membranes and note their common function.
- j) Name the four quadrants of the abdominopelvic cavity and list the organs contained therein.

##### **2. Chemical basis of life**

- a) Describe the structure of an atom
- b) Define bonds; explain how certain types of chemical bonds form
- c) Define anabolic, catabolic and exchange reactions; explain why they are important to the body
- d) Understand the functions of water and the fundamental concepts of inorganic acids, bases and salts
- e) Define pH and how the body attempts to keep pH within the limits of homeostasis
- f) Discuss the functions of carbohydrates, lipids, proteins and nucleic acids

##### **3. Cells**

- a) Define a cell; list its general parts and explain their function
- b) Describe the active and passive processes by which materials move across plasma membranes
- c) Define a gene; explain the sequence of events involved in protein synthesis
- d) Identify the stages, events and significance of cell division

##### **4. Cellular metabolism**

- a) Define metabolism; discuss its importance in homeostasis

## **5. Tissues**

- a) Recognize the general features and functions of epithelial tissue, connective tissue, muscle tissue and nervous tissue

## **B. Support and Movement**

### **1. Integumentary system**

- a) Identify the structures of the skin; give their functions
- b) List the accessory organs of the skin; briefly describe their structures and functions
- c) List the general effects of aging on the integumentary system
- d) Explain how the skin regulates body temperature

### **2. Skeletal system**

- a) Identify the functions of the skeletal system
- b) Describe the microscopic structure of compact and spongy bone tissue
- c) List the steps involved in bone formation
- d) Identify the factors in bone growth and maintenance
- e) Classify the bones of the body into the axial and appendicular divisions
- f) Describe the structural and functional features of the vertebral column
- g) Specify the major bones of the upper and lower extremities and skull

### **3. Articulations**

- a) Define an articulation (joint); describe how articulation structure determines its function
- b) Identify the structure of a typical diarthrosis
- c) List the different types of diarthroses and give the movements that occur at each

### **4. Muscular system**

- a) Describe the connective tissue components, blood and nerve supply and histology of skeletal muscle
- b) Identify the factors involved in the contraction of skeletal muscle fibers with respect to the "sliding-filament theory"
- c) Describe the structure and function of cardiac muscle tissue and smooth muscle tissue
- d) Explain how skeletal muscles produce movement
- e) For various regions of the body, identify the location and function of specific skeletal muscles

## **C. Integration and coordination**

### **1. Nervous system**

- a) List the three basic functions of the nervous system
- b) Describe the organization of the nervous system
- c) Compare the structures and functions of neuroglia and neurons
- d) Explain how a nerve impulse is generated and conducted; including neurotransmitters and the events at a synapse
- e) Identify the protection of the brain and spinal cord
- f) Give the structure and function of the spinal cord
- g) Name the principal parts of the brain; identify their functions
- h) Explain the functions of neurotransmitters
- i) Identify the 12 pairs of cranial nerves by name and function
- j) Compare the main structural and functional differences between the somatic and autonomic nervous system
- k) Identify the main features and divisions of the autonomic nervous system

**2. General senses**

- a) List and describe the cutaneous sensations

**3. Special senses**

- a) Explain the mechanism involved in vision, hearing, taste, smell, and equilibrium and their pathways to the brain

**4. Endocrine system**

- a) Distinguish hormones based on their chemistry  
b) Explain how hormones act on body cells and how their blood levels are regulated  
c) Identify the location, histology, functions, target tissue and action of the hormones of major endocrine glands  
d) Explain how the body responds to stress and how stress and disease are related

**D. Transport**

**1. Blood**

- a) Describe the formation, structure and function of blood components  
b) Define hemostasis  
c) Explain the classification of blood into ABO and Rh groupings

**2. Cardiovascular system**

- a) Locate and identify the structure and function of the heart chambers and valves  
b) Define an electrocardiogram (ECG) and denote its components  
c) Describe blood flow through the heart  
d) Identify the phases of a heartbeat (cardiac cycle)  
e) Identify the factors that affect heart rate  
f) List the main risk factors involved in heart disease  
g) Describe the types of blood vessels in the body  
h) Specify the factors that affect blood pressure and explain how it is regulated  
i) Discuss how materials are exchanged between blood and body cells and the role of the lymphatic system  
j) Define pulse and blood pressure and explain how they are measured  
k) Compare the different major routes that blood takes through various regions of the body

**3. Lymphatic system**

- a) Indicate how lymph, blood and interstitial fluid are related  
b) Identify the structure and function of the different types of lymphatic tissue and how lymph circulates in the body

**4. Immunity**

- a) Illustrate how inflammation occurs and its importance  
b) Explain the relationship between an antigen and an antibody  
c) Compare the functions of cell-mediated immunity to antibody-mediated immunity  
d) Briefly discuss HIV infection and AIDS

## **E. Absorption and excretion**

### **1. Digestive system**

- a) Identify and locate the organs of the digestive system and describe the histology of the gastrointestinal (G-I) tract
- b) Name the structures of the digestive tract and their role in digestion
- c) List and describe the stages of swallowing
- d) Denote the structure of the pancreas, liver and gallbladder; describe their functions

### **2. Nutrition**

### **3. Respiratory system**

- a) Depict the structure of the respiratory system; identify their functions in breathing and voice production
- b) Illustrate how inspiration (breathing in) and expiration (breathing out) occur
- c) Explain how oxygen and carbon dioxide are exchanged between the lungs and the blood and the blood and the blood tissues
- d) Describe the transportation of oxygen and carbon dioxide in the blood
- e) Show how the nervous system controls breathing; list the factors that can alter the rate of breathing

### **4. Urinary system**

- a) Describe the structure and blood supply of the kidneys
- b) Illustrate how the kidneys filter blood; regulate its volume, chemical composition and pH
- c) Depict the structure and function of the ureters, urinary bladder and urethra
- d) Identify the normal components of urine

### **5. Water regulation**

- a) Identify the routes of fluid intake and outtake; explain how they are regulated

### **6. Electrolyte balance**

- a) Denote the general functions of electrolytes and how they are distributed
- b) Describe the functions and regulation of sodium, potassium, calcium, magnesium, chloride and phosphate
- c) Understand how fluids move between compartments in the body

### **7. Acid-base regulation**

- a) Distinguish how buffers, respiration and kidney excretion maintain pH

## **F. The human life cycle**

### **1. Male reproductive system**

- a) Specify the structures and their functions of the male reproductive tract
- b) Describe how and where sperm are produced
- c) Identify the functions of the male reproductive hormones

### **2. Female reproductive system**

- a) Specify the structures and their functions of the female reproductive tract
- b) Describe how and where ova are produced
- c) Identify the functions of the female reproductive hormones

3. **Pregnancy**

a) Describe the stages of pregnancy and how they relate to the growth of the embryo or fetus

4. **Growth**

5. **Development**

6. **Genetics**

a) Describe the concepts underlying inheritance and how genetic information is transmitted from parent to child

*Evaluation*

Student progress will be evaluated using 3-5 examinations, quizzes, and a comprehensive final. Exam questions are multiple choice. The laboratory portion of this course will be evaluated by inclusion on the exam. Approximately 25% of the exam concerns laboratory materials to account for the one credit hour for the laboratory versus three credit hours for the lecture. Students will take a departmental cumulative final exam.