



# BROWARD COLLEGE COURSE OUTLINE

**LAST REVIEW:** 2010-2011  
*(i.e. 2006-2007)*

**NEXT REVIEW:**  
*(i.e. 2011-2012)*

**2015-2016**

**STATUS: A**  
*(A, I, D)*

**COURSE TITLE:** HUMAN ANATOMY AND PHYSIOLOGY I

**COMMON COURSE NUMBER:** BSC 1085

**CREDIT HOURS:** 3

**CONTACT HOUR BREAKDOWN**  
*(Per 16 week term)*

**CLOCK HOURS:**  
*(Voc. Course ONLY)*

Lecture: 48    Lab:  
Clinic:            Other:

**PREREQUISITE(S):**

**COREQUISITE(S):** BSC 1085L

**PRE/COREQUISITE(S):**

**COURSE DESCRIPTION** *(750 characters, maximum):*

A survey of the structure, function, and chemistry of the human body considering the following topics: chemistry, body organization, the cell, tissues, membranes, glands, the integumentary system, the skeletal system, the muscular system, the nervous system, and the special senses. 3 hrs. lec. per week. Meets Area 4A general education requirements for the A.A. degree. Meets Areas 4 or 5 general education requirements for the A.S. degree. CHM 1032, CHM 1040, or CHM 1045 is very strongly recommended (see your program requirements).

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area 4A  
General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area 4 or 5  
General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

## UNIT TITLES

1. Reading and writing in the biological sciences
2. Building the Foundation: Chemistry and Body Organization
3. The Cell
4. Tissues, Membranes, and Glands
5. The Integumentary System
6. The Skeletal System
7. The Muscular System
8. The Nervous System
9. The Special Senses

\*\*\* Complete the following only if course is seeking general education status \*\*\*

**GENERAL EDUCATION Competencies and Skills \*:**

In the box to the right of the Competency/Skill, enter all specific **student learning outcome** unit numbers, as indicated in the course outline (i.e. 1.1, 2.7, 4.2, 4.0 and 5.12) that apply.

<b>Course must include <u>all</u> of the following:</b>	
<b>1. Read with critical comprehension**</b>	1.0 - 1.4
<b>2. Write clearly and coherently**</b>	1.0 - 1.4
<b>3. Demonstrate literacy as appropriate within a given discipline**</b>	1.3(e), 2.8(e)-2.10(e), 2.12(e),2.15(e)-2.17(e),3.5(e),6.6(e),7.7(e),8.17(e)1.1 (f), 2.6(f), 2.9(f),2.15(f), 2.21(f), 2.26(f), 3.2-3.7(f), 4.2(f),4.12(f), 5.6(f),5.9-5.10(f), 6.5(f),6.6(f),6.9(f),6.13(f), 7.7-7.13(f), 8.8-8.10(f), 8.17(f), 8.26(f) 9.3(f),9.8(f),9.12(f)
<b>4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**</b>	2.6,2.8,2.10,2.15,2.17,3.3,3.5,3.7,5.9,5.10,7.12,9.11,9.12,9.13
<b>Course must include at least <u>one</u> of the following:</b>	
<b>5. Differentiate between ethical and unethical behavior</b>	
<b>6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.</b>	2.26,5.9,5.10
<b>7. Demonstrate an understanding of and appreciation for human diversities and commonalities.</b>	5.7, 5.8, 5.9
<b>8. Speak and listen effectively.</b>	

*\*General Education Competencies and Skills endorsed by 2010-2011 General Education Task Force*

**\*\*Required Competencies**

**1) Read with critical comprehension.**

The student will be introduced to the basic texts, concepts, vocabulary, and methods necessary for developing an understanding of the discipline and meeting the required benchmarks as stated in the course outline.

**2) Write clearly and coherently.**

The student will demonstrate an understanding and mastery of subject matter in a variety of ways, including writing. Writing activities may include both graded and ungraded essays, short answer quizzes, summaries, reactions, journals, and various other reports.

**3) Demonstrate and apply literacy across all the disciplines (indicate which ones apply).**

- a) **Information literacy** means understanding how to locate needed information, using the appropriate technology for the task, managing and evaluating the extracted information and using it effectively and ethically.
- b) **Technology literacy** is the ability to responsibly and effectively use appropriate technology to access, manage, integrate, or create information, and/or use technology to accomplish a given task.
- c) **Workplace literacy** is having the appropriate knowledge and skills to communicate and work with others effectively and perform job duties, whether it is through the use of computers and/or other technology.
- d) **Cultural literacy** is recognizing, understanding, and appreciating the similarities and differences between one’s own culture and the cultures of others through a study of the arts, customs, beliefs, values, and history that define a culture.
- e) **Quantitative literacy** is having the ability to formulate, solve and interpret mathematical/statistical operations and graphical/tabular representations to make informed decisions.

f) **Scientific literacy** means understanding the methodology and application of the scientific process, the physical and biological worlds, and recognizing that scientific knowledge is continuously updated or revised as new information is discovered.

g) **Environmental literacy** is creating a context within which environmental issues can be viewed, imparting knowledge to enhance one's ability to analyze the issues, make the connections between humans' decisions and actions and the challenges facing the environment, and instilling the desire to sustain the environment through ethical practices in both one's professional and personal lives.

**4. Apply problem-solving skills or methods to make informed decisions in a variety of contexts.**

The student will use acquired skills or methods to recognize, analyze, adapt, and apply critical thinking to solve problems and make informed decisions.

**EVALUATION:**

In the box to the right of the Methods of Assessment, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 4.0, 4.2 and 5.12) that apply.

1. Portfolio	
2. Short essays	2.1-2.26, 3.1-3.7, 4.1-4.12, 5.1-5.10, 6.1-6.13, 7.1-7.14, 8.1-8.28, 9.1-9.13
3. Research Papers	2.1-2.26, 3.1-3.7, 4.1-4.12, 5.1-5.10, 6.1-6.13, 7.1-7.14, 8.1-8.28, 9.1-9.13
4. Group projects	
5. Discussions (In class and online)	2.1-2.26, 3.1-3.7, 4.1-4.12, 5.1-5.10, 6.1-6.13, 7.1-7.14, 8.1-8.28, 9.1-9.13
6. Multiple Choice tests	2.1-2.26, 3.1-3.7, 4.1-4.12, 5.1-5.10, 6.1-6.13, 7.1-7.14, 8.1-8.28, 9.1-9.13
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	2.1-2.26, 3.1-3.7, 4.1-4.12, 5.1-5.10, 6.1-6.13, 7.1-7.14, 8.1-8.28, 9.1-9.13
10. Take-home tests	2.1-2.26, 3.1-3.7, 4.1-4.12, 5.1-5.10, 6.1-6.13, 7.1-7.14, 8.1-8.28, 9.1-9.13
11. Summaries, critiques, and analyses	
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	2.1-2.26, 3.1-3.7, 4.1-4.12, 5.1-5.10, 6.1-6.13, 7.1-7.14, 8.1-8.28, 9.1-9.13
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain – Homeworks, clickers, field trips, case studies)	2.1-2.26, 3.1-3.7, 4.1-4.12, 5.1-5.10, 6.1-6.13, 7.1-7.14, 8.1-8.28, 9.1-9.13

Common Course Number: BSC 1085

## UNITS

### **Unit 1: Reading and Writing in the Biological Sciences**

The student shall be able to clearly communicate in writing information derived from course related readings the major concepts and themes in the biological sciences.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 1.1 Demonstrate in writing the ability to analyze and extract data relevant to biology from course related readings.
- 1.2 Evaluate the validity of information from a variety of sources.
- 1.3 Demonstrate the use of diagrams, drawings, outlines, concept maps, and/or other methods connections among biological concepts.
- 1.4 Demonstrate the ability to use the appropriate technology to carry out course requirements.

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## UNITS

### Unit 2: Building the Foundation: Chemistry and Body Organization

The student shall be able to demonstrate an understanding of the basic concepts that serve as a foundation to the study of anatomy and physiology, including atoms, ions and molecules, water and mixtures, energy and chemical reactions, organic compounds, anatomical planes, directional terms, body cavities, membranes, and organ systems.

#### Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 2.1 Define an atom and describe its basic structure.
- 2.2 Recognize elements of the human body from their chemical symbols.
- 2.3 Distinguish between chemical elements and compounds.
- 2.4 Define ion, cation, anion, and electrolyte.
- 2.5 Compare and contrast the ionic, covalent and hydrogen bonding
- 2.6 Support the biological importance of water as related to its properties
- 2.7 Distinguish the three types of mixtures and define a mixture
- 2.8 Distinguish between an acid and a base, interpret the pH scale, and evaluate the importance of acids and bases in the human body
- 2.9 Interpret whether a chemical equation is considered a synthesis, decomposition, or exchange reaction
- 2.10 List the factors that affect reactions and assess how these factors will change the speed and direction of a reaction.
- 2.11 Define metabolism and differentiate between anabolism and catabolism.
- 2.12 Distinguish between oxidation and reduction and relate these to changes in the energy content of a molecule
- 2.13 Identify common functional groups of organic molecules from their formulae.
- 2.14 Compare and contrast hydrophilic/polar and hydrophobic/non polar molecules

- 2.15** Assess the relevance of polymers to biology and explain how they are formed and broken down by dehydration synthesis and hydrolysis respectively
- 2.16** Distinguish the types and functions of organic molecules (Carbohydrates, lipids, proteins and nucleic acids)
- 2.17** Describe protein structure and the relationship between its structure and its function and assess factors that can cause denaturation
- 2.18** Explain how enzymes function.
- 2.19** Describe the structure and function of ATP.
- 2.20** Define anatomy and physiology and state the relationship between structure and function.
- 2.21** Explain the levels of structural organization of the human body.
- 2.22** Define cell, tissue, organ, organ system, and organism.
- 2.23** List the systems of the human body, describe their functions, and itemize their component organs.
- 2.24** Define anatomical position and the terms describing various anatomical planes, directions, and regions.
- 2.25** Organize the major organs of the body according to the body cavity where they are found
- 2.26** Define homeostasis and describe the interrelationships of body systems in maintaining homeostasis and support the value of maintaining homeostasis.

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## UNITS

### Unit 3: The Cell

The student shall be able to describe the structure, function, and reproduction of cells.

#### Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 3.1 Define a cell and distinguish between cytosol and cytoplasm.
- 3.2 Identify and give the function of each of the cell's major organelles and cytoskeleton structures
- 3.3 Analyze the structure and molecular organization of the cell membrane assess factors determining its selective permeability.
- 3.4 Explain, and differentiate between, the following mechanisms of cell transport: diffusion, osmosis, facilitated diffusion, active transport endocytosis, and exocytosis.
- 3.5 Explain osmotic pressure and predict how isotonic, hypertonic, and hypotonic solutions affect cells
- 3.6 Outline the events of a cell's life cycle including interphase, mitosis and cytokinesis
- 3.7 Explain the role of DNA and RNA in the process of protein

Common Course Number: BSC 1085

## UNITS

### Unit 4

The student shall be able to describe the structure and function of the various types of tissues, membranes, and glands in the human body.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the students shall be able to:**

- 4.1 Differentiate between cell and tissue.
- 4.2 Compare the four major tissue types as related to their general characteristics.
- 4.3 Recognize the following covering and lining epithelia: simple squamous, simple cuboidal, simple columnar, pseudostratified columnar, stratified squamous, and transitional.
- 4.4 For each of the above tissues, justify each of the tissue's locations with its function in that particular location.
- 4.5 Differentiate between cilia and microvilli, and apical and basal surfaces.
- 4.6 Differentiate among connective tissue cells, fibers, ground substance, and compare the different types of each.
- 4.7 Recognize the following loose connective tissues: areolar, adipose, reticular; and the following dense connective tissues: dense regular, dense irregular, elastic.
- 4.8 For each of the above tissues, justify each of the tissue's locations with its function in that particular location.
- 4.9 Apply the epithelial characteristic that an epithelial layer is supported by a layer of connective tissue to mucous, serous and cutaneous membranes, and relate the location of each membrane type to the location and function of the epithelial portion of the membrane.
- 4.10 Distinguish glandular epithelium from covering-lining epithelium.
- 4.11 Differentiate between endocrine and exocrine glands and categorize specific examples as endocrine or exocrine.
- 4.12 Explain the steps involved in tissue repair; and relate the events of the inflammatory response to its symptoms.

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## **UNITS**

### **Unit 5**

The student shall be able to describe the structure and specialized functions of the skin and its derivatives, including its relation to homeostasis.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the students shall be able to:**

- 5.1 Describe at least five different functions of the skin.
- 5.2 Recognize the skin as an organ of the integumentary system.
- 5.3 Distinguish the structural divisions of the skin (epidermis and dermis) and their relationship to the hypodermis.
- 5.4 List the layers of the epidermis and describe their functions.
- 5.5 Describe the structure and functions of the dermis.
- 5.6 Describe the structures and functions of the accessory organs of the skin, including the nails, hair and glands.
- 5.7 Categorize first-, second-, and third-degree burns.
- 5.8 List and describe the factors that normally contribute to skin color.
- 5.9 Assess how changes in skin color may be used as signs of certain diseases.
- 5.10 Discuss and Evaluate and selected diseases/disorders of the skin

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## UNITS

### Unit 6

The student shall be able to discuss the structure and functions of the skeletal system, including its histology, the ossification process, and its role in maintaining calcium homeostasis.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the students shall be able to:**

- 6.1 List the components and functions of the skeletal system.
- 6.2 Describe cartilage tissue in general and compare the three types with regard to structure, function, and location.
- 6.3 Describe the gross anatomical features of a typical long bone and a typical short bone.
- 6.4 Examine and discuss the microscopic structure of compact bone and compare it to that of cancellous bone.
- 6.5 Analyze the process of ossification and distinguish between intramembranous and endochondral ossification.
- 6.6 Discuss and evaluate the effects of vitamin D and various hormones on bone physiology and plasma  $Ca^{++}$ .
- 6.7 Describe a fracture and distinguish the major types.
- 6.8 Interpret the physiology of bone healing.
- 6.9 Analyze the etiology and symptoms of selected bone disorders.
- 6.10 Examine and identify the bones of the axial and appendicular skeletons.
- 6.11 Analyze the general structure and components of the vertebral column.
- 6.12 Describe the criteria used to classify joints structurally and functionally.
- 6.13 Interpret the anatomical features common to all synovial joints, the six types of synovial joints, and the movements allowed at each type.

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## UNITS

### Unit 7

The student shall be able to explain the structure and function of muscle tissue and be able to relate the neural, electrochemical, and physical events of muscle contractions to body movements.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the students shall be able to:**

- 7.1 Compare the three types of muscle tissue with regard to microscopic appearance, location, function, and regulation of contraction.
- 7.2 Differentiate the following connective tissues associated with muscles- deep fascia, epimysium, perimysium, endomysium, and tendon.
- 7.3 Describe muscle cell anatomy using the terms sarcolemma, transverse tubules, sarcoplasmic reticulum, and terminal cisternae.
- 7.4 Differentiate among fiber, fibril, sarcomere, and thin and thick filaments.
- 7.5 Describe the arrangement of thin and thick filaments in a sarcomere and its relationship to striations.
- 7.6 Define motor unit and describe the anatomy of a neuromuscular junction.
- 7.7 Explain the neural, chemical, and mechanical factors involved in the contraction of skeletal muscle.
- 7.8 Define the all-or-none principle of muscular contraction.
- 7.9 Define muscle tone and explain its importance.
- 7.10 Differentiate between isotonic and isometric contractions and compare how they control movement and maintain posture.
- 7.11 Discuss selected abnormal muscular contractions.
- 7.12 Discuss and evaluate selected diseases/disorders of the muscular system
- 7.13 Define oxygen debt and muscle fatigue and examine their causes.

**7.14** Analyze the criteria used in naming muscles and give an example to illustrate the use of each criterion

**Common Course Number: BSC 1085**

## **UNITS**

### **Unit 8**

The student shall be able to demonstrate an understanding of the major divisions of the nervous system, their component structures, and the various homeostatic mechanisms which operate under nervous control.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the students shall be able to:**

- 8.1** Explain the general role of the nervous system in maintaining homeostasis.
- 8.2** Categorize the subdivisions of the nervous system and list the components of each.
- 8.3** Categorize characteristics and functions of neuroglia and neurons.
- 8.4** Identify and give the specific functions for different types of neuroglial cells.
- 8.5** Identify the parts of a neuron and give their functions.
- 8.6** Classify neurons functionally and structurally.
- 8.7** Explain how an injured nerve fiber may regenerate.
- 8.8** List the sequence of events involved in the initiation and conduction of a nerve impulse.
- 8.9** Explain the all-or-none principle of impulse transmission and discuss the factors that determine its rate.
- 8.10** Discuss and evaluate a synapse then explain and evaluate the sequence of events involved in impulse conduction across the synapse.
- 8.11** Describe a nerve and the connective tissue layers associated with it.
- 8.12** Differentiate among motor nerves, sensory nerves, mixed nerves, cranial nerves, and spinal nerves.

- 8.13** Describe how the 31 pairs of spinal nerves are named, and give their composition and general distribution.
- 8.14** Differentiate ventral root, dorsal root, and dorsal root ganglion and give the composition of each.
- 8.15** Describe the name, composition, and functions of the principal plexuses.
- 8.16** Discuss the name, number, and major functions of each of the 12 pairs of cranial nerves.
- 8.17** Explain and give the function of a reflex.
- 8.18** Distinguish between somatic and autonomic reflexes.
- 8.19** Examine and describe the anatomy of a reflex arc.
- 8.20** Compare and contrast autonomic nervous system and somatic motor division of the peripheral nervous system
- 8.21** Compare and contrast the sympathetic and parasympathetic divisions of the autonomic nervous system.
- 8.22** Distinguish the three coverings of the central nervous system and give the characteristics, location, and function of each.
- 8.23** Describe the major structural features and functions of the spinal cord.
- 8.24** Differentiate white matter, gray matter, tracts, and nuclei.
- 8.25** Describe the major regions of the brain and give the functions of each.
- 8.26** Discuss the functions of cerebrospinal fluid and explain its formation, circulation, and resorption.
- 8.27** Describe blood supply to the brain.
- 8.28** Explain selected nervous system disorders.



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## UNITS

### Unit 9

The student shall be able to demonstrate an understanding of the structure and physiology of the somatic senses as well as the special senses.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the students shall be able to:**

- 9.1 Compare and contrast the various kinds of receptors
- 9.2 Distinguish between somatic and special senses.
- 9.3 Locate the receptors for olfaction and examine the neural pathway for smell.
- 9.4 Explain the relationship between the senses of smell and taste.
- 9.5 List the structure and function of the various types of taste buds.
- 9.6 Describe the parts of the ear.
- 9.7 Organize the events in the physiology of hearing.
- 9.8 Identify the receptor organs for equilibrium and explain their roles in maintaining static and dynamic equilibrium.
- 9.9 Identify the accessory structures of the eye and give their functions.
- 9.10 List the major anatomical structures of the eye and give their functions.
- 9.11 Discuss and evaluate the physiology of vision.
- 9.12 Describe the distribution and functional differences between rods and cones and examine the events of the photochemical cycles resulting in their stimulation.
- 9.13 Discuss and evaluate selected diseases/disorders of the senses