

# Bio 103 Course Outline

Revised Spring 2008

BIO 103  
Course Number

Anatomy & Physiology I  
Course Title

Science / Health Professions  
Division

4  
Credits

3  
Lecture Hours

3  
Laboratory Hours

**Textbook: Hole's Human Anatomy & Physiology**

Shier, Butler, Lewis  
McGraw-Hill  
11<sup>th</sup> ed., 2007

**Lab Manual: Laboratory Investigations in Anatomy & Physiology (Cat Version)**

Stephen Sarikas  
Pearson, Benjamin Cummings  
1<sup>st</sup> ed., 2007

**Catalog Description:**

Systematic approach to the structure and function of the human body; general terminology and organization; cells and tissues; integumentary, skeletal, muscular, and nervous systems. Laboratory includes use of microscope and the study of human anatomy via computer software and preserved specimens.

Does not fulfill any requirements for the Biology AS degree.

Co requisite: ENG 101

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### General Objectives:

1. To understand the body's normal functioning by explaining the structures and functions of the cells, tissues, organs, and organ systems of the human body.
2. To integrate structure and function so that an understanding of anatomy facilitates comprehension of physiology which in turn is essential for the total understanding of the human body.
3. To provide an understanding of the normal structure and function of the human body such that the student can develop habits of healthful living.
4. To emphasize the importance of learning how the body functions in health before one can appreciate the many implications of disordered function or disease.
5. To help the pre-professional student to realize the many interactions of the various body systems and broaden her or his understanding for future learning.
6. To provide the student of anatomy and physiology with terminology, facts, and concepts in order to help the student to think critically and solve problems.

### Attendance and Grading:

1. Attendance at lectures is expected. To be successful in this course you should plan to attend all lecture and lab sessions. If you miss a lecture or lab for any reason, it is your responsibility to obtain the missed information including course material covered, any announcements made, and any handouts that may have been distributed in class.
2. All lecture exams will be given in class or in the testing center (LA-216). The tests covering the lecture material will be given periodically at the end of study of a unit or system. You need to bring your MCCC student ID to each exam. The tests will be announced at least one week in advance. There will be four regular lecture exams plus one comprehensive final exam.
3. It is your responsibility to be present for all tests, lab practicals, and the final exam. There are **NO MAKE UP EXAMS**. If you miss a lecture exam for any reason the final exam will be counted twice. If you miss a second lecture exam you will receive a zero for that exam.
4. The laboratory grade is based on the lab practical grades, quizzes, prelab assignments, and attendance. Three unexcused absences from lab may result in an automatic F for the course no matter how high the lecture grade.

5. Grading: You may keep track of your grades on Page 11 of this course outline.

A	93-100%	B+	87-89%	C+	77-79%	D	60-69%
A-	90-92	B	83-86	C	70-76	F	<60%
		B-	80-82				

6. Examination questions may be objective (multiple choice, T-F, matching, or fill-in the-blank) and/or short answer essay.
7. The final exam is cumulative and will be given during the scheduled final exam period. In order to pass the course you must take the final exam.




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8. **Academic Integrity Statement:** Any student who a) knowingly represents the work of others as her/his own, b) uses or obtains unauthorized assistance in the execution of any academic work, or c) gives fraudulent assistance to another student is guilty of cheating. Violators will be penalized in accordance with established college policies.
9. **Classroom Conduct:** Students are expected to be on time for all classes. If a student walks into a class after it has begun, she/he should sit near the exit so as not to disrupt others. In addition, students are expected to follow ordinary rules of courtesy during class sessions. The use of buzzing and ringing communication and electronic devices, and engaging in side conversations during class time is distracting to other students and the instructor. The instructor has the right to eject a disruptive student from the class at any time.

**THE INSTRUCTOR RESERVES THE RIGHT TO CHANGE THE TEST SCHEDULE AND GRADING AT ANY TIME.**

### Schedule of Lecture Topics and Laboratory Work

Week	Subject	Text Chapters	Lab
1	Intro., Terminology, Homeostasis, Organic Molecules	1, 2 (p.60-69)	Body Organ. & Term. (Ex.1) Microscopy (Ex. 2, 3 p. 31-33)
2	Cells - Membranes, Transport Processes, Organelles	3, 4	Membrane Transport (Ex. 4)
3	DNA, Protein synthesis, Cell division	3, 4, 22 (p. 851-856, 865-870)	Cell Division: (Mitosis – Ex. 3) (Meiosis – Ex. 30 & 31) Epithelial & Connective Tissues (Ex.5)
	<b>Lecture Test #1</b> [Intro.→Cell Div.]		
4	Tissues	5	Integumentary System (Ex.6) Review - Lab Practical#1
5	Tissues/ Integumentary System	5, 6	 <b>Lab Practical #1</b>
6	Integumentary System	6, 12 (p.443-444)	Skeletal System (Ex. 7 - 9)
	<b>Lecture Test #2</b> [Tissues & Skin]		

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<b>Week</b>	<b>Subject</b>	<b>Text Chapters</b>	<b>Lab</b>
7	Skeletal System	7, 8	Skeletal System (Ex. 7 - 9) Computer Exercise
8	Skeletal System	7, 8	Skeletal System (Ex. 7 - 9) Review - Lab Practical #2
9	Skeletal System	7, 8	 <b>Lab Practical #2</b>
	<b>Lecture Test #3</b> [Skeletal System]		
10	Muscular System	9	Muscle Tissue & selected Muscles (Ex. 7, 10, 11) Computer Exercise
11	Muscular System	9	Special Senses –Eye & Ear (Ex. 17) Computer Exercise
12	Muscular System	9	Nervous System (Ex. 13 - 15)
	<b>Lecture Test #4</b> [Muscular System]		
13	Nervous System	10-12	Cranial Nerves (Ex. 14) Review for L.P. #3
14	Nervous System	10-12	 <b>Lab Practical #3</b>
15	Nervous System	10-12	

 **Test #5 (Final Exam - cumulative)**

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### Laboratory Safety Instructions

Your laboratory instructor will call your attention to safety procedures to be followed in the Anatomy and Physiology laboratory. Be sure to become familiar with the location and use of the following safety equipment:

Eyewash	Soap and Running water
Fire blanket	Safety Glasses
Fire Extinguishers	Emergency electric power shut off

*The following are procedures for the dissection of large specimens such as the cat:*

1. Use the disinfectant solution on the lab work table. You may want to spread a plastic sheet or paper toweling over the dissecting surface.
2. Be certain to wear latex, plastic, or rubber gloves and goggles.
3. Be careful not to cut yourself or your partner with the dissecting instruments. Never cut toward yourself and always put the instruments down when not in use. Your lab instructor will demonstrate proper handling and use of the dissecting tools.
4. In the event of a cut or injury of any kind, you must notify your laboratory instructor immediately.
5. When finished the dissection, store your cats as directed, dispose of the paper towels in the appropriate container, and wash the dissecting surface with the disinfectant.
6. Be certain to wash your hands with soap and water prior to leaving the lab for any reason. **Also, do not smoke, eat, drink, or bite your nails in the laboratory.**

For the dissection of small specimens such as kidneys, hearts, etc., follow the procedures above, except that the specimens should be placed in dissecting trays.

Although dangerous chemicals are used infrequently, always read labels and follow instructions carefully.

Before leaving the laboratory, make certain that the gas jets at your station are off and push your chair under the lab table.

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### **BIO 103: Course Objectives**

**Test #1:** Introduction to A&P, Terminology, Homeostasis, Organic Molecules, Cells, Transport Mechanisms, Organelles, DNA, Protein synthesis, Cell Division  
[Chapters 1, 2 (p. 60-69), 3, 4 and 22 (p.851-856, 865-870)]

1. Define anatomy and physiology.
2. Describe the major characteristics of life.
3. Describe the major requirements of organisms.
4. Identify the levels of organization.
5. Identify the organ systems, the major components, and functions of each system.
6. Explain the concept of homeostasis and its importance for living organisms.
7. Describe how negative and positive feedback are involved in maintaining homeostasis.
8. Use anatomical terms to describe body sections, regions, and positions.
9. Identify major body cavities, their subdivisions, and membranes.
10. Distinguish between inorganic and organic compounds.
11. Discuss the structures and functions of the major classes of organic compounds.
12. List the structural components of the cell membrane and some important functions.
13. Describe the organelles of a typical animal cell and explain the functions of each.
14. Explain the function of the nucleus of a cell.
15. Explain how ions and molecules can enter or leave the cell.
16. Describe the various transport mechanisms that are utilized by cells.
17. Discuss how DNA molecules store genetic information.
18. Summarize protein synthesis.
19. Describe the stages of the life cycle of the cell.
20. Describe the process of mitosis and its significance.
21. Describe the process of meiosis and its significance.
22. Discuss control of cell division, tumors, and stem cells.
23. Selected clinical terminology.
24. Selected clinical or health-related situations.

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### Course Objectives

#### Test #2: Tissues, and the Integumentary System

[Chapters 5, 6, 12 (p. 443-444)]

1. Identify the four main tissue types and their general functions.
2. Discuss the types and functions of epithelial cells.
3. Compare the structures and functions of the various connective tissues.
4. Describe characteristics and examples of exocrine and endocrine glands
5. Discuss the four different types of membranes and their functions.
6. Describe the three types of muscle tissues and characteristics of each.
7. Describe the general characteristics and functions of nervous tissue.
8. Describe the structure and function of the epidermis.
9. Explain individual and racial differences in skin.
10. Discuss the effects of UV radiation on skin.
11. Describe the structure and function of the dermis.
12. Discuss the structure and function of the hypodermis.
13. Identify the parts of the hair follicle and the functions of hair.
14. Discuss the various glands that are associated with the skin.
15. Explain the regulation of body temperature.
16. Describe the anatomy of nails.
17. Identify the exteroceptive senses (exteroceptors) and their main functions.
18. Selected clinical terminology.
19. Selected clinical or health-related situations.

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### Course Objectives

#### **Test #3: Skeletal System** [Chapters 7 and 8]

1. Describe the functions of the skeletal system.
2. Classify the bones according to shape.
3. Identify the various bone cells and their main functions.
4. Compare and contrast spongy bone and compact bone.
5. Distinguish between intramembranous and endochondral ossification.
6. Describe the remodeling process.
7. Discuss the effects of hormones, diet, exercise, and aging on the skeletal system.
8. Describe the different types of fractures.
9. Identify major surface features of bones.
10. Identify the bones of the axial skeleton.
11. Identify the various curvatures of the spinal column.
12. Identify the characteristics of the vertebral regions.
13. Explain the significance of the articulations of the thoracic cage.
14. Identify the bones of the appendicular skeleton.
15. Identify the bones that form the pectoral girdle.
16. Identify the bones of the upper and lower limbs.
17. Identify the bones that form the pelvic girdle.
18. Discuss the skeletal differences between females and males.
19. Compare the major classifications of joints.
20. Describe the basic structure of a synovial joint and the various types.
21. Selected clinical terminology.
22. Selected clinical or health-related situations.

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### Course Objectives

#### **Test #4: Muscular System** [Chapter 9]

1. Describe the characteristics and functions of muscle tissue.
2. Describe the organization of skeletal muscle at the tissue level.
3. Describe the microanatomy of skeletal muscle fibers.
4. Identify the components and banding patterns in the sarcomere.
5. Explain the sliding filament model of muscle contraction.
6. Describe the parts of the neuromuscular junction (NMJ).
7. Explain the series of events that take place at the NMJ when a neuron stimulates a skeletal muscle fiber.
8. Explain the key steps in contraction and relaxation of skeletal muscle fibers.
9. Give definitions for the different types of muscle contractions (twitch, summation, recruitment, muscle tone, isometric, and isotonic).
10. Describe how muscle fibers obtain and utilize energy for contraction.
11. Compare aerobic and anaerobic endurance.
12. Compare and contrast the three types of muscle tissue.
13. Define origin, insertion, and action.
14. Explain how names of muscles can help identify its location, shape, or action.
15. Selected clinical terminology.
16. Selected clinical or health-related situations.

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### Course Objectives

**\*Test #5: The Nervous System**  
[Chapters 10 - 12]

1. Name the 2 major anatomical divisions of the nervous system and describe the organization and characteristics of each.
2. Identify the structures of a neuron and describe the function of each.
3. Classify neurons based on structure and function.
4. Describe the locations and functions of neuroglia.
5. Describe the resting potential - how it is created and maintained.
6. Describe the events in the generation and propagation of an action potential (AP).
7. List the factors that affect the speed of conduction of an AP.
8. Describe the synapse and sequence of events in synaptic transmission.
9. Name the main types of neurotransmitters that were discussed in class.
10. Name the factors that affect neural activity.
11. Discuss conditions that are necessary for regeneration of nerves.
12. Describe the difference between white matter and gray matter.
13. Name the major regions of the brain and describe their main function.
14. Explain how the brain is protected and supported.
15. Discuss the blood supply to the brain and the importance of the BBB.
16. Discuss the formation, circulation, and functions of CSF.
17. Identify the cranial nerves and important individual functions.
18. Discuss the structure and functions of the spinal cord.
19. Describe the location of white and gray matter in the spinal cord and the role they play in processing and relaying information.
20. Describe the numbering and location of the spinal nerves and their components.
21. Name the main plexuses and the important nerves that arise from each.
22. Describe the reflex arc and give examples of the different types of reflexes as discussed in lecture.
23. Compare the ANS with other divisions of the nervous system.
24. Compare and contrast the structures and functions of the sympathetic and parasympathetic divisions of the ANS.
25. Selected clinical or health-related situations.

\* Test #5 is cumulative and will include material covered during the entire semester.

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Name: \_\_\_\_\_ Lab Day/Time: \_\_\_\_\_

Test Scores:

Test #1: \_\_\_\_\_

Test #2: \_\_\_\_\_

Test #3: \_\_\_\_\_

Test #4: \_\_\_\_\_

Extra Credit

Quiz points: \_\_\_\_\_

Test #5: \_\_\_\_\_

(Final exam)

Lab Prac. #1: \_\_\_\_\_

Lab Prac. #2: \_\_\_\_\_

Lab Prac. #3: \_\_\_\_\_

Total Prelab points: \_\_\_\_\_

Total points = \_\_\_\_\_

**(Total pts. ÷ 9) = \_\_\_\_\_ = FINAL COURSE GRADE**

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### Anatomy & Physiology Websites:

A&P (Bio103) Website: <http://www.mccc.edu/~falkow>

<http://www.mhhe.com/shier11> Companion website for the Hole's textbook.

<http://www.gwc.maricopa.edu/class/bio201/index.htm> Maricopa Community College  
From this webpage, click on "Interactive Tutorials" at bottom of page for practice on the skull, vertebrae, muscles, histology, cranial nerves, and brain.

<http://msjensen.education.umn.edu/webanatomy> Univ. of Minnesota  
A potpourri of study aids for the beginning A&P student. Includes self tests and images from all major system of the body.

<http://www.bio.psu.edu/faculty/strauss/anatomy> Penn State University  
Links to great photos of skeletal and nervous systems. (Note muscular system is devoted to the cat – meow!)