Bio 104 Course Outline

Bio 104	**Anatomy & Physiology II**
Course Number	Course Title

Science & Health Professions
Division

4	3	3
Credits	Lecture Hours	Laboratory Hours

Textbook: **Hole's Human Anatomy and Physiology**
Shier, Butler, Lewis
McGraw-Hill
12th edition, 2010

Lab Manual: **Laboratory Investigations in Anatomy & Physiology - Cat Version**
Stephen N. Sarikas
Pearson/Benjamin-Cummings
2nd edition, 2010

Catalog Description: Continuation of Bio 103 covering digestive, circulatory, urinary, reproductive, respiratory, and endocrine systems. Lab includes cat dissection, human anatomy study via computer software, and quantitative studies of physiological processes. Does not fulfill any requirements in the Biology AS degree.

Prerequisites: Bio 103 with a minimum of a "C" grade.

Course Coordinator:

Professor Linda Falkow	Professor Ron Smith	Professor Linda Gaylo
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Bio 104 Course Outline

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 anatomy is never an end in itself but a prerequisite for the comprehension of physiology which is essential for understanding the human body.
3. To emphasize the importance of learning how the body functions in health before one can appreciate the many implications of disease.
4. To provide an understanding of the normal structure and function of the human body such that the student can develop habits of healthful living.

Attendance and Grading:

1. Attendance at lectures is expected. To be successful in this course you should plan to attend all lectures and laboratory 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. 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. **You are expected to arrive on time in order to take the test.** 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 final exam period. In order to pass the course you must take the final exam.

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. Refer to Student Handbook for additional information on Academic Integrity Policy.

9. **Classroom & Laboratory 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 cell phones and other electronic devices, and engaging in side conversations during class time is distracting to other students and the instructor. **No** cell phone use, including texting, during class time.

   Participation in biology laboratory courses is permitted provided the student has completed the required prerequisites, is a minimum of 16 years of age, or by permission of the instructor and the Dean of the division. Children are not permitted in the classroom without prior approval by the instructor.

   The instructor has the right to eject a disruptive student from the class at any time. Please refer to the Student Handbook for additional information on rules and regulations.

   Mercer County Community College is in compliance with both the ADA and section 504 of the Rehabilitation Act. If you have, or believe you have, a differing ability that is protected under the law please see Arlene Stinson in LB 216 or at stinsona@mccc.edu for information.

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	Digestive System	17, 18	Human Muscles [Ex.11] Dissection of Muscles: Cat [Dissection Ex. 2, p.581-600]
2	Digestive System	17, 18	Muscle dissection (con't.)
3	Digestive System	17, 18	Digestive system [Ex. 26] [Dissection Ex. 8, p. 643-652]
	→ **Lecture TEST #1 (Digestive System)**		

4	Cardiovascular System	14 - 16	Computer Exercise: Muscles, Digestive system Review for L.P. #1
5	Cardiovascular System	14 - 16	**Lab Practical #1**
6	Cardiovascular System	14 - 16	Blood [Ex. 19] Computer Exercise: CV system
	→ Lecture TEST #2 (CV System)		
7	Urinary System	20, 21	Heart Dissection [Ex. 20] Cat - Veins [Dissection Ex. 5, p. 617-630]
8	Urinary System	20, 21	Cat - Arteries [Dissection Ex. 5, p. 617-630]
	→ Lecture TEST #3 (Urinary System)		
9	Reproductive System	22, 23	Computer Exercise: CV System Review for L.P. #2
10	Reproductive System	22, 23	**Lab Practical #2**
11	Reproductive System	22, 23	Urinalysis [Ex. 29] Urinary system [Ex. 28] Reproductive system [Ex. 30, 31] [Dissection Ex. 9 & 10, p. 653 -666]
	→ Lecture TEST #4 (Reproductive System)		
12	Respiratory System	19	Respiratory system [Ex. 24, 25] [Dissection Ex.7, p. 637-642]
13	Respiratory System	19	Computer Exercise: Urinary/Reprod./Resp. systems Review for L.P. #3
14	Respiratory System	19	**Lab Practical #3**
15	Endocrine System	13	
	→ Lecture TEST #5 (FINAL EXAM) - cumulative		

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.**

7. **Photography is not permitted in the laboratory.**

8. 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.

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

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

Learning Outcomes

Test #1: Digestive System
[Chapters 17 & 18]

1. Identify the organs of the alimentary canal.
2. Explain the functions of the digestive system.
3. Name the 4 main histological layers of the alimentary canal and explain their functions.
4. Describe the movements of the alimentary canal.
5. Describe mechanisms that regulate activities of the digestive system.
6. Discuss the cavities and membranes associated with the digestive organs.
7. Describe the structures and the functions of the oral cavity, including the tongue, teeth, and salivary glands.
8. Describe the structure and function of the pharynx and esophagus.
9. Describe the anatomy and histology of the stomach and its role in digestion.
10. Describe the structure and functions of the pancreas.
11. Describe the structure and functions of the liver.
12. Describe the structure and functions of the gall bladder.
13. Describe the ducts of the pancreas, liver, and gall bladder.
14. Describe the anatomy and histology of the small intestine.
15. Explain the functions of the intestinal secretions.
16. Describe the anatomy and physiology of the large intestine.
17. Describe the hormonal regulation of digestive activities.
18. Discuss the digestion and absorption of carbohydrates, proteins, and lipids.
19. Explain the digestive system disorders as covered in class.
20. Discuss life-span changes that affect the digestive system.

Learning Outcomes

Test #2: Cardiovascular System

[Chapters 14, 15, 16]

1. Name the important components, major functions and characteristics of blood.
2. Discuss the characteristics and functions of erythrocytes including erythropoiesis.
3. Explain the classification and functions of leukocytes, including their formation.
4. Explain the characteristics, functions, and formation of thrombocytes.
5. Discuss the composition and functions of plasma.
6. Explain the mechanism of hemostasis including blood vessel spasm, platelet plug formation, and blood coagulation.
7. Describe the location and general characteristics of the heart.
8. Describe the structure and function of the pericardium.
9. Be able to trace the blood flow through the heart, naming vessels, chambers, and valves.
10. Identify the layers of the heart wall.
11. Name the major vessels of the coronary circulation and explain the nervous innervation of the heart.
12. Describe the conduction system of the heart.
13. Explain the electrical events associated with a normal ECG.
14. Explain the cardiac cycle (systole and diastole) and the 2 main heart sounds that occur in this cycle.
15. Define cardiac output, stroke volume, and heart rate and explain the factors that have an affect on these variables.
16. Describe the difference between the various blood vessels based on structure and function.
17. Explain the different types of capillary exchange and the various pressures involved in the movement of substances between the capillaries and interstitial spaces.
18. Explain how central and local mechanisms regulate blood flow and pressure.
19. Explain neural mechanisms that regulate blood flow and BP including the CV center in the medulla, and reflex control through baroreceptors and chemoreceptors.
20. Describe the differences between the pulmonary circulation and the systemic circulation.
21. Name the specific vessels of the pulmonary, systemic, & hepatic portal circulation.
22. List the main components and functions of the lymphatic system.
23. Explain the abnormal situations discussed in this unit such as pericarditis, MVP, HT, erythroblastosis fetalis, hemophilia, etc.

Learning Outcomes

Test #3: Urinary System
[Urinary system: Chapters 20 & 21]

1. Name the components of the urinary system.
2. Explain the functions of the urinary system.
3. Describe the gross anatomy of the kidney and other structural features of the kidney.
4. Describe the parts and functions of the nephron: renal corpuscle (Bowman's capsule and glomerular capillaries) and the tubules (pct, loop of Henle, dct).
5. Describe structure and function of the juxtaglomerular apparatus (JGA).
6. Name the 2 types of nephrons and describe their location.
7. Name the major blood vessels of the kidney and be able to trace the path of blood through the kidney.
8. Explain the distinctive features of the blood supply to the kidney.
9. Explain the processes of urine formation.
10. List and explain the various pressures that influence filtration.
11. Explain the GFR and the factors that influence the rate of filtrate formed.
12. List the substances that can pass through the filtration membrane.
13. Explain the process of reabsorption.
14. Explain the countercurrent mechanism as discussed in class.
15. Explain the process of secretion.
16. Explain the role of ADH and aldosterone in the regulation of urine volume and concentration.
17. Describe the composition and characteristics of urine.
18. Describe the structure and function of the ureters, urinary bladder, and urethra.
19. Discuss the micturition reflex.
20. Discuss body fluid composition (ICF vs ECF).
21. Explain water balance disorders (dehydration, water intoxication, and edema).
22. Explain the clinical situations as discussed in class.

Learning Outcomes

Test #4 Reproductive System
[Reproductive system: Chapters 22 and 23]

1. Name the components and functions of the male and female reproductive systems.
2. Name the primary and secondary sex characteristics of the male and female reproductive systems.
3. List the structures and explain the functions of spermatic cord, testes, and surrounding structures.
4. Describe process of spermatogenesis, where it takes place, and the path of the sperm.
5. Describe the structures and functions of the male reproductive tract & accessory glands.
6. Discuss the composition of semen.
7. Describe the external structures of the male reproductive system.
8. Discuss the hormones and their regulation of male reproductive activities.
9. Explain selected clinical disorders of the male reproductive system.
10. Describe the female gonads and their support structures.
11. Describe the process of oogenesis and where it takes place.
12. Describe the phases and steps of the ovarian and uterine cycles.
13. Describe the anatomy, histology, and functions of the uterine tubes, uterus, and vagina.
14. Describe the structures of the female external genitalia.
15. Describe the structures of the mammary glands and the hormones that influence their development and function.
16. Discuss the hormones and their regulation of the female reproductive cycle.
17. Describe the process of fertilization.
18. Discuss the early development of the embryo, fetus, and placenta.
19. Explain fetal circulation.
20. Discuss various aspects of menopause.
21. Discuss selected clinical disorders of the female reproductive system.

Learning Outcomes

Test #5: Respiratory System [Chapter 19]

1. Components of the Respiratory System
2. Divisions of Respiratory System - structural and functional
3. Functions of the Respiratory System
4. Def.: pulmonary ventilation, external respiration, internal respiration, cellular respiration
5. Nose and nasal cavity, and sinuses - anatomical features, functions, histology
6. Pharynx - 3 sections
7. Larynx - location, cartilages, ventricular folds and vocal folds
8. Trachea - location, cartilages, histology
9. Primary bronchi - differences between right and left, structure each supplies
10. Secondary bronchi - know the number, alternate name, and structure each supplies
11. Tertiary bronchi - know number, alternate name, structure each supplies
12. Bronchioles
13. Changes with increased branching
14. Lungs - pleural membranes and cavity
15. Lungs - anatomical features
16. Pulmonary lobule – components
17. Mechanics of inspiration and expiration
    - pressure differences, muscles involved in eupnea and forced inspiration and expiration
18. Gas laws - Boyle's, Dalton's, Henry's
19. Respiratory volumes and capacities
20. Blood flow to alveoli
21. Alveolar ventilation
22. Non-respiratory air movements
23. Control of respiration - medulla and pons
24. Control of respiration - chemoreceptors and baroreceptors, Hering-Breuer reflex
25. Alveoli - histology, cell types
26. Respiratory membrane
27. Composition of air
28. Gas transport – O_2 and CO_2
29. Chloride shift
30. CO (carbon monoxide)
31. Oxyhemoglobin dissociation curve
32. Adaptation to high altitudes
33. Clinical situations - pneumonia, asthma, lung cancer, emphysema, CF, pleurisy, pneumothorax, hemothorax, atelectasis, RDS, altitude sickness, decompression sickness, COPD, TB

Test #5 (Final Exam) is cumulative and will include questions on material from the entire semester.

Bio 104 Course Outline

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: _____

*Lab Quiz/Prelab points: _____

Total points = _____

Lab Quiz or Pre-lab
*lowest Quiz/Pre-lab dropped

1:_____

2: _____

3: _____

4: _____

5: _____

6: _____

7: _____

8: _____

9: _____

10: _____

11: _____

(Total pts. ÷ 9) = _____ = FINAL COURSE GRADE

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Anatomy & Physiology Websites:

Bio 104 Website: http://www.mccc.edu/~falkowl Contains the course outline, lecture outlines, and lab information.

Hole's website: http://www.mhhe.com/shier12 Companion website that accompanies the textbook.

http://connect.mcgraw-hill.com Online questions to accompany Hole's Human Anatomy and Physiology, Shier, 12th edition.

http://www.mhhe.com/biosci/ap/cat_dissect/ Waters: Web-Based Cat Dissection Review for Human Anatomy and Physiology for $21.00. The demo on muscles is free.

http://www.gen.umn.edu/faculty_staff/jensen/1135/webanatomy/ University of Minnesota Tutorials using photos and images in a multiple choice format. Includes medical terminology and most body systems.

http://www.bio.psu.edu/faculty/strauss/anatomy Penn State University Links to great photos of muscular, digestive, circulatory, and urogenital systems on the cat.

http://www.anatomylab.com Contains learning resources including practice lab practicals.