



**MERCER COUNTY COMMUNITY COLLEGE
DIVISION OF BUSINESS AND SCIENCE, TECHNOLOGY, ENGINEERING, AND
MATH (STEM)**

Course Outline

<u>Course Number</u> Bio 104	<u>Course Title</u> Anatomy & Physiology II	<u>Credits</u> 4
<u>Hours</u> Lecture/Lab/Other 3/3/0	<u>Pre-requisite</u> Bio 103 with a minimum of a "C" grade.	

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.

Required texts/other materials:

Textbook: Human Anatomy and Physiology

Erin Amerman
Pearson
2nd edition, 2018

Lab Manual: Exploring Anatomy & Physiology in the Laboratory: Core Concepts

Erin Amerman
Morton Publishing
2nd edition, 2018

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Course competencies/goals:

The students will be able to:

1. Use working vocabulary of appropriate terminology in digestive, cardiovascular, urinary, reproductive, respiratory and endocrine systems
2. Apply concepts of anatomy and physiology using processes of critical thinking to examine structure and function of the digestive, cardiovascular, urinary, reproductive, respiratory, and endocrine systems.
3. Differentiate among various histological body tissue samples.
4. Discuss the importance of homeostasis for proper organ system function.
5. Utilize concepts of the scientific method investigating laboratory/clinical data.

General education knowledge goals:

Goal 1. Communication. Students will communicate effectively in speech and writing.

Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

MCCC core skills:

Goal A. Written and Oral Communication in English. Students will communicate effectively in speech and writing, and demonstrate proficiency in reading.

Goal B. Critical Thinking and Problem-solving. Students will use critical thinking and problem solving skills in analyzing information.

Goal D. Information Literacy. Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

Goal E. Computer Literacy. Students will use computers to access, analyze or present information, solve problems, and communicate with others.

Units of study in detail.

Unit 1: Digestive System

Learning Objectives:

The student will be able to...

1. Identify the organs and the functions of the organs of the digestive system. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
2. Name the 4 main histological layers of the alimentary canal and explain their functions. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
3. Describe the movements of the alimentary canal. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
4. Describe mechanisms that regulate activities of the digestive system. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
5. Describe the hormonal regulation of digestive activities. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
6. Discuss the digestion and absorption of carbohydrates, proteins, and lipids. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
7. Explain the digestive system disorders as covered in class. (**Course Goal 3, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)

Unit 2: Cardiovascular and Lymphatic Systems

Learning Objectives:

The student will be able to...

1. Name the important components, major functions and characteristics of blood. (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
2. Explain the mechanism of hemostasis including blood vessel spasm, platelet plug formation, and blood coagulation. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
3. Describe the location, structures, functions, and blood flow through the heart. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
4. Name the major vessels of the coronary circulation and explain the nervous innervation of the heart. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
5. Describe the conduction system of the heart along with the electrical events associated with a normal ECG. (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
6. Explain the cardiac cycle including cardiac output, stroke volume, and heart rate and the factors that have an effect on these variables. (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
7. Describe the difference between the various blood vessels based on structure and function. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
8. Explain the different types of capillary exchange and the various pressures involved in the movement of substances between the capillaries and interstitial spaces. (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
9. Describe the differences between the pulmonary circulation and the systemic circulation. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
10. List the main components and functions of the lymphatic system. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
11. Explain the cardiovascular system disorders as covered in class. (**Course Goal 3, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)

Unit 3: Urinary System

Learning Objectives:

The student will be able to...

1. Identify the organs and functions of the organs of the urinary system. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
2. Describe the parts and functions of the nephron along with the types of nephrons. (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
3. Name the blood vessels of the kidney and the distinctive features of the blood supply to the kidney. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
4. Explain the processes of urine formation through the nephron along with the composition and characteristics of urine. (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
5. Explain the role of ADH and aldosterone in the regulation of urine volume and concentration. (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
6. Discuss the micturition reflex. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
7. Discuss body fluid composition (ICF vs ECF). (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
8. Explain the urinary system disorders as covered in class. (**Course Goal 3, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)

Unit 4: Reproductive System

Learning Objectives:

The student will be able to...

1. Identify the organs and functions for the organs for the male and female reproductive systems. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
2. Name the primary and secondary sex characteristics of the male and female reproductive systems. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
3. Describe process of spermatogenesis, where it takes place, and the path of the sperm. (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
4. Discuss the composition of semen. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
5. Discuss the hormones and their regulation of male and female reproductive activities. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
6. Describe the process of oogenesis and where it takes place. (**Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E**)
7. Describe the phases and steps of the ovarian and uterine cycles. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
8. Describe the structures of the mammary glands and the hormones that influence their development and function. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
9. Describe the process of fertilization. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)
10. Discuss the early development of the embryo, fetus, and placenta. (**Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E**)

11. Explain fetal circulation. (Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E)
12. Discuss various aspects of menopause. (Course Goal 5; Gen Ed 1, 3, 4; Core A, B, D, E)
13. Explain the reproductive system disorders as covered in class. (Course Goal 3, 4; Gen Ed 1, 3, 4; Core A, B, D, E)

Unit 5: Respiratory System

Learning Objectives:

The student will be able to...

1. Identify the organs and functions of the organs of the Respiratory System. (Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E)
2. Define pulmonary ventilation, external respiration, internal respiration, cellular respiration. (Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E)
3. Describe the mechanics of inspiration and expiration detailing the pressure differences, muscles involved in eupnea and forced inspiration and expiration. (Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E)
4. Discuss gas laws including Boyle's law, Dalton's law, and Henry's law. (Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E)
5. Describe the respiratory volumes and capacities. (Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E)
6. Discuss the role of the medulla oblongata and pons in the control of respiration along with chemoreceptors, baroreceptors, and the Hering-Breuer reflex. (Course Goal 1, 2, 4; Gen Ed 1, 3, 4; Core A, B, D, E)
7. Describe oxygen and carbon dioxide transport in association with the chloride shift. (Course Goal 1, 2, 4; Gen Ed 1, 2, 3, 4; Core A, B, D, E)
8. Explain the respiratory system disorders as covered in class. (Course Goal 3, 4; Gen Ed 1, 3, 4; Core A, B, D, E)

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

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.

A student who has special needs because of a documented disability is entitled to receive accommodations (Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973). Students are to give the accommodation form to the instructor at the start of the semester and to discuss how to best implement the accommodations. For more information, contact Arlene Stinson, Director of the Center for Inclusion, Transition and Accessibility, LB 217, 570-3525, stinsona@mccc.edu.

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

Schedule of Lecture Topics and Laboratory Work

<u>Week</u>	<u>Subject</u>	<u>Text Chapters</u>	<u>Lab</u>
1	Digestive System	22	Muscle Tissue & Muscular System [Unit 7] Dissection of Cat Muscles: [Photographic Atlas p. 170-176]
2	Digestive System	22	Muscle dissection (con't.)
3	Digestive System	22	Digestive System [Unit 14] [Photo. Atlas p. 178-184]
→ Lecture TEST #1 (Digestive System)			
4	Cardiovascular System	17 - 20	Computer Exercise: Muscles, Digestive system Review for L.P. #1
5	Cardiovascular System	17-20	Lab Practical #1
6	Cardiovascular System	17-20	Blood [Unit 12] Computer Exercise: CV system
→ Lecture TEST #2 (CV System)			
7	Urinary System	24, 25	Heart dissection [Unit 11] Cat dissection: Veins [Photo. Atlas p. 177-183]
8	Urinary System	24, 25	Cat dissection: Arteries

[Photo. Atlas, p. 177-183]
Computer Exercise: CV System
Review for L.P. #2

→ **Lecture TEST #3 (Urinary System)**

9	Reproductive System	26, 27	Lab Practical #2
10	Reproductive System	26, 27	Urinalysis <i>[Unit 15, Ex. 15-3]</i> Urinary system <i>[Unit 15]</i> Reproductive system <i>[Unit 16]</i> Cat dissection: Urogenital <i>[Photo. Atlas, p.176-184]</i>
11	Reproductive System	26, 27	Respiratory system <i>[Unit 13]</i> Cat dissection: Respiratory <i>[Photo. Atlas, p.176-181]</i>

→ **Lecture TEST #4 (Reproductive System)**

12	Respiratory System	21	Computer Exercise: Urinary/Reprod./Resp. systems Review for L.P. #3
13	Respiratory System	21	Lab Practical #3
14	Respiratory System / Endocrine System	21, 16	

→ **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 dissection specimens 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. Although dangerous chemicals are used infrequently, always read labels and follow instructions carefully.
9. Before leaving the laboratory, make certain that the gas jets at your station are off and push your chair under the lab table.
10. Make sure the lab bench is cleaned and organized for the next lab group.

Name: _____

Lab Day/Time: _____

Test Scores:

Pre-labs or Lab Quiz Points

Test #1: _____

1: _____

Test #2: _____

2: _____

Test #3: _____

3: _____

Test #4: _____

4: _____

Test #5: _____

5: _____

Extra Credit

Quiz points: _____

6: _____

7: _____

Lab Prac. #1: _____

8: _____

Lab Prac. #2: _____

9: _____

Lab Prac. #3: _____

10: _____

Prelabs / Lab quiz points: _____

Total points = _____

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

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Anatomy & Physiology Websites:

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

<http://www.pearsonmylabandmastering.com> Mastering A & P / website for Amerman textbook.

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

<http://msjensen.cehd.umn.edu/> University of Minnesota
Tutorials using photos and images in a multiple choice format.

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

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