

BIOLOGY 12

Human Anatomy and Physiology

(4 credits and 6 hours)

SYLLABUS AND ONLINE COURSE INFORMATION

COURSE CO-COORDINATORS FOR BIOLOGY 11 & 12

Dr. Sherrye Glaser	S-222	368-5748
Dr. David Zilberman	S-109	368-5095

Required textbook and Laboratory manual:

Textbook for Biology 11 and Biology 12 classes:

There is no separate textbook to be purchased. The ebook is supplied for this course at no cost on Blackboard.

Laboratory Manual for Biology 11 and 12:

Elaine N. Marieb, and Lori A. Smith. Human Anatomy and Physiology Laboratory Manual (Pig version, Thirteenth edition), 2018. Pearson Publishing.

IBSN 10: 0-13-480636-0 IBSN13: 978-0-13-480636-5

Virtual labs may require the purchase of an app.

Biology 12: Human Anatomy and Physiology

Program Goals for Student Outcomes- Allied Health Programs

A.S. Biology Majors Program Learning Outcomes (PLOs):

1. Identify and apply the methods and process of life science.
2. Demonstrate proficiency in quantitative reasoning as it relates to life science data.
3. Demonstrate an understanding of evolution.
4. Demonstrate an understanding of the relationship between structure and function.
5. Demonstrate an understanding of genetics.
6. Demonstrate an understanding of the pathways of energy and matter that maintain a particular environment in living systems.
7. Demonstrate an understanding of the levels of biological organization and the interactions among these levels.
8. Demonstrate an understanding of the mechanisms that maintain homeostasis in human body systems.

Course goals for Biology 12:

- i. Apply scientific thinking in relation to human anatomy and physiology.
- ii. Explain the use of feedback loops in maintaining homeostasis of human body systems.
- iii. Analyze the relationship between structure and function of the different components of the organ systems.
- iv. Explain interrelationships among organ systems that maintain body functions.
- v. Conduct laboratory investigations, collect, interpret, and communicate analyzed data in formats commonly used in science.

Statement to the Students

Course Prerequisites

*Students must meet the following prerequisites: **Successful completion of Biology 11***

Course Description

Biology 12 is the second semester of a one-year course in Human Anatomy and Physiology. Both Biology 11 and Biology 12 are designed to provide students with a thorough understanding of the basic principles inherent in the study of human anatomy and physiology, and is intended for students majoring in the allied-health professions, e.g. nursing, pre-physical therapy, pre-physician, assistant, etc. The emphasis of this course will be concerned with understanding the structural and functional relationships of the major organ systems of the human body. A special effort will be made to understand the concept of homeostasis and how the individual organ systems of the body interact with each other in the maintenance of the normal functioning of the entire organism.

Biology 12 combines both lecture and laboratory experiences over a twelve-week period. Each week, the class will provide online curriculum including a lecture and a virtual laboratory component. Students must log-on to Blackboard several times a week and complete all activities, assignments, discussions, and exams by their posted due dates.

Plagiarism is the intentional use of another's intellectual creations without attribution (giving credit to the author). This is theft of materials from another author, and is prohibited. Determination and penalty- ranging from grade reduction to course failure - is at the discretion of individual faculty members.

Required Materials

Textbook for Biology 11 and Biology 12 classes:

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Lab manual for Biology 11 and Biology 12 classes:

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Learning Objectives

You will note that each of the chapters in your textbook and the laboratory exercises in your laboratory manual begins with a list of clearly defined objectives. These objectives are not questions, rather they identify the goals that should be achieved if you have carefully read and understood the assigned readings. It is strongly suggested that you read the list of objectives prior to each assignment and then again after you have completed your readings. If you have successfully mastered the goals represented by these objectives, you can be assured that you have been successful in your readings.

At the end of this packet you will also find lists of learning objectives that refer to goals that should be mastered for each of the basic units. These objectives should serve as a guide and are not to be considered representative of all of the information that you will be required to master. One way to help ensure success on the unit examinations as well as other tests that you will be taking is to be sure that you have mastered the goals listed in these objectives.

Reading Assignments:

To obtain the maximum advantage from the required readings, you should complete the readings before beginning weekly lecture activities. The lecture syllabus lists the reading assignments that will prepare you for the lectures and laboratory exercises for that particular week and refers to reading assignments in your textbook. The benefits that you will derive by completing the readings for lecture prior to the week for which they are assigned are as follows:

1. You will find that it is easier to understand the lecture and laboratory material because you already have some background regarding the topics that are to be covered.
2. The reading assignments are directly related to the topics that will be covered. If you are already familiar with these topics, you will find that you will be able to take fewer and better notes and pay more attention to what the lecturer is saying.
3. Prior reading of the assignments can help you to pinpoint areas which may be giving you some difficulty. You then can pay very special attention to what the lecturer is saying when discussing these same topics.

Grade Determination:

1. **Laboratory:** The laboratory portion of Biology 12 represents 50% of the course grade. The grade for laboratory will be based on your quiz grades, the writing assignments, and other factors that will be explained to you by your laboratory instructor.
2. **Lecture:** There will be three unit exams that will be administered during the semester (consult the syllabus as to the exact weeks). Each of the unit examinations will represent 10% of your grade. The final examination will account for 20% of your grade.

3. Summary of the grading procedures

Laboratory quizzes, summaries, class participation etc.	= 50%
First unit examination	= 10%
Second unit examination	= 10%
Third unit examination	= 10%
Final examination	= 20%
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Total	= 100%

Biology 12 – Human Anatomy and Physiology

Lecture outline

(Follow modules from the ebook on Blackboard)

Week #	Lecture Topics and Reading Assignments
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1.	Introduction to Course, Course Organization
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	Endocrine system
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| | A. Overview of the endocrine system |
| | B. Hormones |
| | C. Glands |
| | D. Other Endocrine organs and tissues |

	Lecture Reading Assignment: <i>Module 1: Endocrine system</i>
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2.	Digestive system.
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| | A. Overview of the digestive system |
| | B. Functional anatomy of the digestive system |
| | C. Physiology of digestion and absorption |

	Lecture Reading Assignment: <i>Module 2: Digestive system</i>
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3.	Cardiovascular System: Blood
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| | A. Overview: Blood composition and function. |
| | B. Blood plasma |
| | C. Formed elements |
| | D. Hemostasis |
| | E. Transfusion |

	Lecture Reading Assignment: <i>Module 3: The Cardiovascular System: Blood</i>
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4.	Cardiovascular System: Heart
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| | A. The pulmonary and systemic circuits |
| | B. Heart anatomy |
| | C. Cardiac muscle fibers |
| | D. Heart physiology |

	Lecture Reading Assignment: <i>Module 4: The Cardiovascular System: Heart</i>
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5.	Cardiovascular System: Blood vessels
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| | A. Blood Vessel structure and function |
| | B. Physiology of circulation |

	Lecture Reading Assignments: <i>Module 5: The Cardiovascular System: Blood Vessels & Circulation</i>
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6.	Lymphatic System
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| | A. Lymphatic system. |
| | B. Lymphoid cells and tissues |
| | C. Lymph nodes |
| | D. Lymphoid organs. |

	Lecture Reading Assignments: <i>Module 6: The Lymphatic and Immune Systems</i>
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7. Immune System

- A. Innate Defenses
- B. Adaptive Defenses

Lecture Reading Assignments: *Module 6: The Lymphatic and Immune Systems*

8. Respiratory System

- A. Functional anatomy of respiratory system
- B. Mechanics of breathing.
- C. Gas exchange between the blood, lungs and tissues.
- D. Transport of respiratory gases by blood
- E. Control of respiration.

Lecture reading assignment: *Module 7: The Respiratory System*

9. Urinary System

- A. Kidney anatomy
- B. Kidney physiology: mechanisms of urine formation
- C. Urine transport, storage and elimination

Lecture reading assignment: *Module 9: The Urinary System*

10. Fluids and Electrolytes

- A. Body fluids
- B. Water Balance
- C. Electrolyte Balance
- D. The Acid Base Balance

Lecture Reading Assignment: *Module 10: Fluid, Electrolyte, and Acid-Base Balance*

11. Reproductive System

- A. Anatomy of the male reproductive system
- B. Physiology of the male reproductive system
- C. Anatomy of the female reproductive system
- D. Physiology of the female reproductive system

Lecture Reading Assignment: *Module 11: The Reproductive system*

12. Pregnancy and Human Development

- A. From egg to zygote
- B. Events of embryonic development: zygote to blastocyst implantation
- C. Events of embryonic development: gastrula to fetus
- D. Events of fetal development
- E. Adjustment of the infant to extra uterine life
- F. Parturition (birth)
- G. Lactation

Lecture Reading Assignment: *Module 12: Development and Inheritance*

Laboratory Exercises

Week #	Laboratory Topic	Lab Manual Exercise #
1.	Introduction and lab safety	
	Endocrine system	exercise 27
	Gross and microscopic anatomy	
	Digestive system	exercise 38
	1. Organ system overview	
	Using models	
	2. Gross anatomy of digestive system	
	3. Microscopic anatomy	
2.	Digestive system	exercise 38
	Dissection of fetal pig digestive system and endocrine system	page 733
	Chemical digestion	exercise 39
3.	Circulatory System: Properties of blood	exercise 29
	1. Formed elements-Wright's stain	
	2. Hemoglobin-Tallquist method	
	3. Hematocrit	
4.	Circulatory System: Heart and Vessels	exercise 30
	1. Anatomy of the Heart	
	a. organization, gross anatomy	
	b. dissection of sheep heart	page 442
5.	Circulatory System: Cardiovascular Physiology	exercise 31
	Electrocardiography	
	1. Cardiac Cycle and Heart Sounds	
	2. Blood pressure measurements	exercise 33
	3. Effect of exercise and other factors on B.P. and heart rate	
6.	Circulatory System: Circulatory Pathways	exercise 32
	1. Gross Anatomical Organization:	
	Organization of blood vessels-histology	
	Circulatory pathways	
	a. cardiopulmonary	
	b. systemic pathways	
	c. hepatic portal circulation	
	d. fetal circulation	
	2. Fetal pig Dissection	page 719

7. Lymphatics and Immunity	exercise 35
1. Blood typing	
2. Review. Organ identification. Histology	
3. Dissection: Fetal pig lymphatic system	page 719
8. Respiratory System	exercise 36
1. Organization, gross and microscopic anatomy	
2. Fetal pig dissection: respiratory system	page 729
3. Mechanics of breathing, respiratory volumes, respiratory sounds	
4. Spirometer	pages 547
9. Urinary System	exercise 40
1. Organization, gross and microscopic anatomy,	
2. Diffusion and osmosis review	
3. Dissection: Sheep kidney	pages 606
4. Dissection: Fetal pig urinary system	page 739
10. Urinary System	
1. Composition of urine/Urinalysis	exercise 41
2. Analysis of components of normal and abnormal urine	
3. Acids, Bases and Buffers	
11. Reproduction	
1. Organization, gross and microscopic anatomy of male and female reproductive systems	exercise 42
2. Fetal pig dissection	page 743
3. Mitosis	page 43
4. Meiosis, gametogenesis	exercise 43
5. Ovarian cycle	
6. Principles of heredity	exercise 45
12. Embryonic Development	exercise 44
1. Stages of human development	
2. Fetal structures	
3. Placental structures	