

# BIOLOGY 11

## Human Anatomy and Physiology (4 credits and 6 hours)

### SYLLABUS AND COURSE INFORMATION

#### COURSE CO-COORDINATORS FOR BIOLOGY 11 & 12

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#### Required textbook:

#### Textbook for Biology 11 and Biology 12.

For the Lecture Students will be using openstax ebook. For assigned readings please access Openstax @ <https://openstax.org/details/books/anatomy-and-physiology>

**Lab manual:** Laboratory Manual for Human Anatomy and Physiology a hands-on approach-pig version. Melissa L. Greene, Robin H. Robinson, Lisa C. Strong (2021) Pearson

ISBN13: 978-0-13-66-58-91

A link to the online ordering: <https://www.pearson.com/en-us/subject-catalog/p/laboratory-manual-for-human-anatomy--physiology-a-hands-on-approach-pig-version/P200000006959/9780136658931>

## **BIOLOGY 11: HUMAN ANATOMY AND PHYSIOLOGY**

### **PROGRAM GOALS FOR STUDENT OUTCOMES**

#### **Allied Health Programs**

1. Apply the methods and process of life science including common laboratory techniques
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
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**

##### **Course goals for Bio 11**

##### **Bio 11 Course Learning Outcomes**

1. Apply scientific thinking in relation to human anatomy and physiology.
2. Describe the use of feedback loops in maintaining homeostasis of human body systems.
3. Appropriately use the vocabulary of anatomy and physiology.
4. Describe the levels of organization in the human body.
5. Explain the relationship between structure and function of the different components of the organ systems.
6. Describe interactions among different organ systems.
7. Perform laboratory investigations, interpret, and communicate analyzed data in formats commonly used in science.

## Statement to the Students

### Course Prerequisites:

*Placement at the English 12 and Math 09 levels on the CUNY assessment tests.*

### Course Description:

Biology 11 is the first 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-physicians 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 11 combines both lecture and laboratory experiences over a twelve-week period.

There will be a writing assignment(s) during the semester relating to an aspect of human anatomy and physiology. Details will be provided by your instructor.

*Plagiarism **as a violation of academic integrity** is the intentional use of another's intellectual creation(s) without attribution. Determination and penalty—ranging from grade reduction to course failure—is at the sole discretion of the faculty member. If a faculty member suspects that a student has committed a violation of CUNY or KCC's Academic Integrity Policy, he/she shall notify the student of the facts and circumstances of the suspected violation whenever possible. It is then at his/her discretion to seek an academic or disciplinary sanction.*

# Required Materials

## Textbook for Biology 11

Students will be using openstax ebook and a lab manual needed for this course.

## Reading Assignments

To obtain the maximum advantage from the required readings, you should complete the readings **before** beginning weekly 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 for lecture 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 in 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 11 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 several unit exams that will be administered during the semester **determined by the individual instructor**. The final examination will account for 20% of your grade.

### 3. **Summary of the grading procedures:**

Laboratory activities	=	50%
Lecture activities	=	30%
Final examination	=	<u>20%</u>
<b>Total</b>	=	<b>100%</b>

## Lecture Syllabus (*openstax ebook*)

### Week #

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- 1. An Introduction to Human body:** Overview of Anatomy and Physiology. Structural levels of organization. Homeostasis. Anatomical terminology. Medical imaging **Chapter 1.**
- 2. The Chemical level of organization:** Chemistry: Elements and atoms. Chemical bonds. Chemical reactions. **Chapter 2.**
- 3. The Chemical level of organization:** Inorganic and organic compounds. **Chapter 2.**
- 4. The Cellular level of organization:** Cell membrane. Cytoplasm and cellular organelles. The nucleus and DNA replication. Protein synthesis. Cell growth and Division. Cellular differentiation **Chapters 3.**
- 5. The Tissue level of organization:** Types of tissues. Epithelial, connective, nervous & muscle and tissues. Tissue injury and aging. **Chapter 4.**
- 6. The Integumentary System:** Layers of skin. Accessory structures of skin. Functions of the integumentary system. Diseases, Disorders and Injuries of Integumentary system **Chapter 5.**
- 7. Bones Tissue and Skeletal system:** Functions of skeletal system. Bone Classification. Bone structure. Bone formation and development. Fracture. Exercise, nutrition, hormones and bone tissue. Calcium homeostasis. **Chapter 6.**
- 8. Joints:** Classification. Fibrous, cartilaginous and synovial joints. Types of body movements. Anatomy of selected joints. **Chapter 9.**  
**Muscle tissue:** Overview of muscle tissue. **Chapter 10.**
- 9. Muscle tissue:** Skeletal muscle. Muscle fiber and contraction and relaxation. Nervous system control of muscle tension. Types of muscle fibers. Exercise and muscle performance. Cardiac muscle. Smooth muscle. Development and regeneration of muscle tissue. **Chapter 10.**
- 10. The Nervous system and Nervous tissue:** Basic structure and function of nervous system. Nervous tissue. The Action potential. Communication between neurons. **Chapter 12.**
- 11. Anatomy of Nervous System.** The Embryological perspective. The Central Nervous system. Circulation and the Central nervous system. The peripheral nervous system. **Chapters 13.**
- 12. The Autonomic Nervous System.** Divisions of Autonomic Nervous system. Autonomic reflexes and homeostasis. Central control. Drugs that affect autonomic system. **Chapter 15.**

# Laboratory Syllabus

## Week #

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1. **Scientific method and metric system.** See handouts and Exercise 1

**The language of anatomy:** Anatomical position, surface anatomy, body planes and sections, body cavities. Exercise 1

2. **Organ system overview:** Rat dissection. Identification of the major organ using the dissected rat and the torso models. Exercise 1

**Matter and Energy.** Elements, atomic structure, chemical bonds, pH. (Acid/Base experiment)

**Chemistry:** chemical reactions See handouts and Exercise 2

3. **Introduction to macromolecules:** structures and synthesis. **Macromolecules:** study and chemical detection. See handouts and Exercise 2 Water lab activities, see handout.

Lactase experiment: See handouts

4. **The microscope. Demo by the instructor.** Exercise 3

**The Cell.** Transport mechanisms and cell permeability: **Passive processes** (diffusion-osmosis and filtration), **Active processes.** Exercise 3

5. **The cell:** Anatomy of the composite cell. Differences and similarities in cell structure. Cell division. Exercise 3

**Epithelial tissue.** Classification of covering and lining membranes. Scientific drawings of epithelial tissue Exercise 4

6. **Connective Tissue.** Scientific drawings of connective tissue. Exercise 4

**Introduction to the integumentary system and the skin.** Basic structure of the skin and accessory organs of the skin. Exercise 5

7. **Introduction to the study of the skeletal system.** Study of the appendicular and axial skeleton. The fetal skeleton. Exercise 6 and 7

8. **Articulations and body movements.** Study of the three major types of articulations, joint disorders and types of body movement. Exercise 8

9. **Gross and microscopic study of the three muscle types.** Scientific drawings of muscle tissue; **Muscle Physiology** Exercise 10 Identification of selected muscle groups using the human torso model. Exercise 9

- 10 **Histology/scientific drawings of nervous tissue.** Exercise 11

**Gross neuroanatomy: Sheep brain dissection.** Study of the preserved human brain and models of the human brain. Exercise 12

- 11 **Gross anatomy, histology and physiology of the spinal cord.** Study of the anatomical aspects of the Autonomic Nervous System. **Reflex physiology Reflex Simulations.** Exercise 12 and 13 and 14

- 12 **Senses: Vision:** Gross anatomy of the eye Dissection of the cow eye. Visual acuity and color blindness tests.

**Audition:** Hearing and equilibrium. Gross anatomy of the human ear (using models of the human ear). Microscopic anatomy of the Organ of Corti. Exercise 15