

STUDY OF HUMAN ANATOMY

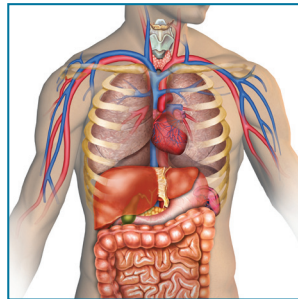


2013–2014 COURSE OVERVIEW
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BIOLOGY BUILDING, ROOM 201



High school students, college students and those entering various healthcare fields will find this self-paced Anatomy and Physiology course to be extremely beneficial. Course goals include the following: 1) Be able to identify the major body systems and understand what each body system does, 2) Be able to relate how each body system works, 3) Be able to identify and explain major cells, tissues, and organs, and 4) Be able to identify and explain functions of central muscles and bones. Class lessons will cover the following topics: Introduction to Anatomy and Physiology, Chemistry, Cells, Tissues, The Integumentary System, The Skeletal System, The Muscular System, The Nervous System, The Sensory System, The Endocrine System, The Cardiovascular System, The Lymphatic System, The Respiratory System, The Digestive System, The Urinary System, and The Reproductive System.

COURSE DESCRIPTION:



This self-paced anatomy and physiology course will cover all the bodily systems playing a major role in human anatomy. The material is presented in a practical and comprehensive manner. The focus of the course is on the need-to-know facts that must be understood in order to pursue any healthcare career or related education in the field of science. These easy to follow lessons are ideal for anyone requiring a solid understanding of how the human body works.

LESSONS INCLUDE THE FOLLOWING TOPICS:

- The Skeletal System
- The Integumentary System
- The Muscular System
- The Nervous System
- The Sensory System
- The Endocrine System
- The Cardiovascular System
- The Lymphatic System
- The Respiratory System
- The Digestive System
- The Urinary System
- The Reproductive System

Anatomy and physiology are the opposite sides of the same biological coin. Anatomy is the study of the body's internal and external structures while physiology studies the function of those structures, both singularly and in conjunction with one another.

Anatomy, which is sometimes called morphology, provides a map of how a body is put together, human or otherwise.

Physiology is akin to an instruction manual. Form and function must both be considered to fully understand the human body.

The Major Characteristics of Life

Physiology is the study of living things, but what exactly does it mean to be alive? It is difficult to isolate a single characteristic that separates all living entities from non-living ones. For example, some might say the ability to reproduce is a necessary trait to indicate life. But mules—which are definitely living offspring of a horse and donkey—cannot reproduce. So physiologists consider a number of traits that all

living things have in common and thus identify life based on the following characteristics:

- **Absorption:** the passage of nutrients from digested food through membranes and into body fluids
- **Assimilation:** the ability to change nutrients of absorbed substances into chemically different forms
- **Circulation:** movement of substances throughout the body via body fluids such as blood
- **Digestion:** chemically breaking down food into its molecular components and getting rid of wastes
- **Growth:** in general, defined as increasing in size without changing basic shape
- **Movement:** the ability to change position or internal structures
- **Reproduction:** creating offspring
- **Respiration:** can mean the act of breathing but on a cellular level; it's a metabolic process that uses oxygen to release energy from glucose
- **Responsiveness:** reacting to one's environment, such as pupils contracting in light, the rush of adrenalin when confronted with danger or fear, or a plant bending toward sunlight
- **Excretion:** the removal of wastes created by metabolic activity

Everything that is alive—from cells to elephants—relies on homeostasis, which is the way the physiological systems work together in living organisms to maintain a stable internal environment, despite changing external or environmental conditions. In humans, that means regulating things like temperature, pH, hydration, and blood oxygen levels.

All living things also require some sort of metabolism, which is commonly understood to mean breaking food down and turning it into energy. But in physiological terms, it refers to the entire range of an organism's biochemical processes. These metabolic pathways involve enzymes that transform one substance into another substance, by either breaking one down (**catabolism**) or creating a new one (**anabolism**).

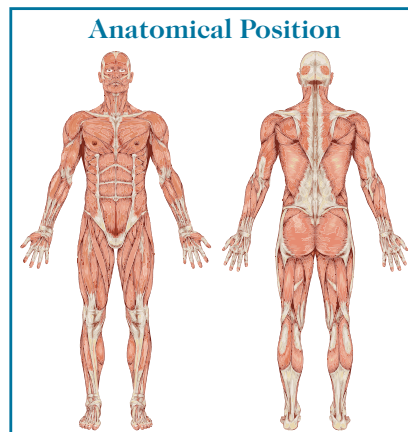
Levels of Anatomical Organization

Anatomists organize the human body into different levels, each level increasing in complexity.

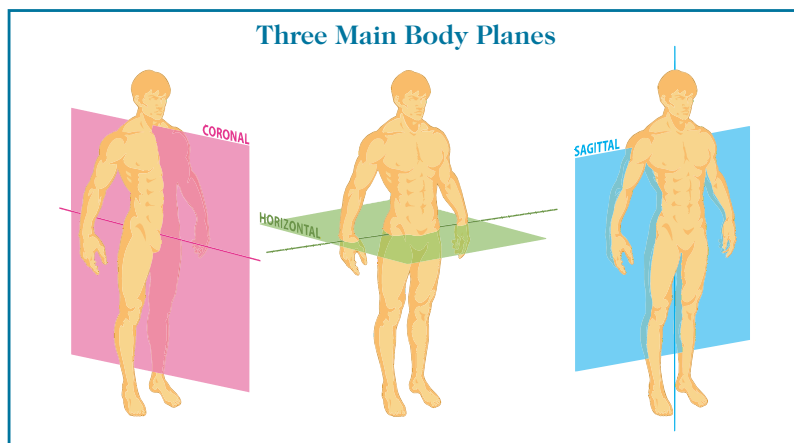
- **Atoms** join together to form molecules, such as H₂O.
- **Molecules** combine to form macromolecules such as polysaccharides (complex carbohydrates), monosaccharides (simple sugars), and fats (lipids).
- **Macromolecules** combine to create organelles like mitochondrion and ribosomes.
- **Organelles** are part of a cell, the basic unit of a body.
- **Cells** are organized into tissues such as muscle, neural, and cardiac.
- **Tissues** are organized into organs, from the brain to the large intestine and everything in between.
- **Organs** working together are organ systems, which include the digestive system, the endocrine system, and the nervous system.
- **Organ systems** make up an organism, such as humans, dogs, or plants.

Spatial Organization of the Human Body

To accurately reference the structures they study, anatomists use positional and directional terms. In order to have a common standard for describing those positions of body parts, it is assumed the person is in what is called **anatomical position**: the body standing upright, feet together, palms facing forward. From this starting point, **all the directional terms are relative to the anatomical position**.



There are three main body planes: the **sagittal**, which divides the body into left and right halves; the **frontal** which divides the body into front and back halves (ventral and dorsal, or anterior and posterior); and the **transverse** which divides the body into upper (toward the head) and lower (toward the feet) halves (superior and inferior).



Additionally, the outer body is divided into two regions: the **axial**, which includes the head, neck and trunk, and the **appendicular** which consists of the limbs.

The same terms are used when describing the skeleton. The skull, ribs, and spinal vertebrae belong to the axial skeleton. These bones protect the major organs such as the brain, heart, and lungs. Also included in the axial skeleton are the three inner ear bones—malleus, incus, and stapes—known collectively as the ossicles, and the hyoid in the throat. There are 80 bones in the axial skeleton.

The appendicular skeleton consists of the 126 bones of our extremities—legs, arms, hands, and feet—which facilitate movement.

Conclusion

The body is a complex organism of cells, tissues, organs, and organ systems. While anatomy describes the structure of how it is physically put together, physiology explains how all the components of the human organism work, individually and together, to maintain life.

LEARNING OUTCOMES

By successfully completing this course, students will be able to:

- Describe the chemistry basics involved in Anatomy and Physiology.
- Describe the function of cells.
- Identify different types of tissues and their functions.
- Describe and identify specific parts and key terms of the Integumentary System.
- Describe and identify specific parts and key terms of the Skeletal System.
- Describe and identify specific parts and key terms of the Muscular System.
- Describe and identify specific parts and key terms of the Nervous System and the Sensory System.
- Describe and identify specific parts and key terms of the Endocrine System and Lymphatic System.
- Describe and identify specific parts and key terms of the Cardiovascular System and Respiratory System.
- Describe and identify specific parts and key terms of the Digestive System, Urinary System, Reproductive System, and
- Demonstrate mastery of lesson content at levels of 70% or higher.

ANATOMY AND PHYSIOLOGY COURSE LESSONS

Lesson 1. Introduction to Anatomy and Physiology

Lesson 2. Chemistry Basics

Lesson 3. Cells - The Foundation of Life

Lesson 4. Tissues (Different Types and Functions)

Lesson 5. The Integumentary System

Lesson 6. The Skeletal System

Lesson 7. The Muscular System

Lesson 8. The Nervous System

Lesson 9. The Sensory System

Lesson 10. The Endocrine System

Lesson 11. The Cardiovascular System

Lesson 12. The Lymphatic System

Lesson 13. The Respiratory System

Lesson 14. The Digestive System

Lesson 15. The Urinary System

Lesson 16. The Reproductive System

The Final Exam

