**1. COURSE TITLE:** Anatomy and Physiology I

**2.** **CATALOG PREFIX:** BIOL **COURSE NUMBER:** 2205

**SECTION:** ***(Course Syllabus-Individual Instructor Specific)***

**3. PREREQUISITE:** High School Biology within the last three years,

BIOL 1104 within the last three years or BIOL 1101.

4. **COURSE TIME/LOCATION: *(Course Syllabus-Individual Instructor Specific)***

**5. CREDIT HOURS:** 4 **LECTURE HOURS:** 3

**LABORATORY HOURS:** 1 (3 contact) **OBSERVATION HOURS:** 0

**6. FACULTY CONTACT INFORMATION: *(Course Syllabus-Individual Instructor Specific)***

**7. COURSE DESCRIPTION:**

This course begins with an introduction to the basics of human anatomy and physiology, evolution, human related anatomical terms and reference points. The course is also an examination of simple chemistry, cell and tissue structure and function, and basic metabolic processes including mitosis. The class will begin study of human systems, including the integumentary system, skeletal system, articulations associated with the skeletal system, muscular system, and the nervous system including somatic and special senses. Laboratory exercises are designed to complement topics covered in lecture.

**8. LEARNING OBJECTIVES:**

At the completion of this course the student will be able to:

1. Introduction to Human Anatomy and Physiology

1. Define anatomy and physiology and explain how they are related.

2. List and describe the major characteristics of life.

3. Define homeostasis and explain its importance to survival.

4. Describe a homeostatic mechanism.

5. Explain the levels of organization of the human body.

6. Describe the locations of the major body cavities.

7. List the organs located in each major body cavity.

8. Name the membranes associated with the thoracic and abdominopelvic   
 cavities.

9. Properly use the terms that describe relative positions, body sections, and   
 body regions.

2. Chemical Basis of Life

1. Describe the relationships among matter, atoms, and molecules.

2. Describe how atomic structure determines how atoms interact.

3. Explain how molecular and structural formulas symbolize the composition of compounds.

4. Describe different types of chemical reactions.

5. Define pH.

6. List the major groups of inorganic substances that are common in cells.

7. Describe the general functions of the main classes of organic molecules   
 in cells.

3. Cells

1. Describe the general characteristics of a composite cell.

2. Explain how the components of a cell's membrane provide its function.

3. Describe each kind of cytoplasmic organelle and explain its function.

4. Describe the cell nucleus and its parts.

5. Explain how substances move into and out of cells.

6. Describe the cell cycle.

7. Explain how a cell divides.

8. Describe several controls of cell division.

9 Cancer: define, describe, and know the processes leading to the

development of cancerous cells.

4. Cellular metabolism

1. Distinguish between anabolism and catabolism.

2. Explain how enzymes control metabolic processes.

3. Explain how the reactions of cellular respiration release chemical energy.

4. Describe the general metabolic pathways of carbohydrate metabolism.

5. Explain how metabolic pathways are regulated.

6. Describe how DNA molecules store genetic information.

7. Explain how protein synthesis relies on genetic information.

8. Describe how DNA molecules are replicated.

9. Explain how genetic information can be altered and how such a change   
 may affect an organism.

5. Tissues

1. Describe the general characteristics and functions of epithelial tissue.

2. Name the types of epithelium and identify an organ in which each type is   
 found.

3. Explain how glands are classified.

4. Describe the general characteristics of connective tissue.

5. Describe the major cell types and fibers of connective tissue.

6. List the types of connective tissue within the body.

7. Describe the major functions of each type of connective tissue.

8. Distinguish between the three types of muscle tissue.

9. Describe the general characteristics and functions of nervous tissue.

10. Describe the four major types of membranes.

6. Skin and the Integumentary System

1. Describe the structure of the layers of the skin.

2. List the general functions of each layer of the skin.

3. Describe the accessory organs associated with the skin.

4. Explain the function of each accessory organ.

5. Explain how the skin helps regulate body temperature.

6. Summarize the factors that determine skin color.

7. Describe the events that are part of wound healing.

7. Skeletal System

1. Classify bones according to their shapes and name an example from each   
 group.

2. Describe the general structure of a bone and list the functions of its parts.

3. Distinguish between intramembranous and endochondral bone formation.

4. Discuss the major functions of bones and the skeletal system.

5. Distinguish between the axial and appendicular skeletons and name major  
 parts of each.

6. Locate and identify the bones and the major features of the bones that   
 comprise the skull, vertebral column, thoracic cage, pectoral girdle,

upper limb, pelvic girdle and lower limb.

8. Joints of the Skeletal System

1. Explain how joints can be classified according to the type of tissue that   
 binds the bone together.

2. Describe the general structure of a synovial joint.

3. Identify several types of joint movements.

9. Muscular System

1. Describe how connective tissue is part of the structure of a skeletal   
 muscle.

2. Name the major parts of a skeletal muscle fiber and describe the function   
 of each part.

3. Explain the major events that occur during muscle fiber contraction.

4. Explain how energy is supplied to the muscle fiber contraction   
 mechanism, how oxygen debt develops, and how a muscle may become   
 fatigued.

5. Distinguish between fast and slow twitch muscle fibers.

F. Distinguish between a twitch and a sustained contraction.

7. Describe how exercise affects skeletal posture.

8. Explain how various types of muscular contractions produce body   
 movements and help maintain posture.

9. Distinguish between the structures and functions of a multiple unit smooth muscle and a visceral smooth muscle.

10. Compare the contraction mechanisms of skeletal, smooth, and cardiac   
 muscle fibers.

11. Identify and locate the major skeletal muscles of each body region.

10. Nervous System I

1. Explain the general functions of the nervous system.

2. Describe the general structure of a neuron.

3. Explain how neurons are classified.

4. Name the different types of neuroglial cells and describe the functions of   
 each.

5. Explain how an injured nerve fiber may regenerate.

6. Explain how a membrane becomes polarized.

7. Describe the events that lead to the conduction of a nerve impulse.

8. Explain how a nerve impulse is transmitted from one neuron to another.

9. Distinguish between excitatory and inhibitory postsynaptic potentials.

10. Explain two ways impulses are processed in neuronal pools.

11. Nervous System II

1. Describe the coverings of the brain and spinal cord.

2. Describe the formation and function of cerebrospinal fluid.

3. Describe the structure of the spinal cord and its major function.

4. Describe a reflex arc.

5. Name the major parts of the brain and describe the functions of each.

6. List the major parts of the peripheral nervous system.

7. Describe the structure of a peripheral nerve and how its fibers are   
 classified.

8. Name the cranial nerves and list their major functions.

9. Describe the general characteristics of the autonomic nervous system.

10. Distinguish between the sympathetic and the parasympathetic divisions of the autonomic nervous system.

11. Describe a sympathetic and a parasympathetic nerve pathway.

effectors.

12. Somatic and Special Senses (time permitting)

1. Name the different kinds of sensory receptors and explain the functions of

each.

2. Explain how receptors stimulate sensory impulses.

3. Explain how a sensation is produced.

4. Distinguish between somatic and special senses.

5. Describe the receptors associated with the senses of touch and pressure, temperature, and pain.

6. Describe how the sense of pain is produced.

7. Explain the importance of stretch receptors in muscles and tendons.

8. Explain the relationship between the senses of smell and taste.

9. Name the parts of the ear and explain the function of each part.

10. Distinguish between static and dynamic equilibrium.

11. Name the parts of the eye and explain the function of each part.

**9. ADOPTED TEXTBOOK(S):**

*Human Anatomy and Physiology with Mastering Bundle*

10th edition

Marieb and Hoehn

Pearson/Benjamin Cummings, 2015

ISBN: 978-0-13-416877-7 (Bundle)

Bundle Contents include Interactive Physiology 10 System Suite CD, Laboratory Simulations in Physiology, Practice Anatomy Lab and Brief Atlas of the Human Body

**10. OTHER REQUIRED MATERIALS:**

The materials that accompany the text. Individual instructors may have specific requirements including accessing online materials or materials on other media including other CDs.

**11. GRADING SCALE:**

Grading will follow policy in college catalog. The scale is as follows:

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| --- | --- | --- | --- |
| **A** | **90** | **–** | **100** |
| **B** | **80** | **–** | **89** |
| **C** | **70** | **–** | **79** |
| **D** | **60** | **–** | **69** |
| **F** | **0** | **–** | **59** |

**12. GRADING PROCEDURES OR ASSESSMENTS: *(Course Syllabus-Individual Instructor Specific)***

**Sample procedure:** The lecture exams will be worth 100 points each. The low

grade of the lecture exams during the semester will be dropped. A comprehensive

200 point final may be given. The lecture exam average will account for 75% of the final course grade. A laboratory grade will be determined by performance on lab tests and laboratory reports and will account for 25% of the final grade.

**13. COURSE METHODOLOGY OR COURSE FORMAT: *(Course Syllabus-Individual Instructor Specific)***

**Sample**: This course will use lecture, discussion, power point and video presentations. Web based tutorials and learning exercises will be referenced and can be used at the discretion of the student. The course will include chapter assignments and laboratory activities. Lecture and laboratory-based exams will be used as appropriate to verify achievement of the course objectives and do determine grades.

**14. COURSE OUTLINE: *(Course Syllabus-Individual Instructor Specific)***

**Sample lecture outline:**

An Introduction to the Human Body

Anatomy and Physiology Defined

Anatomical Terms, Reference Points, Body Cavities and Regions

Chemical Basis of Life

Atoms

Bonds

Molecules

Organic Molecules

Cell Biology

Organelles

Osmosis/Diffusion

Mitosis

Cellular Metabolism

Protein Synthesis

Human Tissues including Epithelial, Connective, Muscle, and Nervous Tissue

Membranes including the different types of membrane Types

Integumentary System

Bone Tissue, Bone Growth and Development

Bones of the Axial and Appendicular Systems

Articulations: Types of

Specifics of the Synovial Joint

Muscular System

Nervous System I

Nervous System II

Somatic and Special Senses

**Sample Laboratory Outline:**

**Handouts will be provided detailing laboratory procedures**

Safety

Metric system and measurements

pH

Urease lab\*, catalase demonstration

**Lab test**

Microscopy

Cell Biology, osmosis/diffusion\*

**Lab test**

Mitosis

Biotechnology lab\* (PCR and electrophoresis)

Tissues

**Lab test**

Gross morphology of the human

**Lab test**

Skeleton, skull and knee anatomy

**Lab tests – anatomical models**

Muscle anatomy

**Lab test – anatomical models**

Sheep brain dissection, brain anatomy

**Lab test – anatomical models**

\* Lab report required

**Evaluation:**

**Performance on lab tests and lab reports**

**The lab grade accounts for 25% of your class grade**

**Sample Course Outline with Exams: LOs**

An Introduction to the Human Body 1.1-1.9

Anatomy and Physiology Defined 2.1, 2.2

Anatomical Terms, Reference Points, Body Cavities and Regions 2.5, 2.6

Chemical Basis of Life, Atoms, Bonds, pH

**Exam I** - Through water and pH Chaps. 1 and part of 2

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Molecules 2.3, 2.4

Organic Molecules 2.7

Introductory Biochemistry

**Exam II** Remainder of Chap. 2

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Cell Biology 3.1-3.5

Membranes Organelles

Osmosis/Diffusion

Extracellular matrix

**Exam III**  Chap. 3 (partial)

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Mitosis/Cell Division 3.6-3.9

Cancer/Skin cancer 4.1-4.9

Cellular Metabolism (lite)

DNA-RNA-Protein Synthesis

**Exam IV** Chap.3

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Human Tissues including Epithelial, Connective, Muscle, and Nervous Tissue

Membranes including the different types of membrane Types 5.1-5.10

Integumentary System Cutaneous membrane 6.1-6.7

**Exam V** Chaps. 4 and 5

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Bone Tissue, Bone Growth and Development 7.1-7.6

Bones of the Axial and Appendicular Systems 8.1-8.3

Articulations: Types of Specifics of the Synovial Joint

**Exam VI** Chaps. 6 and 8

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Muscular System 9.1-9.11

Nervous System I 10.1-10.10

Nervous System II 11.1-11.11

**Exam VII** Chaps. 9 through 14\*

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Somatic and Special Senses 12.1-12.11

Comprehensive Final -Senses (Chap. 15) included, time permitting

**\*Muscle/ Nervous/ Senses may be separated differently than listed, depending on the progression of the course.**

**15. SPECIFIC MANAGEMENT REQUIREMENTS:**

At the discretion of the instructor. For example, not all instructors will use the PhysioEx Labs.

**16.** **OTHER INFORMATION:**

**FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**DISABILITIES:** Students with disabilities may contact the Disabilities Service Office, Central Campus, at 800-628-7722 or 937-393-3431.