

# Lassen Community College Course Outline

## BIOL-25 Human Anatomy and Physiology I

4.0 Units

### I. Catalog Description

First semester of a two semester sequence covering structure and function, integration and homeostasis of the human body at the cellular, tissue organ, organ system and organism level. This semester includes the integumentary, skeletal, muscular, nervous and sensory systems. This course has been approved for hybrid (online/traditional) delivery. This course has been approved for online delivery for emergency use only.

**Recommended Preparation:** English 105 or equivalent multiple measures placement  
Math 60 - Intermediate Algebra or the equivalent multiple measures placement  
Biology 1 and Chemistry 1A

Transfers to both UC/CSU

CSU GE Area: B2 & B3

IGETC GE Area: 5B & 5C

General Education Area: A & E1

*C-ID BIOL 115S*

51 Hours Lecture, 102 Expected Outside Class Hours, 51 Hours Lab, 204 Total Student Learning Hours

Scheduled: Fall

### II. Coding Information

Repeatability: Not Repeatable, Take 1 Time

Grading Option: Graded or Pass/No Pass

Credit Type: Credit - Degree Applicable

TOP Code: 041000

### III. Course Objectives

#### A. Course Student Learning Outcomes

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

1. Relate the structures and functions of the various body systems studied to the metabolic activities of a single selected body cell.
2. Correctly perform biological laboratory skills and display a habit of good laboratory practices.
3. Exhibit oral and written communication competency through mixed format exams, research paper, histology notebook, and laboratory presentations.

#### B. Course Objectives

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

1. Define human anatomy, physiology, cytology and histology.
2. List and describe the levels of organization.
3. List and discuss characteristics of living organisms shared by humans.
4. Place the human organism into its proper place in scientific classification.
5. List the characteristics of various taxa (Chordata, Mammalia, Primates).
6. List and demonstrate anatomical position and the meaning of various terms of direction.

7. Describe the basic structure and function of carbohydrates, lipids, proteins, and nucleic acids.
8. Identify the three primary germ layers and various tissues derived from each.
9. Describe the structure and function of primary organelles found in eukaryotic cells.
10. Discuss various methods of transporting substances across cell membranes.
11. Discuss the significance of the structure to the function of enzymes.
12. Identify and discuss the stages of the cell cycle.
13. Discuss the basic characteristics of each of the four basic tissue types.
14. Identify the location, structure and function of each of the specific tissue types discussed.
15. Differentiate between exocrine and endocrine glands.
16. Explain homeostasis and how it relates to the survival of the human organism.
17. Compare and contrast various types of membranes.
18. Discuss functions of the following systems:
  - a. Integumentary system
  - b. Skeletal system
  - c. Muscular system
  - d. Nervous system
19. Identify the major bones, sutures, foramen, and processes of the human skeleton.
20. Identify, describe and give locations for the various types of articulations.
21. Describe intramembranous and intracartilaginous osteogenesis.
22. Describe the regulation of calcium ion levels in the human body.
23. Describe the establishment of a membrane potential.
24. Describe the function and structural interpretation of muscle contraction.
25. Describe the structure and function of a myoneural junction.
26. Give origin, insertion, and action of representative muscles as indicated by the instructor.
27. Describe the establishment of a resting potential and the generation of an action potential.
28. Describe impulse conduction across a synapse.
29. Differentiate between the roles of monosynaptic and polysynaptic reflexes.
30. Trace the flow of cerebrospinal fluid.
31. Name and describe representative ascending and descending tracts.
32. Name the embryological regions of the neural tube and the adult brain divisions that develop from these embryological parts.
33. Identify structures on a sagittal, coronal, and transverse section of a sheep and a human brain.
34. Classify receptors and describe the sensations that each mediate.
35. Trace an impulse from a designated receptor as it proceeds to the central nervous system.

#### **IV. Course Content**

The following topics may be included; however, the order of presentation, relative emphasis and the depth of treatment will depend on the preferences of the instructor.

- A. Human Organism 's Place in Scientific Classification
- B. Molecular and Cellular Biology
  - a. Membrane Structure and Function
  - b. Cellular Organelle Structure and Function

- C. Homeostasis and feedback systems
- D. Histology (Structure, Function, Location)
  - 1. Epithelium
  - 2. Connective
  - 3. Muscle
  - 4. Nerve
- E. Integumentary System
  - 1. Structure
  - 2. Functions
  - 3. Normal versus diseased, injured or age-related structural changes
- F. Skeletal System
  - 1. Structure of Bones
  - 2. Functions
  - 3. Osteogenesis
  - 4. Articulations
  - 5. Calcium Metabolism
  - 6. Identify of Bones and features (processes, sutures, foramen, etc.)
  - 7. Normal versus diseased, injured or age-related structural changes
- G. Muscular System
  - 1. Types of Muscles
  - 2. Structure of Muscles
  - 3. Membrane Potentials
  - 4. Muscle Physiology
  - 5. Myoneural Junctions
  - 6. Characteristics of Whole Muscle Contraction
  - 7. Identity of major muscles and selected origins, insertions and actions
  - 8. Normal versus diseased, injured or age-related structural changes
- H. Nervous System
  - 1. Organization, Development, and Functions of the Nervous System
  - 2. Central Nervous System
  - 3. Peripheral Nervous System
    - a. Somatic Division
    - b. Autonomic Division (Sympathetic and Parasympathetic)
  - 4. Higher Order Functions
  - 5. Senses
    - a. Receptors
    - b. Tactile Senses
    - c. Chemical Senses
    - d. Vision
    - e. Senses of the Ear
  - 6. Identity of various locations in the nervous system (regions, nerves, tract, nuclei, etc.)
  - 7. Normal versus diseased, injured or age-related structural changes

#### Laboratory Content

- A. Introduction to the Microscope - Eukaryotic Cell Structure
- B. Scientific Inquiry and Experimental Design
- C. Terms of Direction and Cavities
- D. Histology (identification, diagram and label)
  - 1. Epithelial Tissues

2. Connective Tissues
  3. Muscle Tissues
  4. Nerve Tissue
  5. Types of Membranes
  6. Types of Exocrine Glands
- E. Integumentary System
1. Observation of Models and Charts
  2. Histology (identification, diagram and label)
- F. Skeletal System
1. Identification of Bones (processes, foramen, and other structures)
  2. Bone Development
  3. Histology (identification, diagram and label)
  4. Identification of Articulations
- G. Skeletal Muscular System
1. Cat Dissection and Identification
  2. Histology (identification, diagram and label)
  3. Muscle Physiology
- H. Nervous System
1. Sheep Brain Dissection and Identification
  2. Identification of Structures on Human Brain Slices & 3-D slides
  3. Histology (identification, diagram and label)
  4. Nerve Physiology
- I. Sensory Structures
1. Cow Eye Dissection and Identification
  2. Histology (identification, diagram and label)
  3. Sensory Perception Laboratory

## V. Assignments

### A. Appropriate Readings

Reading assignments which will be used to enhance the learning process may include, but are not limited to:

1. Standard college level lecture and laboratory texts
2. Monthly scientific journals such as Scientific American and Science
3. Electronic and other archival research on a variety of topics in human anatomy and physiology
4. Newspaper articles relevant to current topics in human anatomy and physiology

### B. Writing Assignments

In order to successfully complete this course, students must demonstrate understanding of course content through writing assignments which may include, but are not limited to:

1. Essay answers to questions on mixed format examinations
2. Research paper on a topic of interest pertinent to human anatomy and physiology

### C. Expected Outside Assignments

Examples of outside assignments may include, but are not limited to:

1. Reading assignments as specified in the course syllabus
2. Library and Learning Center: electronic and other archival research on a variety of topics in the field of human anatomy and physiology
3. Research paper on a topic of interest pertinent to the human body

4. Read and summarize newspaper articles relevant to current topics in human anatomy and physiology
5. Drawings of histology slides in preparation of a histology notebook

**D. Specific Assignments that Demonstrate Critical Thinking**

Examples of assignments that demonstrate critical thinking may include, but are not limited to:

1. Review of periodicals and newspapers
2. Analysis and synthesis of information presented in the text and during lecture to formulate answers to essay questions on mixed format exams

**VI. Methods of Evaluation**

The formulation of a student grade will be based upon:

**Traditional Classroom Instruction**

- A. Performance on mixed-format exams including essay questions asking students to critically analyze topics discussed in class. Sample essay questions:
  1. Describe the merocrine production of a secretory product.
  2. Discuss the mechanisms that the body would use to return a decreased calcium ion concentration of its fluids to its normal range.
  3. Discuss the establishment of a resting potential.
  4. Describe physiological responses that the body would make to painful stimulation of the hand.
- B. Performance on unit laboratory practical exams
- C. Performance on a term paper based on research
- D. Performance of a histology notebook

**Hybrid Delivery**

A combination of traditional classroom and online evaluations will be used, such as (1) Traditional Classroom: objective examinations and essay examinations, laboratory practical examinations and (2) Online delivery: online quizzes, essay forum postings, chat rooms and email communications.

**Online Delivery**

Same as face-to-face instruction including a variety of evaluation methods such as: research papers, asynchronous and synchronous discussions (chat/forum), exercises/assignments, online quizzes and exams, and postings to online website.

**VII. Methods of Delivery**

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

**Traditional Classroom Delivery**  Correspondence Delivery

**Hybrid Delivery**  Online Delivery

**Traditional Classroom Instruction**

1. Lecture and computer assisted presentations
2. Computer generated tutorials
3. Laboratory
4. Discussion and problem solving performed in and outside class

5. Homework and extended projects
6. Collaborative projects

### **Hybrid Delivery**

Hybrid modality may involve face to face instruction mixed with online instruction. A minimum of 1/3 of instruction including 100 % of labs will be face to face. The remaining hours will be taught online through a technology platform as adopted by the district.

### **Online Delivery**

Online instruction will be utilized through the technology platform adopted by the District. Online delivery will consist of participation in forum-based discussions and posts, web links, email communications, lecture posts, exams and online lectures. Adding extra resources and other media sources as appropriate.

## **VIII. Representative Texts and Supplies**

*Tortora & Derrickson, "Principles of Anatomy and Physiology", 2020, 16<sup>th</sup> edition, JohnWiley & Sons, ISBN: 9781119320647.*

*Human Anatomy and Physiology Laboratory Manual, Cat version, 2019, 13<sup>th</sup> edition. Pearson. ISBN: 9780134632339*

Recommended:

*"Atlas of Histology", Eroschenko, 8th edition, Williams.*

## **IX. Discipline/s Assignment**

Biological Sciences

## **X. Course Status**

Current Status: Active

Original Approval Date: 1/16/1990

Revised Crystal Tobola

Curriculum/Academic Standards Committee Revision Date: 11/02/2021