

# Lassen Community College Course Outline

## BIOL-26 Human Anatomy and Physiology II

4.0 Units

### I. Catalog Description

Second semester of a two semester sequence covering the structure and function, integration and homeostasis of the human body at the cellular, tissue organ, organ system and organism level. This semester includes the cardiovascular, lymphatic, immune, respiratory, urinary, digestive, endocrine and reproductive systems. This course has been approved for hybrid (online/traditional) delivery. This course has been approved for online delivery for emergency use only.

**Prerequisite(s):** Biology 1–Principles of Molecular and Cellular Biology or Biology 25-Anatomy and Physiology I.

Before entering this course the student should be able to:

1. Define the various terms of direction used to describe the location of structures (superior, cephalic, inferior, caudal, dorsal, posterior, ventral, anterior, medial, lateral, peripheral, superficial, deep, proximal, and distal).
2. List and describe the basic structure and function of the four classes of biologically significant macromolecules.
3. Define acid, base and discuss the concept of pH.
4. Define ion, cation, and anion.
5. Discuss the structure of water and its vital role as the solvent found in living organisms.
6. Discuss significance of the structure and function of enzymes.
7. Name and describe the structure and function of the various organelles found in a eukaryotic animal cell.
8. Describe the various mechanisms utilized by cells to transport substances across membranes.
9. Identify the stages and describe the significant events occurring in asexual cell division (mitosis and cytokinesis).
10. Describe the replication of deoxyribonucleic acid and the utilization of genetic information for the production of functional products within eukaryotic cells.
11. Discuss the fluid mosaic model of membrane structure.
12. Identify the early stages of development, primary germ layers and the various tissues derived from each layer.
13. Discuss the basic characteristics of each of the four animal tissue categories.
14. Explain homeostasis and how it relates to the survival of the human organism.
15. Discuss with a specific example a negative feedback arc.
16. Demonstrate ability to successfully operate a compound microscope.

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 Hours Expected Outside Class Work, 51 Hours Lab, 204 Total Student Learning Hours

Scheduled: Spring

## 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:

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:

1. Discuss the functions of the circulatory system.
2. Describe types of blood cells (erythrocytes, leucocytes and thrombocytes) as to structure, development, number, location and function.
3. Describe the clotting process.
4. Describe the anatomy of the heart.
5. Trace the flow of blood through the heart and explain the cardiac cycle.
6. Describe the route and significance of a portal system.
7. Trace systemic and pulmonary circulation.
8. Describe the structure and function of the lymphatic system.
9. Differentiate between types of immunity.
10. Differentiate between humoral and cell mediated immunity.
11. Describe the structure and function of the respiratory system.
12. Explain ventilation, external and internal respiration.
13. Explain the structure and function of the digestive system.
14. Describe the mechanical and chemical processes of digestion and where they take place.
15. Describe the enzymes and hormones involved in digestion.
16. Describe the metabolism of carbohydrates, fats, proteins, vitamins, water and minerals.
17. Describe cellular respiration include: processes, location, starting molecules, products, energy production.
18. Describe the structure and function of the urinary system.
19. Explain fluid/electrolyte balance in the human body.
20. Explain the mechanisms utilized by the human body to maintain the plasma pH balance.
21. Explain the mechanisms of action of steroid and peptide hormones.
22. Explain what is meant by a negative feedback arc and be able to give examples.
23. Give the source and function of the various hormones.
24. Describe the structure and function of the male and female reproductive systems.
25. Discuss hormonal control of reproductive activity.
26. Describe and differentiate between spermatogenesis and oogenesis.

27. Describe the early embryological development of a human.
28. Discuss the structure and function of the placenta.

#### **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. Circulatory System
  1. Structure of the system (heart, vessels and blood)
  2. Functions of the system
  3. Lymphatic system
  4. Immunity
    - a. Non-specific Immunity
    - b. Specific Immunity
  5. Normal versus diseased, injured or age-related structural changes
- B. Respiratory System
  1. Types of respiration
  2. Structure of the system
  3. Respiratory physiology
  4. Normal versus diseased, injured or age-related structural changes
- C. Digestive System
  1. Structure of the system
  2. Functions of the system
  3. Aerobic cellular respiration
  4. Nutrition
  5. Normal versus diseased, injured or age-related structural changes
- D. Excretory System
  1. Structure of the system
  2. Function of the kidney
  3. Acid-base fluid balance
  4. Normal versus diseased, injured or age-related structural changes
- E. Endocrine System
  1. Role of system
  2. Mechanisms of action
  3. Components of the system
  4. Normal versus diseased, injured or age-related structural changes
- F. Reproductive System
  1. Structure of the male and female reproductive systems
  2. Spermatogenesis and oogenesis
  3. Hormonal regulation of reproduction
  4. Normal versus diseased, injured or age-related structural changes
- G. Development

#### Laboratory Content

- A. Circulatory System
  1. Cat Dissection
  2. Sheep Heart Dissection and Identification
  3. Histology (identification, diagram and label)
  4. Cardiovascular Physiology including Blood
  5. Immunity

- 6.
- B. Respiratory System
  1. Cat Dissection and Identification
  2. Sheep Pluck Identification of Structures
  3. Histology (identification, diagram and label)
  4. Respiratory Physiology
- C. Digestive System
  1. Cat Dissection
  2. Histology (identification, diagram and label)
  3. Enzyme Function Laboratory
- D. Excretory System
  1. Cat Dissection and Identification
  2. Pig Kidney Dissection
  3. Histology (identification, diagram and label)
  4. Urinalysis
  5. Acid-Base Balance (buffering systems)
- E. Endocrine System
  1. Cat Dissection and Identification
  2. Histology (identification, diagram and label)
- F. Reproductive Systems (Male and Female)
  1. Cat Dissection and Identification
  2. Preserved Ovary, Testis, Placenta, and Pregnant Uterus (pig) Observation
  3. Histology (identification, diagram and label)
  4. Identification of Structures on Models
- G. Development
  1. Identification of Structures on Models
  2. Histology (identification, diagram and label)
  3. Early Development Exercise

## 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. A take home comprehensive final which requires synthesis of concepts presented throughout the course

### 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. Read and summarize newspaper articles relevant to current topics in human anatomy and physiology
4. 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 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 mechanisms utilized by the body to prevent blood loss.
  2. Trace the pathway of a single carbon atom from its ingestion as carbohydrate to its elimination from the respiratory system.
  3. Discuss the three primary mechanisms utilized by the human body to maintain the plasma pH between 7.35 and 7.45.
  4. Compare and contrast spermatogenesis and oogenesis.
- B. Performance on unit laboratory practical exams
- C. Performance on a comprehensive essay final exam
- D. Performance on 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 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**

**IX.** *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.*

### **X. Discipline/s Assignment**

Biological Sciences

### **XI. Course Status**

Current Status: Active

Original Approval Date: 1/16/1990

Revised By: Crystal Tobola

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