



5055 Santa Teresa Blvd  
Gilroy, CA 95023

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### Course Outline

**COURSE:** BIO 15                      **DIVISION:** 10                      **ALSO LISTED AS:**

**TERM EFFECTIVE:** Summer 2025                      **CURRICULUM APPROVAL DATE:** 06/10/2025

**SHORT TITLE:** ANATOMY AND PHYSIOLOGY

**LONG TITLE:** Survey of Human Anatomy and Physiology

<u>Units</u>	<u>Number of Weeks</u>	<u>Type</u>	<u>Contact Hours/Week</u>	<u>Total Contact Hours</u>
5	18	Lecture:	4	72
		Lab:	3	54
		Other:	0	0
		Total:	7	126

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Out of Class Hrs:            144.00

Total Learning Hrs:       270.00

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### COURSE DESCRIPTION:

An introductory course about the structures and functions of the human body. Includes study at the cellular and organ system levels, emphasizing integration of systems. Course will include the viewing of a cadaver. **ADVISORY:** BIO 10 or BIO 12 with a grade of 'C' or better. Skills equivalent to those in an Elementary Algebra course.

**CREDIT STATUS:** D - Credit - Degree Applicable

### GRADING MODES

L - Standard Letter Grade

**REPEATABILITY:** N - Course may not be repeated

**SCHEDULE TYPES:**

- 02 - Lecture and/or discussion
- 03 - Lecture/Laboratory
- 04 - Laboratory/Studio/Activity
- 04B - Laboratory - LEH 0.75
- 05 - Hybrid
- 71 - Dist. Ed Internet Simultaneous
- 72 - Dist. Ed Internet Delayed
- 73 - Dist. Ed Internet Delayed LAB
- 73B - Dist. Ed Internet LAB-LEH 0.75

**STUDENT LEARNING OUTCOMES:**

By the end of this course, a student should:

1. Identify selected structures of the human body.
2. List the organ systems of the human body and explain their functions.
3. Relate the structures of the human body to their functions.
4. Apply knowledge of structure and function learned in one body system by connecting it to other body systems.
5. Develop basic laboratory and dissection skills which can be utilized in further investigations.

**COURSE OBJECTIVES:**

By the end of this course, a student should:

1. Describe the levels of organization in living things.
2. Define the term homeostasis, and describe how organ systems work to maintain homeostasis.
3. Describe the important qualities of the four biomolecules, and explain their roles in biological systems.
4. Describe cell membrane structure and function.
5. Describe the four basic tissue types and their functions and locations.
6. Describe the four stages of glucose metabolism: glycolysis, the Krebs cycle, the electron transport chain, and chemiosmosis.
7. Identify the components of the axial and appendicular skeleton.
8. Identify the major muscles of the body.
9. Describe the organization of the nervous system and the conduction of a nervous impulse and synaptic transmission.
10. Describe how the special senses work.
11. List the hormones produced by the major endocrine glands and explain their functions.
12. Describe the composition and functions of the blood.
13. Describe the structure and functions of the heart.
14. Compare and contrast specific and non-specific immune response.
15. List and describe the general structures and functions of the respiratory system.
16. Describe the structures and functions of the digestive system.
17. Describe the structures and functions of the urinary system.
18. Describe the structures and functions of the male and female reproductive systems.

**COURSE CONTENT:**

Curriculum Approval Date: 06/10/2025

**LECTURE CONTENT:****4 LEC HOURS**

Topic: INTRODUCTION, ANATOMICAL TERMS

Objectives:

1. Describe the levels of organization in living things.
2. Define and discuss homeostasis.
3. Define terms pertaining to body regions and relative position of body parts.
4. Describe the planes or sections of the body.
5. Describe the body cavities and contents.
6. Describe the abdominopelvic quadrants.

**6 LEC HOURS**

Topic: CHEMISTRY

Objectives:

1. Describe the structure of an atom.
2. Define atomic mass, ion, isotope.
3. Describe the types of chemical bonds and their relative strength.
4. List the primary inorganic and organic constituents of the body.
5. Describe the important qualities of proteins, lipids, carbohydrates and nucleic acids and explain their roles in biological systems.
6. Explain what a chemical reaction is.
7. Explain the meaning of chemical formulas.
8. Define and discuss dehydration and condensation reactions.
9. Define: acid, base, buffer and explain their importance to biological systems.
10. Explain the meaning of the pH scale.
11. Define oxidation and reduction and explain the importance of redox reactions to energy transfer.

**6 LEC HOURS**

Topic: CELL STRUCTURE AND FUNCTION, MEMBRANE TRANSPORT, CELL DIVISION

Objectives:

1. Describe cell membrane structure and function.
2. Define and discuss: diffusion, facilitated diffusion, filtration, pinocytosis, phagocytosis, exocytosis, hypertonic, hypotonic, isotonic.
3. Describe the structure and functions of mitochondria, lysosomes, vacuoles, centrioles, cilia, flagella, Golgi apparatus, endoplasmic reticulum, ribosomes, nucleus, nucleolus, cytoskeleton and other structures.
4. Discuss the composition and roles of the cytoplasm.
5. Discuss protein synthesis.
6. List the phases of the cell cycle and mitosis and the important events of each phase.
7. Compare and contrast mitosis and meiosis.

**COURSE CONTENT(CONTINUED):****LECTURE CONTENT(CONTINUED):**

4 LEC HOURS

Topic: TISSUES, MEMBRANES, AND INTEGUMENT

Objectives:

1. Describe the four basic tissue types and their functions and locations.
2. Discuss the classification of epithelium and connective tissue and list and describe the different types of epithelium and connective tissue.
3. Be able to describe and identify the following: epithelium (simple squamous, simple cuboidal, simple columnar, stratified squamous, pseudostratified, transitional); connective (areolar, dense, adipose, hyaline cartilage, fibrocartilage, elastic cartilage).
4. Describe four membrane types and their functions.
5. Discuss the functions of the integumentary system.
6. Describe the structures of the integumentary system.
7. Describe hair structure and distribution.
8. Discuss the role of the skin in temperature regulation.

4 LEC HOURS

Topic: METABOLISM

Objectives:

1. Define and discuss: catalyst, enzyme, activation energy.
2. Describe the effects of pH, temperature and other factors on enzymes.
3. Describe and discuss the significance of the Law of Mass Action.
4. Discuss energy and the significance of the Laws of Thermodynamics.
5. Explain the meaning of a general metabolic pathway.
6. Describe ATP and its production.
7. Explain the roles of NAD and FAD in energy transfer.
8. Describe and diagram a generalized electron transport.
9. Define and discuss: aerobic, anaerobic.
10. List the major reactants and products of glycolysis, Krebs cycle and the electron transport system.
11. Describe the relationship between glycolysis, Krebs cycle and electron transport and compare in terms of ATP production.
12. Explain the role of oxygen in cellular metabolism.
13. Discuss lactic acid metabolism.
14. Define oxygen debt and explain why it occurs.
15. Describe the metabolism of proteins, lipids and carbohydrates.
16. Discuss the interconversion of proteins, lipids and carbohydrates.

**COURSE CONTENT(CONTINUED):****LECTURE CONTENT(CONTINUED):**

4 LEC HOURS

Topic: SKELETON, OSSEOUS TISSUE, AND ARTICULATIONS

Objectives:

1. Describe the structure of long bones.
2. Compare and contrast the structure of spongy and compact bone.
3. Describe the structure of an osteon.
4. Discuss: osteoprogenitor cells, osteoblasts, osteocytes, osteoclasts.
5. Describe: bone growth, ossification, fracture healing.
6. List and describe the different types of articulations.
7. Describe a generalized synovial articulation.
8. Identify structures of articulations.
9. List and define types of movements that occur at articulations.
10. Identify the components of the axial and appendicular skeleton.
11. Identify the bones and major bone markings of the human skeleton.
12. Identify paranasal sinuses and fontanelles.
13. Compare and contrast male and female skeletons.

4 LEC HOURS

Topic: MUSCLE TISSUE AND MUSCULAR SYSTEM

Objectives:

1. Compare and contrast the three types of muscle tissue.
2. Describe the structure of the sarcomere.
3. Describe and explain the sliding filament theory of contraction.
4. Explain how muscles cause movement and how the action of a muscle can be determined by knowing its origin and insertion.
5. Identify major muscles of the body.
6. Identify the three types of muscle tissue.

4 LEC HOURS

Topic: NERVOUS TISSUE, SPINAL CORD, AND NERVES

Objectives:

1. Describe the structure of motor, association and sensory neurons.
2. List and describe types of neuroglia.
3. Discuss the myelin sheath and its function.
4. Describe the conduction of a nervous impulse and synaptic transmission.
5. Describe the organization of the nervous system.
6. Describe the composition of a nerve and nerve roots.
7. Describe the form major nerve plexi.
8. Describe and discuss the major features of the spinal cord.
9. Describe the autonomic nervous system.
10. Compare and contrast the sympathetic and parasympathetic divisions of the ANS.

**COURSE CONTENT(CONTINUED):****LECTURE CONTENT(CONTINUED):**

4 LEC HOURS

Topic: BRAIN

Objectives:

1. Identify and briefly describe the function of: medulla oblongata, pons, midbrain, thalamus, hypothalamus, cerebellum, cerebrum, ventricles, limbic system.
2. Identify and discuss the following structures or areas of the cerebrum: cerebral cortex, hemispheres, corpus callosum, cerebral lobes, basal ganglia, selected functional areas.

4 LEC HOURS

Topic: GENERAL AND SPECIAL SENSES

Objectives:

1. Describe the receptors for touch, pressure, pain, temperature and proprioception.
2. Explain perception, including adaptation, projection and the law of specific nerve energies.
3. Describe and discuss olfactory and gustatory receptors and perception.
4. Describe the structures of the ear and the perception of sound and equilibrium.
5. Describe the structure of the eye.
6. Discuss the physiology of vision.
7. Describe the neural pathways for vision and hearing.

4 LEC HOURS

Topic: ENDOCRINE SYSTEM

Objectives:

1. Compare and contrast endocrine and exocrine glands.
2. Discuss the actions of hormones and prostaglandins.
3. Explain the general mechanisms for hormone regulation.
4. Identify the major endocrine glands.
5. List the hormones produced by the major endocrine glands and explain their functions.

6 LEC HOURS

Topic: CIRCULATORY SYSTEM: Blood, Heart, Blood Vessels and Lymphatic System

Objectives:

1. Describe the composition and functions of the blood.
2. Describe the structure and functions of the heart.
3. Discuss the cardiac cycle, heart sounds, cardiac conduction system, and the ECG.
4. Discuss the pulmonary and systemic circuits.
5. Identify selected blood vessels.
6. Compare and contrast the structures and functions of different types of blood vessels.
7. Define and discuss blood pressure regulation.
8. Discuss the functions of the lymphatic system.
9. Explain the relationship between the cardiovascular and lymphatic systems.
10. Compare and contrast specific and non-specific immune response.
11. Describe the roles of B and T cells and other immune cells.
12. Define: antigen, antibody.
13. Discuss selected disorders of the immune system.

**COURSE CONTENT(CONTINUED):**

**LECTURE CONTENT(CONTINUED):**

4 LEC HOURS

Topic: RESPIRATORY SYSTEM

Objectives:

1. List and describe the general functions of the respiratory system.
2. Identify and describe the structures of the respiratory system.
3. Describe and discuss respiratory movements and volumes.
4. Describe the transport of oxygen and carbon dioxide in the blood.
5. Define surface tension and surfactant and explain their importance to respiration.
6. Discuss how physical laws affect respiration.
7. Discuss the effects of altitude on respiration.

4 LEC HOURS

Topic: DIGESTIVE SYSTEM

Objectives:

1. List, describe and identify the organs of the digestive system.
2. Describe the functions of the digestive system.
3. Describe the general histology of the alimentary canal.
4. Discuss mechanical and chemical digestion.
5. Discuss the movements of the digestive tract.
6. List the enzymes of digestion and the reactions that they catalyze.
7. Describe the processes and locations of absorption in the digestive tract.

4 LEC HOURS

Topic: URINARY SYSTEM; FLUID AND ELECTROLYTE BALANCE

Objectives:

1. List, describe and identify the structures of the urinary system.
2. Describe the structure and function of the nephron.
3. Discuss the process of urine formation and its regulation.
4. Discuss the regulation of the volume and composition of the blood by the urinary system.
5. Discuss the roles of ADH, aldosterone and other hormones in regulation of urine production.
6. Describe the different fluid compartments and discuss the movement of fluid between the compartments.
7. Discuss micturition and its control.

4 LEC HOURS

Topic: REPRODUCTION AND DEVELOPMENT

Objectives:

1. Describe and discuss the structures and functions of the male and female reproductive systems.
2. Identify selected structures of the male and female reproductive systems.
3. Discuss the processes of spermatogenesis and oogenesis and their regulation.
4. Describe ovulation.
5. Describe the events of the male and female in intercourse.
6. Discuss common clinical conditions affecting the reproductive systems.
7. Describe and discuss: fertilization, implantation, placentation.
8. Describe and discuss: early embryonic stages and germ layer formation.
9. Describe the embryonic membranes.
10. Describe and discuss the roles of the placenta and umbilical cord.
11. Describe labor and delivery.

2 LEC HOURS

FINAL EXAM

## **COURSE CONTENT(CONTINUED):**

### **LAB CONTENT:**

3 LAB HOURS

Topic: INTRODUCTION, ANATOMICAL TERMS

Objectives:

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3 LAB HOURS

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8. Describe and discuss: early embryonic stages and germ layer formation.
9. Describe the embryonic membranes.
10. Describe and discuss the roles of the placenta and umbilical cord.
11. Describe labor and delivery.

**COURSE CONTENT(CONTINUED):****LAB CONTENT(CONTINUED):**

3 LAB HOURS

LAB PRACTICAL EXAMS

**METHODS OF INSTRUCTION:**

Instructional methods will include lecture and lab, with use of audio/visual aids, computer, models, slides, dissection, and possible observation of cadavers.

**OUT OF CLASS ASSIGNMENTS:**

Required Outside Hours 144

Assignment Description

A combination of homework, lab reports, and other assignments requiring that the student describe and explain the structures and functions of the major organ systems of the human body.

**METHODS OF EVALUATION:**

Writing assignments

Evaluation Percent 10

Evaluation Description

Percent range of total grade: 10 % to 15 %

Lab Reports

Problem-solving assignments

Evaluation Percent 15

Evaluation Description

Percent range of total grade: 10 % to 20 %

Lab Reports

Quizzes

Skill demonstrations

Evaluation Percent 5

Evaluation Description

Percent range of total grade: 2 % to 5 %

Class Performance/s

Other methods of evaluation

Evaluation Percent 20

Evaluation Description

Assessing engagement with online lecture content. Assessments would include submitting lecture notes and lecture quizzes.

**METHODS OF EVALUATION (CONTINUED):**

Objective examinations

Evaluation Percent 50

Evaluation Description

Percent range of total grade: 40 % to 60 %

Multiple Choice

True/False

Matching Items

Completion

**REPRESENTATIVE TEXTBOOKS:**

Hole's Essentials of A&P, 16e, Welsh, Prentice-Craver, McGraw Hill, 2021 or a comparable textbook/material.

ISBN: 9781260251340

Rationale: Newest edition available (16e).

13 Grade Verified by: Verified by:D.Young

Amerman, Erin. Exploring Anatomy & Physiology in Lab: Core Concepts. 4e. Morton Publishing, 2022. ISBN 9781640433984

**ARTICULATION and CERTIFICATE INFORMATION**

Associate Degree:

GAV B2

GAV B3

GAV Area 5 = Natural Sci

CSU GE:

CSU B2

CSU B3

IGETC:

IGETC 5B

IGETC 5C

CSU TRANSFER:

Transferable CSU

UC TRANSFER:

Transferable UC

**SUPPLEMENTAL DATA:**

Basic Skills: N

Classification: Y

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

Prior to College Level: Y

Non Credit Enhanced Funding: N

Funding Agency Code: Y

In-Service: N

Occupational Course: E

Course Control Number: CCC000264916

Sports/Physical Education Course: N

Taxonomy of Program: 041000