

**College of San Mateo**  
**Official Course Outline**

1. **COURSE ID:** BIOL 260    **TITLE:** Human Physiology    **C-ID:** BIOL 120B  
**Units:** 5.0 units    **Hours/Semester:** 48.0-54.0 Lecture hours; and 96.0-108.0 Lab hours  
**Method of Grading:** Letter Grade Only  
**Prerequisite:** BIOL 250, and CHEM 192, 210 or 410.  
**Recommended Preparation:**  
    Completion of or concurrent enrollment in any READ 400 level course.

2. **COURSE DESIGNATION:**

**Degree Credit**

**Transfer credit:** CSU; UC

**AA/AS Degree Requirements:**

    CSM - GENERAL EDUCATION REQUIREMENTS: E5a. Natural Science

**CSU GE:**

    CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B2 - Life Science

    CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B3 - Laboratory Activity

**IGETC:**

    IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: B: Biological Science

    IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: C: Science Laboratory

3. **COURSE DESCRIPTIONS:**

**Catalog Description:**

    Functions of the organs and systems of the human body. (Intended for students of nursing, physiotherapy, physical education, psychology and related fields. Elective for pre-dental, pre-medical, and pre-veterinary students.) Extra supplies may be required. A materials fee as shown in the Schedule of Classes is payable upon registration.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**

    Upon successful completion of this course, a student will meet the following outcomes:

1. Describe the interactive functions of key homeostatic mechanisms.
2. Describe cellular activity using chemical and physical principles.
3. Relate cellular activity to the functioning of specific body tissues and organs.
4. Distinguish between normal physiological changes and common pathological changes in the body.
5. Use quantitative information to evaluate and understand physiological processes.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**

    Upon successful completion of this course, a student will be able to:

1. Explain: the functional characteristics common to humans and the importance of each to maintaining life, homeostasis and positive and negative feedback mechanisms, the chemistry of water and its importance to living systems, the role of dehydration synthesis and hydrolysis in the formation and breakdown of organic molecules, the role of ATP in cell metabolism, the structural and functional divisions of the nervous system,
2. Distinguish and compare: the general structures and biological functions of various organic molecules, the four types of body tissues, endocrine glands to exocrine glands, pathophysiological conditions that may arise from hypersecretion or hyposecretion of a hormone, meiosis and mitosis, passive transport system to active transport, nonspecific body defenses to specific defenses, excitation-contraction process in skeletal, cardiac and smooth muscle, functions of neuroglial cells and neurons, the somatic and autonomic nervous system, receptor mechanisms for the various senses, events and goals of the absorptive and postabsorptive states, relative fluid volume and solute composition of the fluid compartments of the body, female and male hormonal responses.
3. Describe: the function of various cell organelles, cell growth and reproduction, protein synthesis, the role of the plasma membrane in cells' interactions with their environment, the sliding filament theory of muscle contraction, resting membrane potential, how action potentials are generated and propagated along neurons, reflex activity, the process of hemostasis, the basis of transfusion reactions, the structural characteristics and functions of blood components, control of respiration, transport of respiratory gases, mechanisms to regulate electrolyte and water balance, buffer systems of the body adjustments of the infant

to extrauterine life, events that lead to genetic variability of gametes.

4. Recognize and name: stages of mitosis and meiosis, atomic and molecular structures, diagnostic blood tests, parts of an EKG tracing, the important events and products of glycolysis, the Krebs cycle and the electron transport chain,
5. Define and compare: acidosis and alkalosis resulting from respiratory and metabolic factors, parasympathetic and sympathetic responses, basal metabolic rate and total metabolic rate,
6. Apply knowledge to solve problems illustrating: Mendelian genetics, transport of respiratory gases, enzyme activity, osmosis and diffusion, transfusion reactions, analysis of EKG tracings
7. Demonstrate basic laboratory skill for the investigation of physiological phenomena: use of light microscope, diagnostic kits (cholesterol, bilirubin), computerized data acquisition (BIOPAC), tools for metric measurement of length and volume, accurate observation and recording of results, cooperative group preparation, analysis of simulations and wet labs using the scientific process.
8. Demonstrate research skills for physiological topics
9. Communicate explanations of physiological phenomena both in writing and orally.

## 6. COURSE CONTENT:

### Lecture Content:

- 1) Concept of homeostasis, necessary life functions, levels of structural organization
- 2) Chemistry review, patterns of chemical reactions, chemical composition of living matter,
- 3) Cellular physiology, cell division, cell cycle control, cell structure and genetic control
- 4) Membrane transport and membrane potential, intercellular communication signal transduction
- 5) Principles of Metabolism: endergonic and exergonic reactions, activation energy, energy coupling, enzyme catalysis
- 6) Neuronal physiology, central nervous system, peripheral nervous system, neuronal control of involuntary effectors, functions of the autonomic nervous system
- 7) Sensory physiology
- 8) Principles of Endocrinology
- 9) Muscle Physiology, molecular basis of muscle contraction, skeletal muscle metabolism
- 10) Cardiac physiology, blood vessels and blood pressure
- 11) Blood functions and body defenses, immune system
- 12) Respiratory Physiology
- 13) Digestive system and regulation of metabolism, energy balance and temperature regulation
- 14) Urinary system, electrolytes, fluid and acid-base balance
- 15) Reproduction physiology and development

### Lab Content:

- 1) Review of the basic chemical concepts used in physiology.
- 2) Cellular functions of membrane transport, membrane potentials, and ion channels.
- 3) Regulation of fluid and electrolyte balance
- 4) Skeletal muscle physiology
- 5) Chemical and physical processes of digestion
- 6) Neural and endocrine control mechanisms
- 7) Cardiovascular dynamics and physiology
- 8) Physical and chemical aspects of pulmonary function
- 9) Blood analysis
- 10) Innate immunity and adaptive immunity

## 7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Lecture
- B. Lab
- C. Discussion
- D. Experiments
- E. Observation and Demonstration
- F. Other (Specify): Online activities

## 8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

### Writing Assignments:

- 1) Students are required to complete several comprehensive lab reports during the semester. The reports

reflect an understanding of the scientific method including a statement of a hypothesis, data collection, manipulation and analysis of the data, and reporting conclusions.

2) Students are required to complete a number of personal profile reports based on assigned laboratory experiences and research. For example, students do a week long diet and fiber analysis. The report includes a statement of purpose with background information, test performed/methods used, including any modifications, results, analysis of results and conclusions.

3) A portion of each exam requires several short written answers to questions such as: "Discuss several ways that the nervous system and endocrine system overlap in function."

**Reading Assignments:**

1) Textbook: Students are expected to read approximately one chapter from the textbook each week.

2) Laboratory: Students must read the background and instructions for each lab and complete pre lab quizzes.

3) Scientific journals: Students are expected to read 3-4 scientific journal articles from the primary scientific literature. A comprehensive understanding of the article is not required by the students should be able to accurately identify the hypothesis and summarize the major findings.

**Other Outside Assignments:**

1) Students may be required to review sections of the online "Interactive Physiology" tutorials (Benjamin Cummings Publishers) and to complete associated exercise sheets and quizzes.

2) Students are required to perform online laboratory simulations using "PhysioEx" (Benjamin Cummings Publisher) web-based program.

**9. REPRESENTATIVE METHODS OF EVALUATION**

Representative methods of evaluation may include:

A. Class Performance

B. Exams/Tests

C. Group Projects

D. Lab Activities

E. Oral Presentation

F. Portfolios

G. Projects

H. Quizzes

I. Research Projects

J. Quizzes and exams may include the following formats: multiple choice, fill-in questions, matching, short answer and essay questions, and quantitative problem solving. Reports and portfolio projects may include data collection, reporting results, quantitative analysis, construction of tables and graphs, research and citing references from peer reviewed scientific literature. Group projects may include classroom presentations, including preparation of posters, oral presentations and electronic presentations

**10. REPRESENTATIVE TEXT(S):**

Possible textbooks include:

A. Fox, Stuart,. *Human Physiology*, 13th ed. WCB/McGraw Hill, 2012

B. Silverthorn, D.,. *Human Physiology* , 6th ed. Benjamin Cummings, 2012

C. Marieb, Elaine. *Human Anatomy and Physiology*, 9th ed. Benjamin Cummings with Mastering A & P, 2012

Possible manuals include:

A. Marieb, E., & Mitchell, R.. Human Anatomy and Physiology Laboratory Manual, Benjamin Cummings, 01-01-2012

**Origination Date:** May 2014

**Curriculum Committee Approval Date:** September 2014

**Effective Term:** Fall 2015

**Course Originator:** Carlene Tonini-Boutacoff