

Santa Monica College

Course Outline For

Course Title: PHYSIOLOGY 3: HUMAN PHYSIOLOGY

Date Submitted: Sept 21, 2006

Updated: December 13, 2006

Units: 4

IGETC Area: 5B (Biological
Sciences + lab)

CSU GE Area: B2, B3

Transfer: **UC, CSU**

I. Catalog Description:

Prerequisite: Anatomy 1 and Chemistry 10 with a grade of C or better.

Skills advisory: Eligibility for English 1

This rigorous course provides a basic understanding of physiological mechanisms with a focus on the human body. Basic concepts of cellular physiology, including: molecular control; mechanisms of gene expression; ligand-binding site interactions; energy and cellular metabolism; membrane transport; membrane and action potentials; and cellular communication, including signal transduction, will be integrated within the concept of homeostasis involving the following body systems: nervous and sensory, endocrine, muscle, circulatory, immune, respiratory, renal, digestive, and reproductive. The course content includes both general and clinical applications and is intended to prepare students for advanced courses in Allied Health and Medical professions including Nursing, Physical Therapy, Respiratory Therapy, Physician's Assistant, Pharmacy, and Exercise Science/Kinesiology Training.

II. Required Text and References:

Current editions of a textbook and lab manual similar in content and level to the following are required:

A. Texts

1. Fox, S.I. 2006. *Human Physiology, 9th edition*, McGraw-Hill Publishing.
2. Silverthorn, D.U. 2007. *Human Physiology, An Integrated Approach, 4th edition*, Prentice Hall Publishers.
3. Vander A., J. Sherman, and D. Luciano. 2004. *Human Physiology: The Mechanisms of Body Function, 9th edition*, McGraw-Hill Publishing.

B. Lab Manuals or equivalent

1. SMC Faculty. 1996. *Human Physiology Lab Manual, 5th edition*, Santa Monica College.
2. Fox, S.I. 2006. *Laboratory Guide to Human Physiology, 11th Edition*. McGraw-Hill Publishing.

III. Course Objectives:

Upon completion of the course, students should be able to

1. Explain the major concepts of the cell including structure, function, and processes, including molecular interactions such as ligand-binding site relationships.
2. Explain the major concepts of cell and membrane physiology including membrane transport and cell communication.
3. Explain the functional interrelationships of tissues, organs and organ systems of the human body within the framework of homeostasis.
4. Apply physiological concepts to issues of human health and common pathologies.
5. Effectively use and apply lab techniques, methods and equipment related to the fields of physiology.
6. Understand and apply principles of the scientific process to physiological problems.
7. Conduct experiments and record and display data appropriately.
8. Analyze experimental data while demonstrating logical and critical thinking skills.
9. Compose appropriate scientific reports.
10. Use basic computer technology in the field of physiology

IV. Methods of Presentation:

The primary means of instruction are lecture presentation and laboratory experiments (primarily Clinical assessment and wet labs), that incorporate audiovisual presentations, PowerPoint presentations, and computer-simulation exercises in order to emphasize physiological concepts. There are approximately three hours weekly lecture, based on reading assignments and class exercises, and three hours weekly laboratory work. Students are required to spend one hour per week in self-paced instruction in the Science Learning Resource Center or Science Computer Lab.

V. Course Content:

- A. The sequence and approximate time allowed for lecture and lab vary with individual instructors but will generally follow the outline below:

The precise distribution may vary slightly from instructor to instructor, but approximate values are:

Percentage of Term	Topic
3%	Introduction to Physiology and Homeostasis
6%	The Chemistry of the Macromolecules: Carbohydrates, Lipids, Proteins, and Nucleic Acids
3%	DNA Replication and Gene Expression
6%	Cell-cell communication, including ligand-binding site relationships and signal transduction
8%	Enzymes and Cellular Metabolism
3%	Membrane Transport
3%	Membrane Potential

6%	Action and Graded Potentials
6%	Synapse and Neurotransmitters
7%	Sensory Receptors and Special Senses
3%	Autonomic Nervous System
3%	Endocrine System
7%	Muscle Physiology and the Control of Body Movement
3%	Specific and non-specific immunity
9%	Cardiovascular Physiology
6%	Respiratory System
3%	Renal System
3%	Acid-base balance
6 %	Digestive System
3%	Regulation of Metabolism
3%	Reproduction
100%	

B. Laboratory Exercises (*indicates labs that must be performed in class: others may be performed as homework or computer simulations) incorporated into the above mentioned topics.

1. Laboratory safety.*
2. Pipetting skills, including micropipetting, and serial dilutions*
3. Measurements (including the Metric System) and Mathematical Conversion Exercise
4. Expressing the Concentrations of Substances in Solution Exercise
5. Conceptually Constructing a DNA and RNA Molecule Exercise
6. Introduction to the Scientific Method: data collection, interpretation and analysis by writing a laboratory report and construction of graphs and tables
7. Enzyme Activity and Modulation *
8. Use of the spectrophotometer and standard curve*
9. Membrane Transport and Vesicular Transport
10. Membrane Potential and Action Potentials
11. Somatic Reflexes Experiment*
12. Sensory Receptors Experiments*
13. Hematology Experiments*
14. Electrocardiogram Experiments *
15. Blood Pressure Assessment*
16. Spirometry and Pulse Oximetry Experiments *
17. Urinalysis *
18. Additional exercises that may be included are:
 - a. DNA separation by gel electrophoresis
 - b. Enzyme-Linked Immunosorbent Assay
 - c. Estimated basal metabolic rate
 - d. RFLP (DNA fingerprinting)
 - e. Mitochondrial PCR

VI. Methods of Evaluation: (Actual point distribution will vary from instructor to instructor but approximate values are shown.)

The actual distribution may vary slightly from instructor to instructor, but approximate values are:

Lecture Exams	40 - 60 %
Cumulative Final Exam	10 - 30 %
Lab Quizzes, Exercises, Lab Reports	10 - 40 %

Grades are determined on the basis of points earned compared to points possible as follows:

A	90-100%
B	80-89%
C	65-79%
D	50-64%
F	below 50%