

CATALOG INFORMATION

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Dept & Nbr: BIO 231 Title: HUMAN PHYSIOLOGY
Full Title: Human Physiology

Units	Course Hours	Per Week	Nbr of Weeks	Course Hours	Total
Max: 5.0	Lecture	4.0	17	Lecture	68.0
Min: 5.0	Lab	4.0		Lab	68.0
	Contact DHR	0.0		Contact DHR	0.0
	Contact Total	8.0		Contact Total	136.0
	Non-contact DHR	0.0		Non-contact DHR	0.0

Title 5 Category: 01 AA Degree Applic
Grading: GC Credit course for grade or CR/NC
Repeatability: 00 No repeatability allowed or defined
Also listed as:

CATALOG DESCRIPTION:

A study of human organ systems and the associated physiological principles with appropriate practical experimentation in the laboratory.

PREREQUISITES:

COREQUISITES:

RECOMMENDED PREPARATION:

Completion of BIO 202, and completion of CHM 200, and completion of MTH 55.

LIMITS ON ENROLLMENT:

SCHEDULE OF CLASSES INFORMATION:

Recommended: Completion of BIO 202, and completion of CHM 200, and completion of MTH 55.
Health professionals, biology majors and general interest students will study the function of the human organ systems. (Grade or CR/NC)
Transfer Credit: CSU; UC.

ARTICULATION and CERTIFICATE INFORMATION

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ASSOCIATE DEGREE:		Effective: FALL	1990	Inactive:
Area:	A	NATURAL SCIENCES		
CSU GE:		Effective: FALL	1990	Inactive:
Transfer area:	B2	LIFE SCIENCE		
	B3	LAB ACTIVITY		
IGETC:		Effective: FALL	1991	Inactive:
Transfer area:	5B	BIOLOGICAL SCIENCES		
CSU TRANSFER:	TRANSFERABLE	Effective: FALL	1990	Inactive:

UC TRANSFER: TRANSFERABLE Effective: FALL 1990 Inactive:

CAN:

CERTIFICATE APPLICABLE: N NOT CERTIFICATE/MAJOR APPLICABLE

APPROVAL AND DATES

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Version 02 Submitted by: BLUNDELL/WEST Date: 04/17/2003
Department approved: Date:
Curriculum approved: 10/10/2001 Version approved: 05/14/2003
Prerequisites approved: 10/10/2001 Last reviewed: 05/14/2003
Term effective: FALL 2003 Last taught: FALL 2008 Inactive:

COURSE CONTENT

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OUTCOME AND OBJECTIVES:

1. Be familiar with the function of the major organ systems of the human body.
2. Know the major biochemical processes involved in homeostasis.
3. Understand clinical examples of human physiology.
4. Develop the fundamental laboratory skills which enhance the study

TOPICS AND SCOPE:

Lecture

1. Functional Groups of Organs
2. Homeostasis
 - a. negative feedback
 - b. positive feedback
 - c. homeostatic mechanisms
 - d. control systems
3. Chemistry and Cell Biology
 - a. atoms and molecules
 - b. chemical bonding
 - c. inorganic compounds/solutions (including the concept of pH)
 - d. organic compounds
 - e. energy transfer using ATP
 - f. intracellular organization of nucleus and cytoplasm
 - g. membrane structure
 - h. mechanisms for movement of materials across cellular membranes
 - i. organelles
 - j. protein synthesis
 - k. cellular respiration (introduction)
 - l. somatic cell division (mitosis and cytokinesis)
3. Cardiovascular System
 - a. formation and composition of blood plasma
 - b. hemostasis, including coagulation of the blood
 - c. ABO and Rh blood grouping
 - d. physiology of cardiac muscle contraction
 - e. pattern of blood flow between heart chambers and between the heart and major vessels leading directly to or from the heart
 - f. cardiac cycle, including basic rhythm of heartbeat, pressure and volume changes, heart sounds, and electrocardiogram
 - g. regulation of stroke volume and heart rate
 - h. blood pressure and its functional interrelationships with cardiac output, peripheral resistance, and hemodynamics
4. Respiratory System
 - a. mechanism of pulmonary ventilation
 - b. pulmonary air volumes and capacities
 - c. mechanism of gas exchange in lungs and tissues

- d. control of pulmonary ventilation
- 5. Muscle System
 - a. physiology of skeletal muscle contraction
 - b. skeletal muscle metabolism
 - c. principles and types of whole muscle contraction
- 6. Digestive System
 - a. mechanical and chemical processes of digestion and absorption
 - b. processes of excretion and elimination
 - c. hormonal and neural regulation of digestive processes
 - d. homeostatic integration with other systems
 - e. nutrition and metabolism
 - f. cellular respiration
 - g. catabolism and anabolism of carbohydrates, lipids, and proteins
 - h. metabolic roles of specific tissues and organs, including the liver, adipose tissue, and skeletal muscle
 - i. hormonal and neural regulation of metabolism
 - j. energy balance, metabolic rate, and thermoregulation
- 7. Urinary System
 - a. functional processes of urine formation, including filtration, reabsorption, secretion, and excretion
 - b. factors regulating and altering urine volume and composition, including the renin-angiotensin system and the roles of
 - c. endocrine activities of the kidneys, such as vitamin D activation and secretion of erythropoietin
- 8. Fluid/Electrolyte and Acid/Base Balance
 - a. regulation of water intake and output
 - b. description of the major fluid compartments, including intracellular, intravascular, and interstitial
 - c. volume and chemical composition of major compartment fluids
 - d. movements between the major fluid compartments, causal forces, volumes, and electrolyte balance
 - e. role of the urinary system in acid/base balance
- 9. Endocrine System
 - a. definition and chemical classification of hormones
 - b. control of hormone secretion
 - c. mechanisms of hormone actions at effectors
 - d. roles of the hypothalamus and pituitary gland
 - e. identity, secretory control, and functional roles of the major hormones of the pituitary, adrenal, thyroid, parathyroid, pancreas, gonads, and pineal glands, including the effects of hypo- and hypersecretion
 - f. functions of hormones secreted by other endocrine tissues and cells, such as erythropoietin, thymosin, digestive hormones, placental hormones, atrial natriuretic peptide, vitamin D, eicosanoids, and growth factors
 - g. hormonal response to stress
- 10. Nervous System
 - a. neurophysiology, including mechanism of resting membrane potential, production of action potentials, and impulse transmission
 - b. neurotransmitters and their roles in synaptic transmission
- 11. Reproduction and Development
 - a. reproductive cell division (meiosis, gametogenesis, folliculogenesis)
 - b. specific roles of the ovaries, uterine tubes, uterus, vagina
 - c. specific roles of the testes, epididymis, ductus deferens, seminal vesicles, prostate, bulbourethral glands, and urethra
 - d. regulation of reproductive functions, including puberty, the female reproductive cycle, spermatogenesis, and the climacteric
 - e. development of the embryo/fetus and the hormonal changes

- during pregnancy
- f. parturition and labor
- g. sex determination and introductory human genetics
- 12. Lymphatic System and Immunity
 - a. lymph formation and flow mechanisms
 - b. non-specific resistance to disease and the inflammation response
 - c. antibody-mediated (humoral) immune response
 - d. cell-mediated immune response
 - e. roles of B cells and T cells in immune responses
- 13. Special Senses
 - a. roles of specific tissues of the eye in vision
 - b. roles of specific tissues of the ear in hearing and equilibrium
 - c. olfactory receptors and their role in smell
 - d. gustatory receptors and their role in taste

Laboratory

1. Molecular Activity
2. Blood Plasma Chemistry
3. Hemoglobin and O₂ Transport
4. White blood Cell Function
5. EKG Reading
6. Heart Sounds/Blood Pressure
7. Effects of Drugs on Animal Heart Function
8. Pulmonary Volumes
9. O₂ Utilization
10. Enzyme Kinetics
11. Skeletal Muscle Physiology
12. Early Embryology and Fertilization
13. Cell-Surface Receptors
14. Human Chromosome Analysis
15. Histology of Endocrine
16. Protein evolution and the Western Blot

ASSIGNMENTS:

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READING ASSIGNMENTS:

Students will be required to read and study assigned chapters in the textbook, as well as assignments from the laboratory manual prior to laboratory experiments. Supplemental reading from selected journal articles will be assigned. Examples of appropriate recommended reading are: Scientific American; New England Journal of Medicine; Journal of the American Medical Association; and Biological Bulletin.

WRITING ASSIGNMENTS:

Students are required to investigate, complete and record their laboratory experiments and analyze their results. Extensive writing is also required to successfully complete the lab exams, which include essay format.

OUTSIDE ASSIGNMENTS:

Six hours of independent work must be completed outside of class each week. This work includes studying lecture discussions, reviewing and writing laboratory results, answering questions presented in lecture at the textbook and preparing for upcoming textbook and preparing for upcoming

ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING:

The experimental laboratory by its very nature, requires critical thinking on the part of the student. Students must analyze laboratory results and demonstrate their understanding by interpreting the the results in a well-written laboratory report.

METHOD OF INSTRUCTION:

METHODS OF EVALUATION:

1. The total grade for the semester will be comprised of 2/3 for the lecture and 1/3 for the laboratory. 2. The lecture grade will be based on at least four exams with the total score being the cumulative total of each score. Each exam will have equal weighting. 3. The laboratory grade will be based on at least two major laboratory exams and the evaluation of an extensive laboratory reports. Each exam will have equal weighting.

BASIS FOR GRADING:

The assignment of a grade is based on the level of achievement of the outcomes and objectives of the course outline and is reflected in quantifiable terms in the course syllabus.

REPRESENTATIVE TEXTBOOKS:

Lecture: Anatomy and Physiology: The Unity of Form and Function,
Kenneth Saladin, 2nd edition, WCB McGraw Hill
Anthropologist from Mars, by Oliver Sacks
Laboratory: Customized version for Mendocino College, by Fox