

Eastern Illinois University
Revised Course Proposal
BIO 2001G, Human Physiology

1. Catalog Description

- a. Course level: BIO 2001G
b. Title: Human Physiology
c. Credit: (3-2-4)
d. Terms to be offered: F,S,Su
e. Short title: Human Physiology
f. Course description: An organ systems approach to the function of the human body. Does not count toward the Biological Sciences major or minor. Credit for BIO 2001G will not be granted if the student already has credit for or registration in BIO 2091G or BIO 3520. L1 904L
g. Prerequisite: None
h. Course is writing active.

2. Student Learning Objectives

Students will:

- discuss the interrelationship of different levels of organization (molecular, cellular, organ system, and whole organism) on physiological processes. (critical thinking)
- define key terms in physiology and use them appropriately when writing and speaking about physiological mechanisms. (writing and speaking)
- discuss the physiological basis of many common diseases and the importance of a healthy lifestyle in the prevention of disease. (critical thinking, citizenship)
- identify important scientists and events in the history of physiology. (critical thinking)
- apply the scientific method to further their knowledge of physiology. (critical thinking)
- use computer technology to acquire and analyze experimental data.(critical thinking)
- present experimental data in written reports and class presentations. (writing and speaking)
- draw logical conclusions based on observation and experimentation. (critical thinking)
- participate in classroom discussions on current controversies which arise with new biotechnology and other advances in human medicine. (writing and speaking, critical thinking, citizenship)

3. Course Outline

- a. Introduction to Human Physiology (1 week)
- 1). History and nature of physiology as a science and its relationship to other sciences
 - 2). Levels of organization
 - 3). Homeostasis and control systems
 - 4). Laboratory: Using the scientific method
 - 5). Laboratory: Microscopic examination of tissues
- b. Endocrine System (1 week)
- 1). Communication systems in the body
 - 2). Introduction to glands, hormones, and receptors
 - 3). Endocrine glands: Function and associated diseases
 - 4). Historical perspective: Banting and Best and the discovery of insulin
 - 5). Laboratory: Introduction to the computer-based laboratory
- c. Reproductive System (1 week)

- 1). Development and anatomy of the male and female reproductive systems
 - 2). Regulation and actions of the sex hormones
 - 3). The menstrual cycle
 - 4). Pregnancy and parturition
 - 5). Laboratory: Contraception and pregnancy testing
- d. Nervous System (2 weeks)
- 1). Organization and anatomy of the nervous system
 - 2). Physiology of the neuron
 - 3). Functions of the central nervous system
 - 4). Peripheral nervous system
 - 5). Integrated functions of the nervous system
 - 6). Historical perspective: Understanding the nerve impulse -- from Galvani to Hodgkin and Huxley
 - 7). Laboratory: Simulation of the action potential
 - 8). Laboratory: Sensory receptors, reflexes, and reaction times
 - 9). Laboratory: Vision
- e. Muscle (2 weeks)
- 1). Muscle types and their properties
 - 2). Mechanism of muscle contraction
 - 3). Muscular development, muscle fiber type, and effects of exercise
 - 4). Smooth muscle
 - 5). Laboratory: Human electromyography (EMG)
 - 6). Laboratory: Mechanical properties of skeletal muscle
- f. Digestive System (1 week)
- 1). Organization of the digestive system
 - 2). Introduction to carbohydrates, proteins, and lipids
 - 3). Digestion of food
 - 4). Absorption of digested materials
 - 5). Historical perspective: Beaumont and digestion in the stomach
 - 6). Laboratory: Digestive action of saliva
- g. Metabolism (1 week)
- 1). Energy balance in the body
 - 2). The role of adenosine triphosphate (ATP) in cell function
 - 3). Production of ATP by anaerobic and aerobic respiration
 - 4). Historical perspective: Krebs and the Krebs cycle
- h. Cardiovascular System (2 weeks)
- 1). Organization of the cardiovascular system
 - 2). Physiology of the heart
 - 3). Coronary circulation and heart attack
 - 4). Regulation of blood pressure
 - 5). Historical perspective: Starling's law of the heart
 - 6). Laboratory: Human electrocardiogram (ECG) and blood pressure
- i. Blood and the Immune System (1 week)
- 1). Red blood cells and oxygen transport
 - 2). White blood cells and immunity
 - 3). Blood clotting
 - 4). Historical perspective: Jenner and the smallpox vaccine
 - 5). Laboratory: Hematocrit and blood typing
- j. Urinary System (1 week)
- 1). Organization of the urinary system
 - 2). Renal physiology

- 3). Historical perspective: Cushny and the discovery of filtration and reabsorption
- 4). Laboratory: Urinalysis and regulation of body water balance
- k. Respiratory System (1 week)
 - 1). Organization of the respiratory system
 - 2). Pulmonary mechanics
 - 3). Gas exchange in the lungs and tissues
 - 4). Transport of gases in blood
 - 5). Control of breathing
 - 6). Historical perspective: Priestley and the discovery of oxygen
 - 7). Laboratory: Pulmonary function testing
- l. Examinations (1 week, distributed throughout the course)

NOTE: Whenever appropriate, additional emphasis is placed upon diseases which are of interest and importance to general students, on applications related to exercise training and stress, and on ethical implications of advances in medical physiology.

4. Evaluation of Student Learning

- a. Evaluation of student learning will be based on five examinations (60%), short quizzes (10%), laboratory worksheets (10%), a lab report (10%), and additional written assignments and/or oral presentations (10%).
- b. Examinations will include essay questions from the lecture and laboratory. Quizzes include lab practicals or brief review questions given at the beginning of class periods. Laboratory worksheets are designed to facilitate students in reporting the results and conclusions of each laboratory experiment. The lab report, based on one of the laboratories, is written in the style of a scientific publication. Additional written assignments will be based on current topics in physiology chosen by the student.

5. Rationale

- a. This course is proposed under the "Scientific Awareness" segment of General Education as a Biological Sciences laboratory course. The study of physiology not only increases the student's awareness of the scientific process, but also improves his/her understanding of the mechanisms that are responsible for the function of the human body and how they are regulated in health and disease. Historical perspectives of important discoveries in physiology will give the student a view of how scientific research is conducted as well as an historical framework for better understanding physiological concepts. Whenever possible, the class will discuss ethical implications of advances in medical physiology, the use and misuse of physiological research, as well as the ongoing revision of scientific knowledge. Laboratories will be investigative in nature. Students will gain experience in experimental design and hypothesis testing. They will learn that scientific investigation is quantitative in nature and requires problem-solving and written communication skills. Finally, students will learn that scientific investigation is not only challenging, but can also be relevant and fun.
- b. BIO 2001G is designed for non-majors with little or no background in the biological sciences. The content is appropriate for a sophomore-level course. There are no prerequisites.
- c. This course is a revision of BIO 2001C and should maintain the same curriculum ID as BIO 2001C. The topics covered in BIO 2001G overlap to some degree with the content of BIO 3520 (Animal Physiology), but there are significant differences between the two courses. BIO 3520 is a required course for Biological Science majors and has biology and chemistry prerequisites. BIO 2001G cannot be counted as an elective in

the Biological Science major. In BIO 2001G, physiological mechanisms are covered in less detail, while there is increased emphasis on the nature of science, historical foundations, human disease, and current issues related to medical physiology. Almost all of the laboratories in BIO 2001G involve human subjects, while most of the laboratories in BIO 3520 involve animals.

- d. BIO 2001G is a required course in the following majors: Health Studies, Physical Education, and Family and Consumer Sciences (Option in Dietetics). It is an approved elective in the Communication Disorders and Sciences major.

6. Implementation

- a. This course will initially be taught by Dr. Kip McGilliard, Dr. Britto Nathan, and others in the Department of Biological Sciences who have expertise in animal physiology.
- b. Text: Sherwood, L. Human Physiology: From Cells to Systems, 4th ed., West Publishing Company, St. Paul, MN, 2000.
Laboratory manual: A manual containing background information and experimental procedures for the laboratory will be written by the physiology faculty and printed locally.
- c. Each student will be charged a \$10 laboratory fee to help defray the cost of laboratory supplies. The laboratory manual will cost each student approximately \$6. These costs have been previously approved by the President's Council.
- d. Term to be first offered: Spring 2001.

7. Community College Transfer

A community college course may be judged equivalent to this course.

8. Date approved by the Department of Biological Sciences: March 24, 2000

9. Date approved by COSCC: April 14, 2000

10. Date approved by CAA: October 19, 2000

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