Course Syllabus

Department: Science and Technology

Date: 2/1/12

I. Course Prefix and Number: BIO 110

Course Name: Fundamentals of Human Anatomy and Physiology

Credit Hours and Contact Hours: 3 credit hours and 4 contact hours

Catalog Description including pre- and co-requisites:
Study of the basics of human anatomy and physiology including anatomical terminology, basic biochemistry, cells and tissues, and the integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic/immune, respiratory, digestive, and urinary systems. Introduction to common human disease processes. Four hours of lecture weekly with potential lab experience within the four contact hours (three credit hours). Prerequisite: Successful completion of all required remedial courses.

II. Course Outcomes and Objectives

Student Learning Outcomes:

At the completion of this course students will be able to:

1. Define basic anatomical and physiological terms.
2. Describe the normal anatomy and physiology of the integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic/immune, respiratory, digestive, and urinary systems and diseases common to these systems.
3. Describe how body systems interact with one another in human health and disease.
4. Explain the concept of homeostasis and give examples of homeostatic regulatory mechanisms in cells, tissues, organs, and body systems.

Relationship to Academic Programs and Curriculum:

The course is intended for pre-nursing, pre-athletic training and pre-massage therapy students. It can also be taken for general science/biology credit. The course is required for Physical Education Studies. It is not a required course for any other specific degree program.

College Learning Outcomes Addressed by the Course:

- □ writing
- □ oral communications
- □ reading
- □ mathematics
- □ critical thinking
- □ ethics/values
- □ citizenship
- □ global concerns
- □ information resources
III. Instructional Materials and Methods

Types of Course Materials:

The course will require a textbook (Essentials of Anatomy and Physiology, Martini and Bartholemew). Other course materials may be added as instructors choose.

Methods of Instruction (e.g. Lecture, Lab, Seminar …):

Methods of instruction may vary for different instructors and may include:

1. Lecture
2. In-class group work and problem solving.
3. Class projects and presentations.
4. Papers or summary reports based on articles of interest.
5. Optional in-class laboratory exercises
   - Basic Human Anatomy (use of models in class is recommended wherever possible)
   - How to use a microscope, representative tissue slides
   - Bone and muscle models
   - Blood pressure and heart sounds
   - Blood typing
   - Respiratory spirometry

IV. Assessment Measures (Summarize how the college and student learning outcomes will be assessed):

Writing: Students will be given writing assignments in class; exams will include a short answer writing component

Reading: Textbook reading assignments will be given; supplementary reading from the primary literature or popular news sources may be included at the instructor’s discretion

Critical thinking: Students will be guided through the process of understanding homeostasis and applying this concept to the different states of body function. This will be measured in class through group discussion, and on exams through questions designed to assess the student’s ability to reason.

V. General Outline of Topics Covered:

1. Introduction to the human body – homeostasis, levels of organization, body cavities, directionality
2. General chemistry – the periodic table, atoms, bonding, molecules and compounds; pH and buffers; inorganic compounds, including electrolytes and water; the four major biological macromolecules - carbohydrates, lipids, proteins, and nucleic acids – and their role in the structure of the human body
3. Cells, organelles and their functioning; introduction to DNA, RNA and protein synthesis
4. Cell membrane structure, and entry and exit mechanisms
5. The four tissue types, their characteristics, roles and locations in the human body
6. Bone microscopic structure and function; introduction to major bones of the body
7. Muscle structure and physiology; introduction to major muscles of the body
8. Nervous system – levels and divisions of organization; neurons and generation of action potential; human brain organization and function; reflex arcs and the spinal cord; overview of the autonomic nervous system
9. Endocrine system – negative feedback, binding and signaling of lipid and peptide hormones, regulation by the hypothalamus, major endocrine organs (thyroid, adrenal, pancreas, etc)
10. Blood – components, functions; structure and function of hemoglobin; clotting
11. Cardiovascular system – heart structure and function, cardiac muscle, blood flow, electrical generation of heart beat and ECG, heart disease; blood vessels – structure and function; neural and hormonal control of blood pressure; blood flow through capillaries
12. Lymphatic and immune system – structure and function of lymphatic circulation, lymph organs; nonspecific and specific immunity; generation of T cell tolerance and steps in the generation of specific response, including T/B cell interaction for generation of antibodies; viral infection; autoimmunity and allergies
13. Respiratory system – anatomy of respiratory tract; ventilation, external respiration and internal respiration; gas exchange at the respiratory membrane; gas transport; neural regulation of respiration; disease of respiratory system
14. Digestive system – anatomy of digestive tract and accessory organs; the six functions of the digestive system; digestion and absorption of major nutrients; hormonal regulation of digestion; functions of pancreas and liver
15. Renal system – kidney anatomy; nephrons, filtration and urine production, hormones that control urine output; the kidney’s role in homeostasis; structure and function of the urinary tract