GROSSMONT COLLEGE

COURSE OUTLINE OF RECORD

Curriculum Committee Approval: 05/18/2021

GCCCD Governing Board Approval: 06/15/2021

BIOLOGY 141 – HUMAN PHYSIOLOGY

1. Course Number Course Title Semester Units

BIO 141 Human Physiology 3

Semester Hours:

3 hours lecture - 48-54 hours 96-108 outside-of-class hours 144-162 total hours

2. Course Prerequisites

A “C” grade or higher or “Pass” in Biology 120 or equivalent. Only Nursing majors may fulfill the BIO 120 prerequisite with one year of high school biology with a lab.

Corequisite

None

Recommended Preparation

A “C” grade or higher or “Pass” in Biology 140 and Math 090 and English 120 or equivalents.

3. Catalog Description

A study of the function and interrelationships of the nervous, endocrine, muscular, circulatory, respiratory, digestive, exocrine and reproductive systems of the human body. The course emphasizes the homeostatic and evolutionary nature of these systems with some reference to human disease state.

4. Course Objectives

The student will:

a. Comprehend the functions of the physiological systems in the human body.

b. Relate physiology to the basic principles of chemistry and physics.

c. Explain physiological homeostasis as well as natural selection as the unifying principles in the ongoing function of living systems, from the cellular level to the organismal level.

d. Synthesize model homeostatic mechanisms for given physiological conditions.

e. Compare and contrast negative and positive homeostatic feedback mechanisms.

f. Apply the general methods and critical thought processes of life science.

g. Explain normal human physiology as a foundation for the more advanced allied health programs.

h. Evaluate the ethics of current scientific practices such as stem cell research and in vitro fertilization.

i. Read, comprehend, and interpret selected examples from the primary scientific literature.

j. Collect, organize and analyze data.

5. Instructional Facilities

a. Standard lecture classroom with large chart of the Periodic Table of the Elements mounted on the wall of the classroom.

b. Equipment to support multimedia presentations.

6. Special Materials Required of Student

None

7. Course Content

a. Homeostasis as it relates to the concept of health: overview of homeostatic control systems, with emphasis on the physiological reflex model controlled by negative feedback. Major physiological disorders of all major organ systems.

b. Brief review of chemistry as it applies to the study of human physiology.

c. Brief review of cellular physiology, with emphasis on energy sources and energy transfer to ATP, cell membrane, membrane transport, cell-to-cell communication, as well as the functions of ATP in human cells.

d. Brief review of genes and their expression, with attention to selected human genetic diseases.

e. Physiology of neural and endocrine reflex control systems. Cell membrane potential, action potentials, the effect of neurotransmitters at the synapse. Emphasis on stress and the autonomic nervous system, thermoregulation, and sensory organ function.

f. Cardiovascular physiology, with special attention to the baroreceptor reflex and the homeostasis of arterial blood pressure.

g. Components of plasma and interstitial fluid; exchange between fluid compartments.

h. Respiratory physiology, including the blood gases and their transport.

i. Renal physiology, including overview of excretory function and osmoregulation. Includes: discussion of the kidney’s contribution to arterial blood pressure.

j. Immune system function, emphasizing the roles of lymphocytes in specific immune response. Special topics may include vaccines and immunological memory, acquired immune deficiency, and tissue compatibility.

k. Metabolic regulation as it applies to blood glucose homeostasis: absorptive and post-absorptive states.

l. Review of reproductive physiology, with emphasis on endocrine controls.

m. Development of physiological systems in light of natural selection.

n. Overview of functions of body tissues, with emphasis on the integumentary system.

o. Endocrine physiology with emphasis on glucose homeostasis, thyroid homeostasis, and bone homeostasis.

p. Skeletal muscular structure and function.

8. Method of Instruction

a. Lecture

b. Demonstration

c. Video and other multimedia presentations

9. Methods of Evaluating Student Performance

1. Written examinations are included, each covering a portion of the lecture material. The examinations as well as the final will consist of multiple-choice questions, matching, diagramming, fill-in and short essays. Students are expected to:

1) Define relevant terms.

2) Describe major physiological processes.

3) Diagram and explain selected homeostatic mechanisms.

b. Multiple-choice quizzes, each covering a portion of the lecture material.

c. Weekly homework questions based upon assigned readings.

d. All written materials require the use of proper English grammar and correct spelling including technical terminology particular to the subject matter.

10. Outside Class Assignments

a. Selected topical readings from scientific literature.

b. Homework papers on health topics of current interest.

11. Representative Texts

1. Representative Text(s):

Sherwood, Lauralee. *Human Physiology. From Cells to Systems.*9th edition. Boston, MA: Brooks/Cole, Cengage Learning. 2015.

or

Silverthorn, Dee. *Human Physiology: An Integrated Approach.* 8th edition. Pearson, 2018.

1. Supplementary texts and workbooks:

None

Addendum: Student Learning Outcomes

Upon completion of this course, our students will be able to do the following:

1. Describe factors that contribute to denaturation in enzymes.
2. Given an observation of a disruption in homeostasis, student will be able to identify the body receptor, control center and effector involved, and using this information to draw a diagram and write a statement as to how the body restores homeostasis.
3. Describe the physiological effects of long-term sympathetic nervous system stimulation on five organ systems.