COMMON COURSE OUTLINE: Course discipline/number/title: BIOL 1218: Anatomy and Physiology II

A. CATALOG DESCRIPTION
1. Credits: 4
2. Hours/Week: 3 hours lecture and 2 hours lab per week
3. Prerequisites (Course discipline/number): BIOL 1217, CHEM 1117, MATH 0098 or equivalent, and college-level reading and writing skills.
4. Co-requisites (Course discipline/number): CHEM 1117
5. MnTC Goals (if any): Goal 2/Critical Thinking, Goal 3/Natural Sciences

This course is part two of the two-semester Anatomy and Physiology sequence. This course covers the nervous, respiratory, digestive, urinary, endocrine, and reproductive systems.

B. DATE LAST REVISED (Month, year): October, 2014

C. OUTLINE OF MAJOR CONTENT AREAS:
Students will demonstrate basic knowledge, understanding, and ability to apply and analyze concepts and solve problems that relate to the anatomy and physiology of the following areas and body systems. Students will use information from the prerequisite courses in these processes. Students will use microscopes to view and identify tissues. Students will follow experimental procedures to learn about enzyme activity, to identify structures of the nervous system, and to become familiar with major organs of each body system. Students will dissect preserved specimens to explore brain anatomy and major organs of the respiratory, digestive, urinary, endocrine, and reproductive systems. Students will use computer applications to run physiology simulations and to record, analyze, and interpret data.

1. The nervous System
   a) Organization of the nervous system
      i. CNS
      ii. PNS
   b) Nervous tissue
      i. Neurons
      ii. Neuroglia
      iii. White matter and gray matter
   c) Protection
      i. Blood brain tumor
      ii. Meninges
      iii. Cerebrospinal fluid
   d) Spinal cord
      i. External and internal anatomy
      ii. Sensory and motor tracts
      iii. Spinal nerves
      iv. Reflexes
   e) Brain
      i. Functional areas of the cortex
      ii. Basal nuclei
      iii. Diencephalon - thalamus and hypothalamus
      iv. Limbic system
      v. Brain stem - midbrain, pons, and medulla oblongata
      vi. Reticular formation and reticular activating system
      vii. Cerebellum
      viii. Cranial Nerves
   f) Autonomic nervous system
      i. Parasympathetic division
      ii. Sympathetic division
   g) General senses and sensory receptors
   h) Special senses
      i. Gustation and olfaction
      ii. The eye and vision
C. OUTLINE OF MAJOR CONTENT AREAS: Continued...
   iii. The ear, hearing and equilibrium
      i) Homeostatic imbalances

2. The respiratory System
   a) Anatomy and histology
   b) Gas laws
   c) Inspiration and expiration
   d) External respiration
   e) Internal respiration
   f) Gas transport
   g) Control of breathing
   h) Homeostatic imbalances

3. The digestive System
   a) Anatomy and histology
   b) Mechanical digestion
   c) Chemical digestion and enzyme activity
   d) Absorption of nutrients
   e) Control of digestion
   f) Homeostatic imbalances

4. Metabolism
   a) Anabolic and catabolic pathways for:
      i. Carbohydrates
      ii. Lipids
      iii. Proteins
      iv. Nucleic acids
   b) Pre-absorptive and post-absorptive states
   c) Cholesterol
   d) Homeostatic imbalances

5. The urinary system
   a) Anatomy and histology
   b) Functions
   c) Urine formation – filtration, reabsorption, and secretion
   d) Regulation of urine formation
   e) Homeostatic imbalances

6. Fluid, electrolyte, and acid-base balance
   a) Intracellular vs. extracellular fluid
   b) Electrolytes
   c) Acid-base balance
      i. Control of acid base balance of the body
      ii. Physiological buffers - respiratory system and urinary system
      iii. Buffer systems
   d) Homeostatic imbalances

7. The endocrine system
   a) Anatomy and histology
   b) General principles of hormone action
   c) Hypothalamus
   d) Pituitary gland
   e) Thyroid gland
   f) Parathyroid glands
   g) Pancreas
   h) Adrenals glands
C. OUTLINE OF MAJOR CONTENT AREAS: Continued...
   i) Gonads – testes and ovaries
   j) Other endocrine tissues
   k) Homeostatic imbalances

8. The reproductive System
   a) Male reproductive anatomy and histology
   b) Female reproductive anatomy and histology
   c) Regulation of male and female reproductive cycles

9. Development
   a) Conception and embrogenesis
   b) Fetal development

D. LEARNING OUTCOMES (GENERAL): The student will learn:
   1. Have acquired Vocabulary/terminology specific to anatomy and physiology.
   2. Use vocabulary/terminology appropriately both orally and in writing.
   3. Use the microscope to identify tissues.
   4. Identify major anatomical structures of each body system.
   5. Identify the histology of major organs in each body system.
   6. Relate the structure of major organs/glands to their functions.
   7. Explain physiological principles specific to each body system.
   8. Predict how homeostatic imbalance(s) can lead to disease.

E. LEARNING OUTCOMES (MNTC):
   Goal 2/Critical Thinking: The student will be able to:
   1. Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and
      conscious of possible bias in the information selected.
   2. Imagine and seek out a variety of possible goals, assumptions, interpretations or perspectives which can give
      alternative meanings or solutions to given situations or problems.
   3. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim;
      generate and evaluate implications that follow from them.
   4. Recognize and articulate the value assumptions which underlie and affect decisions, interpretations, analyses and
      evaluations made by ourselves and others.

   Goal 3/Natural Sciences: The student will be able to:
   1. Demonstrate understanding of scientific theories.
   2. Formulate and test hypotheses by performing laboratory experiments requiring the collection of data, its statistical and
      graphical analysis and an appreciation of its sources of error and uncertainty.
   3. Communicate their experimental findings, analysis and interpretations both orally and in writing.
   4. Evaluate society issues from a natural science perspective, ask questions about the evidence presented and make
      informed judgments about science-related topics and policies.

F. METHODS FOR EVALUATION OF STUDENT LEARNING:
   1. Lecture exams - objective and/or subjective
   2. Lecture and/or laboratory quizzes
   3. Laboratory practical exams
   4. Lecture and/or laboratory assignments or reports

G. RTC CORE OUTCOME(S) ADDRESSED:
   ☒ Communication
   ☐ Civic Responsibility
   ☒ Critical Thinking
   ☐ Personal/Professional Accountability
   ☐ Global Awareness/Diversity
   ☐ Aesthetic Response
H. SPECIAL INFORMATION (if any):
The initial lab session explains and familiarizes the student with general safety hazards and safety equipment in the lab. During the pre-lab discussion, the hazardous characteristics of any materials used during the lab are discussed. In addition, if lab sessions involve any potentially infectious material, the students is taught the proper use and disposal of these materials. The instructor instructs all students to wear necessary protective equipment while working with any hazardous chemicals. A copy of Material Safety Data Sheets for chemicals used is available in the lab.