Common Course Outline for: BIOL 1102 Human Biology

A. Course Description
   1. Number of credits: 4
   2. Lecture hours per week: 3
      Lab hours per week: Minimum of 3 hours of self-directed lab work
   3. Prerequisites: Eligible for READ 1106
   4. Co-requisites: None
   5. MnTC Goal: 3

A non-majors, general education lab course that introduces the topics of human structure and function and causes of disease. Topics include the scientific method, cells and organ systems with an emphasis on contemporary issues. Lab requires dissection of a small mammal and collaborative data collection. Lecture 3 hours per week. Lab requires a minimum of 3 hours per week of self-directed lab work. May not be taken for credit after earning a “C” or better in BIOL 2041.

B. Date last revised: April 2016

C. Outline of Major Content Areas

   Lecture: Subtopics listed under each main topic may vary due to recent developments in the field and current events.

   1. An Introduction to Life, Human Biology and Science
      a. Characteristics of Life
      b. Classification and Homo sapiens
      c. Scientific Method and Critical Thinking
   2. Chemistry of Life
      a. Atoms, Bonds, Water
      b. Macromolecules: Carbohydrates, Proteins, Lipids, Nucleic Acids
      c. Diffusion, Osmosis and Active Transport
      d. Anaerobic and Aerobic Energy Relationships
   3. Body Organization and Homeostasis
      a. Body Cavities, Planes of Section, Directional Terms
      b. Negative and Positive Feedback Loops
      c. Cell Structure and Function
      d. The Four Major Tissues
   4. Organ Systems
      a. Integumentary System
         i. Epidermis and Dermis
         ii. Accessory Structures
         iii. Burns and Wound Healing
b. Skeletal System
   i. General Skeletal Anatomy and Functions
   ii. Skeletal Development, Remodeling and Repair
   iii. Components of the Axial and Appendicular Skeletons
   iv. Articulations

c. Muscular System
   i. Muscle Fibers, Sarcoplasm, Myofibrils and Sarcomeres
   ii. Sliding Filament Theory of Muscle Contraction
   iii. Miscellaneous Aspects of Muscle Function

d. Nervous System
   i. Structure of the CNS and PNS
   ii. Contributions of Resting Membrane Potentials, Action Potentials, and Refractory Period to the Nerve Impulse
   iii. Neurotransmission at the Synapse
   iv. Functions of the Cranial Nerves, Spinal Nerves and Plexuses
   v. Anatomical, Physiological and Pharmacological Components of the Autonomic Nervous System
   vi. Reflexes

e. Circulatory System
   i. Blood Components and Functions, including Blood Types
   ii. Cardiovascular System and Lymphatic System
   iii. Heart, Electrocardiogram, and Cardiac Cycle
   iv. Blood Pressure
   v. Cardiovascular Disease and Treatment

f. Immune System
   i. Pathogens
   ii. Nonspecific Defenses
   iii. Specific Defenses
   iv. Active and Passive Immunity

g. Respiratory System
   i. Structural Components
   ii. Ventilation and External Respiration
   iii. Blood Gas Transport

h. Digestive System
   i. Structure and Function of G.I. Organs
   ii. Functions and Importance of Accessory Organs
   iii. Enzymatic Digestion of Carbohydrates, Proteins and Fat

i. Urinary System
   i. Gross and Microscopic Anatomy
   ii. Glomerular Filtration and Selective Reabsorption
   iii. Urine Formation

j. Endocrine System
   i. Mode of Action of Hormones
   ii. Feedback Mechanisms
   iii. Hormones, Hormone Functions and Dysfunction of the Endocrine Glands

k. Special Senses
i. General Anatomy and Physiology of at least two of the special senses
l. Reproductive System
   i. Anatomy of the Reproductive Systems
   ii. Physiological Aspects of Reproduction
   iii. Developmental Stages of Conceptus
2. Human Genetics
   a. Human Chromosomes and Human Genes
   b. Patterns of Inheritance
   c. Genetic Disorders
   d. Genetic Testing
3. Evolution
   a. Origins of Life
   b. Mutation, Natural Selection, Genetic Drift and Gene Flow
   c. Evidence for Evolution

Laboratory: Students will be involved, actively and individually, in the dissection of a small mammal in the laboratory. Students will be involved in collaborative data collection. Students will actively participate in lab by engaging in studies related to:
   1. Human macroscopic structural anatomy
   2. Rat dissection
   3. Cell membrane transport
   4. Enzyme function
   5. Cranial nerve function
   6. Use of the microscope
   7. Mammalian histology
   8. Skeletal anatomy
   9. Blood pressure
   10. Pulmonary function
   11. Immunology
   12. Controlled experimental investigation

D. Course Learning Outcomes
Upon successful completion of the course, the student will be able to:
   1. Identify normal structures and describe normal function of the human body. (3a)
   2. Explain scientific theories and describe the ways in which scientists develop, express and question theories. (3a)
   3. Design and test hypotheses by performing laboratory experiments. (2b, 3b)
   4. Utilize critical thinking skills during discussions and when interpreting laboratory results. (2a, 3a, 3b)
   5. Communicate experimental results, analyses and interpretations both orally and in writing. (2c, 2d, 3c)
   6. Elaborate upon and defend positions relating to medical treatment, medical ethics, and genetic testing. (2d, 3d)
E. Methods for Assessing Student Learning

A variety of evaluation and assessments methods will be used including, but not limited to, the following:

1. Written examinations (may include some or all of the following formats: multiple choice, true-false, fill-in-the-blank, matching, short answer and critical thinking questions) over lectures, class discussions and reading assignments
2. Writing assignments
3. Quizzes
4. Graphing exercises
5. Work sheets
6. Oral, individual quizzing on laboratory activities.
7. Term papers
8. Oral presentations
9. Laboratory reports
10. A final comprehensive exam

F. Special Information

The laboratory portion of the course is delivered in the Biology Learning Center (BLC). The BLC is an open lab and has its own set of operating policies and procedures. An instructor will include the most recent version of the Departmental and Biology Learning Center Policies in the course syllabus.

Dissection of a small mammal is required of each student; there are no exceptions or alternate activities.

Laboratory procedures require the handling, treatment, and manipulation of Daphnia (water fleas).

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