

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: 3
3. Prerequisites: ENGC 0960 (C- or better) OR READ 0960 (C- or better) OR High School GPA of 2.60+ OR ACT Sub-Score of 21+ OR ACT Sub-Score of 19+ and High School GPA of 2.50+ OR SAT Read/Write score of 480+ OR SAT Read/Write score of 440+ and High School GPA of 2.50+ OR Accuplacer Reading score of 250+ OR Accuplacer Reading score of 236+ and High School GPA of 2.50+ OR MCA Reading score of 1047+ OR MCA Reading score of 1042-1046 and High School GPA of 2.50+
4. Corequisites: None
5. MnTC Goal: #3 Natural Sciences

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, collaborative data collection, and collecting data from students. Lecture 3 credits, 3-hour lab 1 credit.

B. Date last reviewed/updated: January 2023**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
 - iv. Disorders of the muscular system
- 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 and physiological components of the autonomic nervous system
 - vi. Reflexes
 - vii. Disorders of the nervous system
- 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
 - v. Disorders of the immune system
- g. Respiratory System
 - i. Structural components
 - ii. Ventilation and external respiration
 - iii. Blood gas transport
 - iv. Disorders of the respiratory system
- h. Digestive System
 - i. Structure and function of gastrointestinal organs
 - ii. Functions and importance of accessory organs
 - iii. Enzymatic digestion of carbohydrates, proteins and fat

- iv. Disorders of the digestive system
- i. Urinary System
 - i. Gross and microscopic anatomy
 - ii. Glomerular filtration and selective reabsorption
 - iii. Urine formation
 - iv. Disorders of the urinary system
- 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
 - iv. Disorders of the reproductive system
- 5. Human Genetics
 - a. Human chromosomes and human genes
 - b. Patterns of inheritance
 - c. Genetic disorders
 - d. Genetic testing
- 6. 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 gross anatomy
2. Rat dissection
3. Cell membrane transport
4. Enzyme function
5. Cranial and spinal nerve function
6. Use of the microscope
7. Mammalian histology
8. Skeletal anatomy
9. Blood pressure
10. Pulmonary function
11. Muscular function
12. Immunology
13. 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. (Goal 3a)
2. Explain scientific theories and describe the ways in which scientists develop, express and question theories. (Goal 3a)
3. Design and test hypotheses by performing laboratory experiments. (Goal 2b, 3b)
4. Utilize critical thinking skills during discussions and when interpreting laboratory results. (Goal 2a, 3a, 3b)
5. Communicate experimental results, analyses, and interpretations both orally and in writing. (Goal 2c, 2d, 3c)
6. Elaborate upon and defend positions relating to medical treatment, medical ethics, and genetic testing. (Goal 2d, 3d)

E. Methods for Assessing Student Learning:

A variety of evaluation and assessment methods may be used:

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:

Instructors will include the most recent version of the Departmental Expectations document in their course syllabus.

When offered on-campus:

- The laboratory portion of the course is delivered in the Biology Learning Center (BLC).
- Instructors will include the most recent version of the Biology Learning Center (BLC) Expectations document in their course syllabus.
- Dissection of a small mammal is required of each student; there are no exceptions or alternate activities.
- Laboratory procedures may require the handling and killing of microscopic organisms.