



DEPARTMENT OF SCIENCE
COURSE INFORMATION SHEET FOR
BIO102 – GENERAL BIOLOGY II

All members of the Science Department at Clinton Community College use the respective course templates as a basis for their course syllabi. Faculty may, at their discretion, change the order of the course content or add course content.

COURSE NUMBER AND TITLE: BIO102 – General Biology II

COURSE SECTION: TBA

CONTACT HOURS: 5 **CREDIT HOURS:** 4

SEMESTER AND YEAR: TBA

INSTRUCTOR'S NAME, TELEPHONE NUMBER, EMAIL ADDRESS, OFFICE NUMBER, AND OFFICE HOURS: TBA

I. COURSE DESCRIPTION:

This course is a continuation of BIO 101. Topics include evolution, biological diversity, plant structure and function, animal systems, development and reproduction, and introductory concepts of ecology with emphasis on current environmental concerns. The laboratory reinforces concepts discussed in lecture emphasizing anatomy and physiology of selected members of the plant and animal kingdoms. There are three hours of lecture and one two-hour laboratory per week.

II. PREREQUISITE: BIO101 – General Biology I

Students receiving credit for BIO101 and/or BIO102 cannot receive credit for BIO100.

COREQUISITE: ENG101 – English Composition or equivalent

III. COURSE OBJECTIVES:

As the result of instructional activities, students will be able to:

Evolution, Population Genetics, History of Life

Explain the Hardy-Weinberg law and describe the assumptions of the law.

Describe how natural selection acts to change gene frequencies.

Explain the role of variation and sexual reproduction in evolutionary change.

Describe the allopatric speciation model.

Explain how organisms are categorized based on evolutionary changes.

Name the four geologic eras and list the major groups of organisms that arose during each era.

Viruses

Describe the structure of a virus.

Describe reproduction in bacteriophages, animal viruses containing DNA, and retroviruses.

Prokaryotes

Describe the structure of a prokaryotic cell.

Describe reproduction in prokaryotes.

Describe mechanisms of genetic recombination in prokaryotes.

Describe the role of autotrophic and heterotrophic bacteria in ecosystems.

Find and identify representative bacterial types using a microscope.

Eukaryotes

Explain the endosymbiotic theory of the origin of the chloroplast and mitochondrion and list evidence to support the theory.

Draw three types of life cycles that are typical of eukaryotes.

Protists, Fungi, Plants, Animals

Describe the structure of representative genera from each of the major phyla (divisions).

Describe and draw the life cycle of representative genera from each of the major phyla (divisions) and state the name and function of reproductive structures.

Describe how representative genera obtain their energy and nutrients, where they are found in the environment, their important relationships with other organisms, and any important adaptations.

Animals

List characteristics of animals.

Explain the life cycle of animals.

Describe the development of embryonic germ layers, symmetry, body cavity, and gut in the major phyla of animals.

Name at least nine major phyla animals and describe representative genera from each.

Describe how representative genera obtain their energy and nutrients, where they are found in the environment, their important relationships with other organisms, how they protect themselves, and any important adaptations.

Animal Tissues

Name three embryonic tissues and list the tissues that they give rise to.

Name the types of epithelial tissue, connective tissue, and muscle tissue.

For each types of tissue named above, state important characteristics of the tissue, tell where is found and state it's function.

The Circulatory System

Describe the function of the circulatory system in representatives of the major phyla of animals.

Explain the difference between open and closed circulatory systems and give examples of animals with each type.

Describe the structure and function of each type of blood vessel in vertebrate animals.

Describe the structure of a mammalian heart and state the function of each structure.

Describe the cardiac cycle by stating the events that occur during a complete cycle.

Explain how blood pressure is measured.

Describe the components of mammalian blood and state the function of each component.

Explain how a blood clot forms.

Lymphatic and Immune Systems

Describe antibody-mediated immunity.

Describe clonal selection of B lymphocytes.

List functions of the complement system.

Describe the mechanism of activation of T lymphocytes.

State the function of each type of T lymphocyte.

Endocrine System

State the name and function of hormones secreted or released by the posterior and anterior pituitary.

State the name, mechanism of stimulation, and function of hormones secreted by the thyroid, adrenal cortex, gonads, parathyroids, adrenal medulla, pancreas, thymus, and pineal glands.

Describe the mechanism of stimulation of the anterior pituitary, thyroid, adrenal cortex, gonads, parathyroids, adrenal medulla, islets of Langerhans, thymus, and pineal glands.

Describe negative feedback inhibition of the anterior pituitary, thyroid, adrenal cortex, gonads, parathyroids, and islets of Langerhans.

Digestive System

Describe the digestive activities that occur in each of the major organs of the digestive system.

Name major digestive enzymes and discuss where they are secreted.

Describe how hormones regulate the secretion and release of digestive secretions from the stomach, pancreas, liver, and gall bladder.

Respiratory System

Name the major structures of the mammalian respiratory system and describe their function.

Explain how oxygen and carbon dioxide are transported to and from tissues in mammals.

Describe how breathing rate is controlled in mammals.

Excretory System

Name three types of nitrogenous wastes produced by terrestrial animals and explain advantages or disadvantages to each type.

Describe the function of each part of the nephron and explain how it functions to concentrate urine.

Describe the role of each of the following hormones in regulating water loss: ADH, aldosterone, atrial natriuretic hormone

Explain how pH of the blood is regulated.

Motor Systems (skeletal and muscle)

Describe the structure of bone and explain how it is formed embryonically.

Name the major bones of the body.

Describe major kinds of joints and explain how they function.

Describe the structure and function of skeletal, smooth, and cardiac muscle.

Explain the role of actin, myosin, calcium, tropomyosin, and troponin in muscle contraction.

Reproductive System

Name the major structures of the mammalian male and female reproductive systems and describe their function.

Describe spermatogenesis and oogenesis by naming the structures and cells involved and stating the number of chromosomes present in each of the meiotic cells.

Describe the menstrual cycle by stating the role of each hormone and the effect of each hormone on their target structures.

Explain how pregnancy stops the menstrual cycle.

The Nervous System

Describe the evolution of the nervous system in the major phyla of animals.

Describe the function of the somatic, sympathetic, and parasympathetic nervous systems.

Describe reflex arcs.

Identify the following regions on a photograph of the human brain:
medulla oblongata, cerebellum, pons, midbrain, thalamus, hypothalamus, cerebrum,
corpus callosum, motor cortex, sensory cortex

State the function of each brain region listed above.

Name the four major lobes of the cerebral cortex and describe their function.

Explain how action potentials are propagated along a neuron.

Describe the function of schwann cells.

Describe physiological mechanisms that lead to the release of neurotransmitter and explain how neurotransmitter is removed from the synaptic cleft.

Sensory Systems

Explain how neurons from a sensory organ can detect a wide range of intensity of stimuli.

Describe the function of chemoreceptors and photoreceptors and tell where they are found in the bodies of representatives of the major phyla of animals.

List the major structures of a vertebrate eye and state the function of each structure.

Name the types of cells that detect light in a vertebrate eye, tell where these cells are located, and state the type of light that they detect.

IV. REQUIRED TEXTBOOK AND MATERIALS:

REQUIRED TEXTBOOK:

Biology, 7th edition; Campbell. Benjamin Cummings
ISBN #0-805-37171-0

REQUIRED MATERIALS:

Safety glasses are required for all on-campus sections.

V. METHODS OF INSTRUCTION/COURSE ORGANIZATION: *To be determined by the respective instructor.*

VI. ATTENDANCE PROCEDURE (INCLUDING MAKEUP POLICY): *To be determined by the respective instructor.*

VII. BIBLIOGRAPHY OF READINGS (IF APPLICABLE): *To be determined by the respective instructor.*

VIII. METHODS OF EVALUATION (INCLUDING THE CALCULATION OF COURSE GRADE): *To be determined by the respective instructor. The methods of evaluation shall include tests (test types, length and weight of each), papers (weight of each), projects (weight of each), and other forms of evaluation (weight of each).*

IX. GRADING SCALE: *To be determined by the respective instructor. The grading scale shall indicate what numerical scores correspond to the following grades: A, A-, B+, B, B-, C+, C, C-, D+, D, and F.*

Please Include: If you have, or suspect you may have, any type of disability or learning problem that may require extra assistance or special accommodations, please speak to me privately after class or during my office hours as soon as possible so I can help you obtain any assistance you may need to successfully complete this course. You should also contact Laurie Bethka, Room 420M in the Academic Assistance Center, for further assistance.

X. GENERAL TOPICS OUTLINE:

1. Evolution and Population Genetics
2. Speciation and Taxonomy
3. History of Life
4. Viruses
5. Prokaryotes
6. Protists
7. Fungi
8. Seedless Plants
9. Seed Plants
10. Sponges, Cnidarians, Flatworms, Roundworms
11. Mollusks, Annelids, Arthropods
12. Echinoderms, Chordates
13. Animal Tissues
14. Circulatory System
15. Lymphatic and Immune Systems
16. Endocrine System
17. Digestive System
18. Respiratory System
19. Excretory System
20. Motor Systems
21. Animal Reproduction
22. The Nervous System: Neurons
23. The Nervous System: Organization
24. Sensory Systems

XI. ACADEMIC INTEGRITY: Academic honesty is expected of all Clinton Community College students. It is academically dishonest, for example, to misrepresent another person's

work as one's own, to take credit for someone else's work or ideas, to accept help on a test, to obtain advanced information on confidential test materials, or to intentionally harm another student's chances for academic success.

XII. COURSE CONTINUITY PLAN: In the case that the college officially closes because of an emergency which causes a short term disruption of this course, we will utilize e-mail to continue this course in the short term (1-3 weeks). All students need to utilize their campus e-mail to receive course related information.