BIOLOGY 0110 COURSE OUTLINE

Fall 96

INSTRUCTOR: Audrey Wells

OFFICE: J115

OFFICE PHONE: 539-2038

OFFICE HOURS: drop in or make an appointment

TEXTBOOK: Modern Biology, by A. Towle

SUPPLIES: lined and unlined paper, three-ring binder, stapler; lab coat recommended but not mandatory

COURSE GOALS:
This course is designed to introduce the student to some of the basic biological principles: characteristics of life, scientific method, cell theory, structure , classification and diversity of living organisms. The course will explore the structure and function of living organisms using selected examples of oganisms from the five biological kingdoms. The lab component of the course will give students a chance to get some hands-on experience with organisms and to develop biology lab skills and scientific skills.

ATTENDANCE:
Regular attendance is crucial for passing the course. Students who miss classes will soon find themselves falling behind and failing. A student will be barred from writing the final exam if 10% or more of the classes are missed. Students must assume the responsibility for course work and assignments missed when absent. Please try not to be late. Late individuals disrupt the class. Students who fail to submit or to attend two labs will be barred from the final exam.

TESTS AND EXAMS:
There will be several tests and quizzes throughout the term, a midterm exam and a final exam. There will be no surprise tests. Absence from tests or quizzes will result in a mark of 0 for that test or quiz unless PREVIOUS arrangement is made with the instructor for medical or other legitimate reasons. There will be no make-up tests. Doctor certificates will be required for medical reasons. The date and time must be clearly indicated.

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LABS AND LAB REPORTS:

There will be approximately 9 labs during the course; lab attendance is compulsory. Evaluation of labs is either through a lab quiz, or a lab report. Lab reports are due exactly one week following completion th the lab. No late labs will be accepted. Please read the lab procedure before the lab so that you are better prepared and can complete the lab during the lab period.

EVALUATION:

Lab reports/quizzes.....30%
Tests and quizzes.....30%
Midterm exam.....15%
Final exam.....25%

I am available to help you. If you find yourself floundering, please don't hesitate to ask for assistance. You have made the commitment to come back to education, I am here to help you reach your goal.

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COURSE CONTENT:
Use this as a guide for reading the test and studying for tests, labs and quizzes.
Some material may be omitted or added to this outline.

UNIT 1: THE NATURE OF SCIENCE (Chapter 1, 2)

1. Define science. Define Biology
2. List biological fields of study and biological themes.
3. Outline and identify the main steps in the scientific method. Explain their importance
4. Define the following terms: Control, variable, experimental factor.

UNIT 2: UNDERSTANDING BIOLOGICAL CONCEPTS AND TOOLS.

1. Define magnification and resolution
2. Differentiate between the light microscope and the electron microscope.
3. Label the parts of a light microscope.
4. Name two types of electron microscopes.
5. Identify a biological picture as drawn by an artist, taken with a light microscope, or taken with an electron microscope.
6. Understand the essential components of a lab report.
7. Draw lab diagrams and label correctly.
8. Define cross section and longitudinal section.

UNIT 3: INTRODUCTION TO BIOLOGY (Chapter 1, 5)

1. List the characteristics of living things.
2. List the basic requirements of living things.
3. State the cell theory and how it was developed.
4. Describe the structure and function of the following cell parts: cytoplasm, nucleus, nucleolus, nuclear envelope, chromosomes, cell membrane, ribosomes, endoplasmic reticulum, Golgi apparatus, mitochondria, lysosomes, cilia, flagella, cell wall, vacuoles, plastids.
5. Label all the above parts on diagrams
6. Distinguish between plant and animal cells.
7. Distinguish between prokaryotic and eukaryotic cells.
8. Explain the concept of cellular specialization
9. Distinguish between tissues, organs, organ systems and organisms.

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UNIT 4: INTRODUCTION TO CLASSIFICATION

1. Explain the need for classification of organisms.
2. Outline the contributions of Aristotle and Linnaeus to the Science of Classification.
3. Explain and use correctly the binomial nomenclature system for naming organisms.
4. Correctly use a dichotomous key(taxonomy).
5. List the groupings used in modern taxonomy in the correct sequence.
6. Distinguish between the five kingdoms of living organisms: Monera, Protista, Fungi, Plantae, Animalia.

UNIT 5: MICROORGANISMS

VIRUSES

1. Explain why viruses can be considered living or non-living.
2. Describe the basic structure of viruses.
3. Describe the life cycle of a bacteriophage.
4. List some diseases caused by viruses.
5. Discuss the problems involved with studying viruses, and prevention and cure of viral diseases.

KINGDOM MONERA

Bacteria (Chapter 20)

1. Name and describe the three general shapes of bacteria.
2. Describe the structure, nutritional requirements, respiration, and reproduction of bacteria.
3. Name some diseases caused by bacteria. Discuss how bacteria cause disease.
4. State the importance of bacteria to humans and to the living world in general: disease, food spoilage, decomposition, nitrogen fixation, industrial usage.

KINGDOM PROTISTA

1. List the general characteristics of the Kingdom Protista
2. Name the two groups of Protists
3. Define protozoan
4. Describe the structure, mvement, reproduction, nutrition and response of the Amoeba and Paramecium.
5. Name some diseases caused by protozoans
6. Describe the structure, movement , reproduction, nutrition and response of the autotrophic protists, the unicellular Euglena and the filamentous Spirogyra
7. State the importance of algae.

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KINGDOM FUNGI

1. List the general characteristics of Fungi
2. Describe the structure, nutrition, reproduction of selected examples of fungi: Rhizopus, common mushroom, sugar yeast.
3. Importance of gungi in decompostion,diseases and industry eg. antibiotics, food, beverages.
4. Mycorrhizae and lichens

UNIT 6: THE PLANT KINGDOM (Chapters 24-27)

Importance of plants/plant animal coevolution

NON SEED PLANTS

1. State how land plants are adapted to life on land.
2. Three characteristics of phylum Bryophyta.
3. Relate the characteristics of mosses to their structure.
4. Describe the life cycle of the moss.
5. Explain "alternation of generations". Define the terms sporophyte, gametophyte, haploid, diploid, meiosis, and dominant generation.
6. List the general characteristics of th phylum Pterophyta.
7. Describe the structure and life cycle of the fern.

SEED PLANTS

1. Define seed, angiosperm and gymnosperm.
2. List 5 ways seeds are dispersed.
3. Label diagrams of seeds.
4. List some general characteristics of gymnosperms.
5. Discuss how conifers are well adapted for life on land.
6. Outline the life cycle of Pinus.
7. Describe the general characteristics of Angiosperms.
8. State why angiosperms are so successful.
9. Describe the functions of roots stems and leaves.
10. Distinguish between monocots and dicots.
11. Describe pollination, fertilization, seed formation, and fruit production in flowering plants.
12. Compare the life cycles of the moss, fern, pine, and angiosperm.

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UNIT 7: THE ANIMAL KINGDOM

INVERTEBRATES

1. Describe the general characteristics of animals.
2. Distinguish between asymmetry, radial and bilateral symmetry.
3. Define lateral, dorsal, ventral, posterior, and anterior.
4. Describe the basic structure and functional characteristics of porifera.
5. Describe the basic structure and functional characteristics of cnidaria(coelenterates) with emphasis on Hydra
6. Describe the characteristics of platyhelminths, and distinguish between free-living flatworms, flukes and tapeworms. (Chapter 30)
7. Describe the structure and life cycle of a tapeworm.
8. Describe the structure and organ systems of the earthworm (Annelida, chapter 31)
9. Describe the characteristics of mollusks and echinoderms.(Chapters 31, 34)
10. Discuss the characteristics of arthropods.(Chapter 32)
11. Distinguish among the major classes of arthropods: arachnids, crustaceans, insects, diplopods, and chilopods.
12. Describe the basic structure and organ systems of the crayfish and the grasshopper.
13. Give reasons why insects are among the most successful organisms (Chapter 33)
14. Distinguish between complete, and incomplete metamorphosis in insects, giving giving examples of each.

VERTEBRATES

1. Chordate and vertebrate characteristics. (Chapter 36)
2. Describe main characteristics and adaptations of each class of vertebrates:
   Chordates
   Fish - agnatha, cartilaginous fish, bony fish: adaptations for aquatic life, respiration, reproduction, external and internal anatomy of bony fish.
   Amphibians (Chapter 37) general characteristics and adaptations
   Reptiles (Chapter 38) general characteristics and adaptations
   Birds (Chapter 39) general characteristics, adaptations for flight, differences in beaks, feet, for different ecological niches.
   Mammals(Chapter 40) adaptations to different environments, three types of mammals: monotremes, marsupials, placentals: orders of placentals and their adaptations.