

A. CATALOG DESCRIPTION (include prerequisites)

Course Title: A Survey of Life Forms
Credits: 4
Hours/Week: 3 hours lecture and 2 hours lab per week
Semesters Offered: One semester per year
Prerequisites: High school chemistry or CHEM 1101 or equivalent, and BIOL 1220 or equivalent

This course meets the requirements for the Minnesota Transfer Curriculum in CT (Critical Thinking), NS (Natural Science) and PN (People and the Environment).

A study of the diversity of plants and animals including the anatomical and physiological study of select organisms. Intended for biology majors and individuals majoring in forestry, agriculture, conservation, medicine, veterinary medicine, recreation, physical therapy, optometry, pharmacy, home economics and dentistry.

B. DATE LAST REVISED (use current date): April, 2003

C. RECOMMENDED ENTRY SKILLS/KNOWLEDGE:

College-level reading and writing and working knowledge of elementary algebra

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Evolution and Diversity of Organisms
 - a. The origin and evolution of life
 - b. Bacteria and viruses
 - c. Protistans
 - d. Fungi
 - e. Plants
 - f. Animals: the invertebrates
 - g. Animals: the vertebrates
 - h. Human evolution: A case study
2. Plant Structure and Function
 - a. Plant tissues
 - b. Plant nutrition and transport
 - c. Plant reproduction
 - d. Plant growth and development
3. Animal Structure and Function
 - a. Tissues, organ systems and homeostasis
 - b. Information flow and the neuron
 - c. Integration and control: nervous system
 - d. Sensory reception
 - e. Integration and control: endocrine systems
 - f. Protection, support and movement
 - g. Circulation
 - h. Immunity
 - i. Respiration
 - j. Digestion and human nutrition

D. OUTLINE OF MAJOR CONTENT AREAS (continued):

3. Animal Structure and Function (continued)
 - k. Water-solute balance and temperature control
 - l. Principles of reproduction and development

Laboratory activities are used to enhance, correlate and demonstrate a variety of scientific inquiry and as verifications of concepts covered in lectures.

- Lab #1 Taxonomy: classifying and naming organisms
- Lab #2 Monerans and protists; fungi; algae
- Lab #3 Bryophytes: liverworts and mosses; seedless vascular plants: fern allies and ferns
- Lab #4 Seed plants I: gymnosperms; seed plants II: angiosperms
- Lab #5 Sponges and cnidarians; flatworms, roundworms and rotifers
- Lab #6 Mollusks, segmented worms and joint-legged animals; echinoderms, hemichordates and invertebrate chordates
- Lab #7 Vertebrates
- Lab #8 Plant organization: vegetative organs of flowering plants
- Lab #9 Animal organization
- Lab #10 Dissection of the fetal pig: introduction, external anatomy and the muscular system
- Lab #11 Dissection of the fetal pig: digestive, respiratory and circulatory systems;
Dissection of the fetal pig: urogenital and nervous systems
- Lab #12 Human sensations, reflexes and reactions; human skeletal and muscular systems
- Lab #13 Human blood and circulation
- Lab #14 Human respiration
- Lab #15 Animal development: gametogenesis and fertilization
- Lab #16 Animal development: cleavage, gastrulation and late development

E. LEARNING OUTCOMES (GENERAL):

1. Learn diversity of invertebrates and vertebrates
2. Learn human evolution
3. Learn the diversity of plants
4. Learn various plant structures and functions
5. Learn various animal structures and functions
6. Learn plant and animal development

F. LEARNING OUTCOMES (MNTC):

Critical Thinking

- a. 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.
- b. 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.
- c. 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.
- d. Recognize and articulate the value assumptions, which underlie and affect decisions, interpretations, analyses and evaluations made by ourselves and others.

F. LEARNING OUTCOMES (MNTC) (continued):

Natural Sciences

- a. Demonstrate understanding of scientific theories in the biological sciences.

- b. Formulate and test hypothesis by performing laboratory and field experiments requiring collection of data, its statistical and/or graphical analysis, and an appreciation of uncertainty and sources of error
- c. Communicate their experimental findings, analysis and interpretations both orally and in writing.
- d. Evaluate society issues from a natural science perspective, ask questions about the evidence presented and make informed judgments about science-related topics and policies.

People and the Environment

- a. Explain the basic structure and function of various natural ecosystems and of human adaptive strategies within those systems.
- b. Describe the basic institutional arrangements (social, legal, political, economic, religious) that are evolving to deal with environmental and natural resource challenges.
- c. Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems and institutions.
- d. Propose and assess alternative solutions to environmental problems.
- e. Articulate and defend the actions they would take on various environmental issues.

G. METHODS FOR EVALUATION OF STUDENT LEARNING:

- 1. Examinations over topics discussed in lecture.
- 2. Laboratory reports which are turned in at the end of each lab.
- 3. Midterm and final lab practicals over lab exercises.

H. SPECIAL INFORMATION (fees, directives on hazardous materials, etc.):

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 the lab involves any potentially infectious material, the students will be instructed on the proper use and disposal. The instructor will direct 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.