Biology 110 Course Outline
Fall 1993

INSTRUCTOR: Keith Roscoe OFFICE: C213

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OFFICE HOURS: see posted hours on my office door, or make an appointment.

TEXTBOOK: Modern Biology, by A. Towle (1989 or 1991 edition)

REQUIRED SUPPLIES: (1) stapler—for stapling labs and assignments (2) three-ring binder (3) plain paper for lab drawings.

RECOMMENDED (especially if you are carrying on to biology 130): a **lab coat**—available at the bookstore

ABOUT THE COURSE:

The course is intended to provide students with opportunities to understand and apply some basic biological principles: *diversity, reproduction and inheritance, energy relationships, and adaptation.* The main theme of the course is biological diversity, the present loss of biodiversity, and what can be done about it. In pursuing this theme, the course will concentrate on the nature and characteristics of living organisms using selected examples of organisms from the five biological kingdoms.

For the purposes of this course, "learning biology" means understanding and applying knowledge of biological ideas and principles in a variety of situations, not the mere memorization of facts and names. The lab component of the course will give students a chance to get some hands-on experience of organisms, and to develop biology lab skills and scientific skills.

LABS:

There will be 9 labs during the course, starting in the second week of the semester. Attendance is compulsory for all labs, and wearing a lab coat is recommended. Evaluation of labs is either through (a) a lab quiz or (b) a lab report . For dates of labs, see course schedule.

TESTS AND EXAMS:

There will be a fifty minute test about every two weeks or so— a total of four tests for the course (see course schedule for dates). About six quizzes (5-15 min) will be given at intervals between tests. Absence from tests, quizzes, or exams will result in a mark of 0 for that test or exam unless a previous arrangement is made with the instructor for medical or other legitimate reasons. In the case of an emergency, failure to phone and leave a message with the college switchboard within a short time of a missed test will disqualify the student from a make-up test.

EVALUATION:

Tests and Quizzes	30%
Assignments & Labs	30%
Midterm Exam	15%
Final Exam	25%

Assignments and labs: A written lab report is required for every other lab; the details for format and content are given in the lab manual. Other assignments may be required.

STUDENT RESPONSIBILITIES:

Here are some of your basic responsibilities as a student, from page 29 of the GPRC calendar (also familiarize yourself with your rights, described on p. 28):

- arrive on time and remain for the duration of scheduled classes or related activities.

Regular attendance is expected, and attendance is taken. Students who miss more than 20% of classes may be barred from writing the final exam. Classes will start on time, so please arrive a few minutes early.

- respect instructor's right to set deadlines for assigned work, to expect assignments to be submitted at the times specified, and to establish penalties for failure to comply with deadlines.

Failure to submit assignments and reports on time will result in late penalties:
1 day late= -25%; 2 days late= -50%, 3 days late= -100%

- respect an instructor's right to expect assignments to be neatly presented with appropriate identification. Submit lab reports and any assignments following the required format.
- respect an instructor's right to expect that any work submitted by the student is original, and to know what plagiarism and other forms of cheating are.
- respect an instructor's right to appropriate classroom behaviour...should a student be disruptive the instructor has the right to take action to exclude a student from learning activities.
- write tests and examinations at times scheduled by instructor.
- assume responsibility for course work and assignments missed when absent.

COURSE CONTENT:

Use this as a guide for reading the text and studying for tests, quizzes and exams. Some material may be omitted or added to this outline.

Unit 1: Characteristics of Living Organisms (Chapter 1, pp. 5-12)

- four biological themes: *(1)* diversity of life *(2)* reproduction and inheritance *(3)* energy relationships *(4)* adaptation
- characteristics of living organisms and differences between living organisms and non-living matter
- levels of biological organization: cell - tissue - organ - organ system - organism
- basic biological terms: diversity, adaptation, DNA, gene, inheritance, photosynthesis, respiration, extinction, endangered species
- the importance of biodiversity and the reasons for loss of biodiversity leading to extinctions and endangered species

Unit 2: Diversity and Classification (Chapter 18, pp. 267-274)

- biological classification: its purpose and use; scientific naming of organisms
- classification groupings used in modern classification: kingdom, phylum/division, class, order, family, genus, species.
- five kingdoms of living organisms: Monera, Protista, Fungi, Plantae, Animalia .

Unit 3: Vertebrate Animals

Chapter **40** pp. 604-613

- characteristics of the vertebrates. (p. 539)
- characteristics of mammals, mammals' adaptations to different environments, *Homo sapiens* as a mammal.
- three types of mammals: monotremes, marsupials, and placental mammals.
- orders of placental mammals and their adaptations for locomotion and feeding.

Chapter **39**, pp. 589-598

- external and internal of characteristics of birds; birds' adaptations for flight.
- adaptations of birds' beaks and feet for different ecological niches.
- reproduction and reproductive behaviour in birds.

Chapter **36**, pp. 537-540, 546-550

- adaptations of fish for aquatic life.
- external and internal anatomy of a bony fish.
- respiration and reproduction in bony fishes.

Unit 4 : Invertebrate Animals

Chapter **29** ,pp. 437-438, 444-446

- two kinds of symmetry: radial symmetry and bilateral symmetry.
- advantages and disadvantages of multicellular organization and specialization in animals.
- characteristics of the cnidaria (coelenterates) and describe the basic structure and function of the hydra.

Chapter **30**, pp. 453-460,

- general characteristics of flatworms (platyhelminthes).
- structure, nutrition, nervous coordination, and reproduction in planaria.

Chapter **31**, pp. 464-474

- general characteristics of the segmented worms (annelida).
- structure, nutrition, circulation, respiration, excretion, nervous coordination, and reproduction in the earthworm.

Chapter **32**, 479-480, 483-485

- characteristics of the arthropods.
- structure of the arthropod exoskeleton in relation to its structure.

Chapter **33**, pp. 493-506

- general characteristics of insects; why insects are among the most successful organisms.
- importance of insects to society and to ecology.
- major orders of insects, and examples of each.
- external and internal structure of a representative insect: the grasshopper.

• complete and incomplete metamorphosis. significance of metamorphosis for the success of insects.

Unit 5: Cells (Chapter **5**, pp.63-74)

• cell theory.
• concept of "cell diversity".
• relationship between cell structure (size, shape, internal structure) and function.
• structure and function of : cell membrane, nucleus, cytoplasm, ribosome, mitochondria, lysosome, cilia, flagella, cell wall, chloroplast, vacuole.
• plant and animal cells.

Unit 6: Plants

Importance of Green Plants (Chapter **24**, pp.353-359)

• importance of plants in ecology.

Plant Classification (Chapter **25**, pp. 365-368;375-376)

• three plant adaptations to life on land.
• vascular and non-vascular plants; gymnosperms (cone-bearing plants) and angiosperms (flowering plants).
• the success of the flowering plants (angiosperms).

Plant Structure and Function (Chapter **26**, pp. 383-396)

• structure and function of plant organs: roots, stems, leaves.

Plant Reproduction (Chapter **27**, pp. 405-416)

• structure and function of the main parts of a flower.
• pollination and seed formation.

Unit 7 : Microorganisms: Fungi, Protists, Monera

Fungi (Chapter **23**, pp. 335-341)

• general characteristics of fungi.
• structure, nutrition, and reproduction in selected examples of fungi: common mushroom, black bread mold, sugar yeast.
• importance of fungi in decomposition, diseases, and industry (e.g., antibiotics, food, beverages).

Protozoa (Chapter **21**, pp. 309-316)

• characteristics of the protozoa, and the two protozoan lifestyles (free-living and parasitic).
• movement, structure, nutrition, and reproduction in the ameba and paramecium.

Algae (Chapter **22**, pp. 321-329)

• characteristics of the algae.
• importance of the algal plankton to ecology.
• selected examples of algae: diatoms, green algae.

Bacteria (Chapter **20**, pp. 300-304)

- simple (prokaryotic) and complex (eukaryotic) cells.
- sexual and asexual reproduction.
- structure, nutrition, respiration, reproduction, and growth factors of bacteria.
- harmful and beneficial activities of bacteria: disease, food spoilage, decomposition, nitrogen fixation, industrial uses.