Biology 110 Course Outline

GPRC Fall 1991

INSTRUCTOR: Keith Roscoe OFFICE: C 213

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OFFICE HOURS: MWF 11:00-12:00, 14:00-15:00
TR 14:30-15:30

TEXTBOOK: Modern Biology, by A. Towle (1989 Edition)
Please bring your text book to every class.

CLASS MEETS: Regular classes: **M,T, R.** 09:00-09:50, H 211; Labs: F 08:00-9:50, J 130

REQUIRED SUPPLIES: (1) lab coat—available at bookstore (2) stapler—for stapling labs and assignments (3) three-ring binder.

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, interdependence, evolution and adaptation.* The course will concentrate on the nature and characteristics of living organisms, cells, and selected examples of organisms from the five kingdoms. Examples will be selected for their interest value, as well as for their relevance to everyday life and to important science-society issues.

In this course "learning biology" means understanding and applying knowledge of biological concepts 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 ten labs during the course, starting in the second week of the semester. Attendance is compulsory for all labs, and wearing a lab coat is strongly advised. Absence from a lab will result in a mark of 0 for that lab unless the absence is for medical or other legitimate reason. There will be no make-up labs. A lab report is required for each lab and students must hand in a minimum of eight out of nine labs to pass the course. For dates of labs see course schedule on page 2.

TESTS AND EXAMS:

There will be a fifty minute test about every two weeks on thursdays— a total of four tests for the course (see course schedule for dates). Five or so "quickie quizzes" (5-10 min.) will be given on thursdays at intervals between tests. Absence from tests, quizzes, or exams will result in a mark of zero 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.

GPRC Fall 1991 Semester Schedule
Biology 110

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	**Sept** 2	3	4	5 *First Class* Unit 1	6 *no class*
2	9	10	11	12	13 *Lab# 1*
3	16 Unit 2	17	18	19 Quiz # 1	20 *Lab # 2*
4	23	24	25	26 **Test # 1**	27 *Lab # 3*
5	30 Unit 3	**Oct** 1	2	3 Quiz # 2 Unit 4	4 *Lab # 4*
6	7	8	9	10 **Test # 2**	11 *Lab # 5*
7	14 *THANKSGIVING*	15	16	17 Quiz # 3	18 *2 h class*
8	21	22	23	24 **Midterm Exam**	25 *Lab # 6*
9	28 Unit 5	29	30	31	**Nov 1** *Lab # 7*
10	4	5	6	7 **Test # 3** Unit 6	8 *Lab # 8*
11	11 *REMEMBRANCE DAY*	12	13	14 Quiz # 4	15 *Lab # 9*
12	18	19	20	21 **Test # 4**	22 *2 h class*
13	25	26 Unit 7	27	28 Quiz # 5	29 *Lab # 10*
14	**Dec** 2	3	4	5 **Test # 5**	6 *2 h class*
15	9	10 *Last Class*	11	12	13

EVALUATION:

Tests and Quizzes	30%
Assignments & Labs	20%
Midterm Exam	20%
Final Exam	30%

STUDENT RESPONSIBILITIES:

Here are some of your basic responsibilities as a student, from page 26 of the GPRC calendar.

- 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 penalities 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:

The "objectives" listed below provide a guide to what you are expected to know in this course. Use this as a guide for reading the text and studying for tests, quizzes and exams. Some objectives may be omitted, or material may be added to this list.

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

1. List and explain six biological themes:
(1) diversity of life
(2) reproduction and inheritance
(3) energy relationships
(4) interdependence of structure and function
(5) interdependence of organisms; interdependence of organisms and environment
(6) change over time: evolution and adaptation.

2. Identify the characteristics of living organisms.

3. Distinguish between living organisms and non-living matter.

4. List and explain the levels of biological organization:
cell - tissue - organ - organ system - organism -
population - community - biosphere

5. Define and explain the following terms: diversity, evolution, adaptation, DNA, gene, inheritance, sexual reproduction, asexual reproduction, photosynthesis, respiration.

Unit 2: Cells (Chapter 5, pp.63-74)

1. State and explain the cell theory.

2. Explain the limits to cell growth, based on cell surface area /volume ratios.

3. Explain the idea of "cell diversity".

4. Describe the relationship between cell structure (size, shape, internal structure) and function.

5. Describe the structure and function of the following cell components:
cell membrane, nucleus, cytoplasm, ribosome, mitochondria, lysosome, cilia, flagella, cell wall, chloroplast, vacuole.

6. Compare and contrast plant and animal cells.

Unit 3: Diversity and Classification (Chapter 18, pp. 267-274)

1. Identify the need for a system of biological classification.

2. Explain and correctly use binomial nomenclature.

3. Recognize the classification groupings used in modern classification:
kingdom, phylum/division, class, order, family, genus, species.

4. Define: kingdom, genus, species.

5. Distinguish between the five kingdoms of living organisms:
Monera, Protista, Fungi, Plantae, Animalia .

6. Classify given organisms into one of the five kingdoms.

Unit 4 : Microorganisms: Viruses, Monera, Protista, Fungi

Bacteria (Chapter 20, pp. 300-304)

1. Compare and contrast simple (prokaryotic) and complex (eukaryotic) cells.

2. Describe the structure, nutrition, respiration, reproduction, and growth factors of bacteria.

3. Explain how bacteria cause diseases, and describe some common bacterial diseases.

4. Describe and give examples of the bacteria found in and on the human body: the "normal flora".

5. Describe beneficial activities of bacteria: decomposition, nitrogen fixation, industrial uses.

Protozoa (Chapter 21, pp. 309-316)

6. Identify the characteristics of the protozoa, and the two protozoan lifestyles (free-living and parasitic).

7. Describe and explain movement, structure, nutrition, and reproduction in amebas, and in ciliates (eg paramecium).

8. Describe diseases caused by protozoans (eg. Giardiasis, sleeping sickness, malaria).

Algae (Chapter 22, pp. 321-329)

9. Describe the characteristics of the algae.

10. Discuss the importance of the algal plankton to ecology.

11. Describe selected examples of algae: diatoms, green algae.

Fungi (Chapter 23, pp. 335-341)

12. Describe the general characteristics of fungi.

13. Describe structure, nutrition, and reproduction in selected examples of fungi: the common mushroom, the bread mold, and the sugar yeast.

14. Identify the importance of fungi in decomposition, diseases, and industry (eg. antibiotics, food, beverages).

Unit 5: Plants

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

1. Discuss the importance of plants for: food production, industry, medicine, and ecology.

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

2. Describe three plant adaptations to life on land.

3. Distinguish between: vascular and non-vascular plants; gymnosperms (cone-bearing plants) and angiosperms (flowering plants); monocots and dicots.

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

4. Describe the structure and function of flowering plant organs: roots, stems, leaves.

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

5. Describe and explain the structure and function of the main parts of a flower.

6. Describe pollination and seed formation.

7. Describe the structure of fruits and seeds and adaptations that promote seed and fruit dispersal.

Unit 7: Vertebrate Animals

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

1. List the characteristics of the chordates and the vertebrates.

2. Describe the major adaptations that enable fish to live in water.

3. Describe the external and internal anatomy of a bony fish.

4. Describe respiration and reproduction in bony fishes.

Chapter 39, pp. 589-598

5. Describe the external and internal of charactersitics of birds.

6. Discuss birds' adaptations for flight.

7. Discuss adaptations of birds' beaks and feet for different ecological niches.

Chapter 40 pp. 604-613

8. List the characteristics of mammals and explain how the characteristics of mammals enabled them to adapt to different environments.

9 Distinguish between three types of mammals: monotremes, marsupials, and placental mammals.

10. Name at least five orders of placental mammals and give an example of each.

11. Describe and explain some adaptations of placental mammals, eg. for locomotion and feeding.

Unit 6 : Invertebrate Animals

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

1. Describe two kinds of symmetry: radial symmetry, and bilateral symmetry.

2. Discuss the advantages and disadvantages of multicellular organization and specialization in animals.

3. Describe the basic structure and function of the cnidarians, with an emphasis on the hydra.

Chapter 30, pp. 453-460,

4. Describe the general characteristics of flatworms (platyhelminthes).

5. Describe the structure and function, nutrition, nervous coordination, and reproduction in planaria.

6. Describe the structure, adaptations, and life cycles of parasitic flatworms(flukes) (eg. liver flukes, blood flukes).

7. Describe the structure, adaptations, and life cycles of tapeworms (cestodes) (eg. human fish tapeworm)

Chapter 31, pp. 464-474

8. Describe the general characteristics of the segmented worms (annelida).

9. Discuss structure, nutrition, circulation, respiration, excretion, nervous coordination, and reproduction in the earthworm.

Chapter 32, 479-480, 483-485

10. Describe the general characteristics of the arthropods.

11. Relate the structure of the arthropod exoskeleton to its structure.

Chapter 33, pp. 493-506

12. Describe the general characteristics of insects.

13. Give reasons why insects are among the most successful organisms.

14. Describe the importance of insects to society and to ecology.

15. Name at least five of the major orders of insects, giving an example of each.

16. Describe the external and internal structure of a representative insect: the grasshopper.

17. Distinguish between complete and incomplete metamorphosis, and discuss the significance of metamorphosis for the success of insects.