SEP 1 2 1989

# BIOLOGY 110 --- COURSE OUTLINE

1989-90

INSTRUCTOR: Alberto J. Rodriguez

OFFICE: #1, Portable J

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OFFICE HOURS: will be posted depending on the students' schedule.

TEXTBOOK: **Modern Biology** by Albert Towle. Published by Holt, Rinehart and Winston.

## COURSE GOALS:

At the end of this course, the student should be able to:

1. Identify the characteristics that distinguish living things from non-living things.
2. Understand the development of the cell theory and its applications.
3. Understand how organisms can be classified into various levels.
4. Initiate an understanding of the difference and similarities that exist among organisms.
5. Develop effective laboratory techniques such as proper use of the microscope and dissecting skills.
6. Appreciate the importance of developing effective study and discussion skills as a means for successful and enjoyable life-long learning.

## ATTENDANCE AND LATENESS

In order to complete the course successfully, regular attendance is necessary. Students will find that the class periods will usually be used for the discussion and clarification of the material covered. Students who do not attend the class discussions will find it difficult to keep up. Therefore, students missing 20% or more of classes may not be permitted to write the final exam.

You must be in class a few minutes before starting since videotapes and other materials may be shown.

## ASSIGNMENTS AND EXAMS

Every effort will be made to accommodate exceptional circumstances; however, it is the student's responsibility to contact the instructor in order to make special arrangements. Any late assignment or lab report submitted will receive a 10% penalty a day to a maximum of 3 days (or 30%). After three days, the student will receive a grade of 0% for the assignment or lab.

Students who miss a test and do not make special arrangements will receive a grade of 0% for that test.

## LAB REPORTS:

Labs are an integral part of the course. They allow the students to put some of the theory into practice. Therefore, attendance to all labs and the preparation of lab reports is required to complete the course. Any student missing three or more labs or lab reports will receive an incomplete standing in the course. Note that labs are worth 10% of your mark and they could be a great way to keep your average up.

A lab coat is optional but recommended. If you are planning on taking other science courses, a lab coat could be a good investment.

## EVALUATION

You will generally be graded using the percentage system, this mark will then be converted to the stanine system to calculate your final grade (see conversion table below).

| Stanine | Description | Percentage Equivalence |
|---|---|---|
| 9 | Outstanding | 90 - 100 |
| 8 | Excellent | 80 - 89 |
| 7 | Very good | 72 - 79 |
| 6 | Good | 65 - 71 |
| 5 | Pass | 57 - 64 |
| 4 | Pass | 50 - 56 |
| 3 | Fail | 45 - 49 |
| 2 | | 26 - 44 |
| 1 | | 0 - 25 |

GRADING

| | | |
|---|---|---|
| | Participation | 10% |
| | Tests/quizzes | |
| | Assignments | 20% |
| | Lab reports | 15% |
| | Mid-term exam | 20% |
| Option A: | Final Exam | 35% or |
| Option B: | Project | 10% |
| | Final Exam | 25% |

A contract must be signed for option B.

COURSE CONTENT AND OBJECTIVES

Unit 1: The Nature of Science (Chap. 1-pp. 4-5; Chap. 2-pp. 17-23)

1. Define science. Define Biology.
2. Name and describe the steps in the scientific method.
3. Identify the main steps in the scientific method in examples of scientific work.
4. Define the following terms: - control, variable, experimental factor.
5. State the purpose of a control.
6. Distinguish between theory, hypothesis, and law.
7. Recognize the limitations of science.

Unit 2: Introduction to Biology (Chap. 14-pp. 204-207)

1. List the characteristics of living things.
2. Compare the theories of biogenesis and spontaneous generation.
3. Briefly describe and state the significance of the experiments of the following scientists relating to spontaneous generation: Redi, Spallanzani, and Pasteur.

Unit 3: Cells (Chap. 5-pp. 62-76)

1. Describe the contribution of Hooke, Leeuwenhoek, Schleiden, Schwann, and Virchow to the development of the cell theory.
2. State the three statements of the cell theory.
3. List the basic requirements of living organisms.
4. Describe the structure and function of the following cell parts: - nucleus, cytoplasm, endoplasmic reticulum, mitochondria, lysosomes, Golgi apparatus, plastids, vacuole, plasma membrane.
5. Label the cell structure above on a diagram of a typical plant and/or animal cell.
6. Distinguish between plant and animal cells.

7. Compare the structure of procaryotic, and eucaryotic cells.
8. Explain the concepts of specialization and division of labor of living organisms.
9. Distinguish between different levels of cellular organization: cells, tissues, organs, organ systems.

Unit 4: Introduction to Classification (Chap. 10-pp. 266-274)

1. Explain the need for classification of organisms.
2. Describe the contributions of Aristotle and Linnaeus to the science of classification.
3. Explain and use correctly the binomial nomenclature system for naming organisms.
4. List and explain the criteria on which modern classification is based.
5. Define taxonomy, genus, species.
6. List the groupings used in modern taxonomy in the correct sequence.
7. Outline the 5 Kingdom system of classification.
8. Correctly use a biological key to classify organisms.

Unit 5: Simple Organisms

Viruses: (Chap. 19-pp. 280-290)

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 at least six diseases caused by viruses.
5. Discuss the problems involved with studying viruses, prevention and cure of viral diseases.

Bacteria: (Chap. 20-pp. 294-304)

1. Name and describe the three general shapes of bacteria.
2. Describe the structure, nutrition, respiration, growth factors and reproduction in bacteria.
3. Name at least six disease caused by bacteria. Discuss how bacteria can cause disease.
4. State the importance of bacteria to humans and to the living world in general.

Kingdom Protista: (Chap. 21-pp. 308-316; Chap. 22-pp. 323,327,329)

1. List the general characteristics of the Kingdom Protista
2. Name the two groups of Protista
3. Define protozoan
4. Describe the structure, movement, reproduction, nutrition and response of the two protozoans, the Ameba and the Paramecium
5. Name at least two diseases caused by protozoans

6. Describe the structure, movement, reproduction, nutrition and response of the autotrophic protista - the unicellular Euglena and the filamentous Spirogyra
7. State the importance of Algae

Kingdom Fungi: (Chap. 23-pp. 334-338)

1. List general characteristics of fungi
2. Describe the structure, nutrition, reproduction in Rhizopus and common mushroom
3. Identify some fungal diseases
4. State the importance of fungi to man and to the environment

Unit 6: The Plant Kingdom

Non-Seed Plants (Chap. 25-pp. 364-373; Chap. 27-pp. 401-403)

1. State how land plants are adapted to life on land
2. State three characteristics of the 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 terms sporophyte, gametophyte, haploid, diploid, meiosis, and dominant generation
6. List general characteristics of the phylum Pterophyta (Ferns)
7. Describe the structure and life cycle of a fern

Seed Plants (Chap. 25-pp. 373-376; Chap. 27-pp. 403-406, 408-413)

1. Define seed, angiosperm and gymnosperm
2. List 5 ways seeds are dispersed
3. Label a diagram of a seed
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 Angiosperm
8. State why Angiosperms are so successful
9. Describe the function 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
13. Label a diagram of a flower

## Unit 7: The Animal Kingdom

### Simple Organisms

(Chap. 29-pp. 434-437, 441-448; Chap. 30-pp. 452-460; Chap. 31-pp. 464-474; Chap. 34-pp. 511)

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 the porifera (sponges)
5. Describe the basic structure and functional characteristics of the coelenterates with emphasis on Hydra
6. Describe the characteristics of the platyhelminthes (flatworms) and distinguish between free-living flatworms (planaria), flukes and tapeworms
7. Describe the structure and life cycle of a tapeworm
8. Describe the structure and organ systems of the earth worm
9. Describe the characteristics of molluscs and echinoderm

### Complex Animals

(Chap. 36-pp. 534-541; Chap. 37-pp. 554-556; Chap. 38-pp. 570-573; Chap. 39-pp. 586-589; Chap. 40-pp. 602-607; Summary pp. 834-839)

1. Discuss the characteristics of arthropods
2. Distinguish among the major classes of arthropods: arachnids, crustaceans, insects, diplopods, and chilopods
3. Describe the basic structure and organ systems of the crayfish, and the grasshopper
4. Give reasons why insects are among the most successful of organisms
5. Distinguish between complete and incomplete metamorphosis in insects giving examples of each
6. Describe the main characteristics of chordates and vertebrates
7. Describe the main characteristics and adaptions of each phylum of vertebrates: agnatha, cartilage fish, bony fish, amphibian, reptiles, birds and mammals
8. Classify each organism or group discussed to phylum class or order