



**CREDIT COURSE OUTLINE**

**I. COVER PAGE**

|              |                                   |       |
|--------------|-----------------------------------|-------|
| (1) BIOL 11B | (2) BIOLOGY FOR SCIENCE MAJORS II | (3) 5 |
| Number       | Title                             | Units |

|  |                      |        |  |   |                    |
|--|----------------------|--------|--|---|--------------------|
| (4) Lecture / Lab Hours:                         |                      |        | (8) Classification:                                    |   |                    |
| Total Course Hours                               |                      |        |  |   |                    |
|  | Total Lec hours:     | 3.00   |  | Degree applicable:                        | X                  |
|  | Total Lab hours:     | 6.00   |  | Non-degree applicable:                    |                    |
|  | Total Contact hours: | 162.00 |  | Basic skills:                             |                    |
| Lec will generate <u>0</u> hour(s) outside work. |                      |        | (9)RC  | Fulfills AS/AA degree requirement: (area) |                    |
| Lab will generate <u>0</u> hour(s) outside work. |                      |        |  | General education category:               |                    |
| (5) Grading Basis:                               | Grading Scale Only   | X      |  | Area A Natural Sciences                   |                    |
|  | Pass/No Pass option  |        |  | Major:                                    | BIOLOGICAL SCIENCE |
|  | Pass/No Pass only    |        |  | Certificate of:                           |                    |
| (6) Advisories:                                  |                      |        |  | Certificate in:                           |                    |
| <i>No defined advisories.</i>                    |                      |        | (10)CSU  | Baccalaureate:                            | X                  |
| (7) Pre-requisites(requires C grade or better):  |                      |        | (11)Repeatable: (A course may be repeated three times) |   | 0                  |
| Corequisites:                                    |                      |        |  |   |                    |

(12) Catalog Description:

This course is the second-semester course of a two-semester sequence of general biology. Students will study the origins of life, the evolutionary history of biological diversity, plant form and function, animal form and function, and ecology. This course is intended for science majors and for pre-medical, pre-veterinarian, pre-dental, pre-optometry, and pre-pharmacy majors.

**II. COURSE OUTCOMES:**

*(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)*

Upon completion of this course, students will be able to:

- I. identify life from an evolutionary approach, from basic organic molecules to whole organ systems;
- II. evaluate the biological sciences through references to historical discoveries and contributions which have led to the current use of scientific methods;
- III. use scientific methods in performing experiments and collecting data;
- IV. apply knowledge of evolutionary principles to their understanding of living organisms and species response to environmental change;
- V. evaluate comparative anatomy and physiology in living organisms;
- VI. compare and contrast functional systems of living organisms;
- VII. use inductive and deductive reasoning in any environmental or ecological issue;
- VIII. evaluate scientific literature and current biological advances;
- IX. distinguish how all body systems work together to maintain homeostasis;

**III. COURSE OBJECTIVES:**

*(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)*

In the process of completing this course, students will:

- I. understand the structure and functions of living organisms;
- II. understand the scientific method and be able to apply the process to any situation that needs evaluation and recommendations;
- III. identify environmental and ecological issues;
- IV. identify and describe physiological processes of plants including growth, nutrition, reproduction and responses to environmental conditions;
- V. describe applications for biotechnology related to plants;
- VI. explain the evolutionary processes that have resulted in present day species;
- VII. identify major components of the nervous systems of various organisms;
- VIII. identify characteristics used to classify organisms;
- IX. illustrate how energy flows through an ecosystem;
- X. list the major body systems of animals and describe the purpose of each;

XI. explain how various phyla of fungi differ;

#### IV. COURSE OUTLINE:

##### Lecture Content:

##### A. Unit One The Evolutionary History of Biological Diversity

1. Early Earth and the Origin of Life
2. Prokaryotes and the Origins of Metabolic Diversity
3. The Origins of Eukaryotic Diversity
4. Plant Diversity I: How Plants Colonized Land
5. Plant Diversity II: The Evolution of Seed Plants
6. Fungi
7. Introduction to Animal Evolution
8. Invertebrates
9. Vertebrate Evolution and Diversity

##### B. Unit 2 Plant Form and Function

1. Plant Structure and Growth
2. Transport in Plants
3. Plant Nutrition
4. Plant Reproduction and Biotechnology
5. Plant Responses to Internal and External Signals

##### C. Unit 3 Animal Form and Function

1. An Introduction to Animal Structure and Function
2. Animal Nutrition
3. Circulation and Gas Exchange
4. The Body's Defenses
5. Regulating the Internal Environment
6. Chemical Signals in Animals
7. Animal Reproduction
8. Nervous Systems
9. Sensory and Motor Mechanisms

##### D. Unit 4 Ecology

1. An Introduction to Ecology and the Biosphere
2. Behavioral Biology
3. Population Ecology
4. Community Ecology
5. Ecosystems
6. Conservation Biology

##### Lab Content:

1. Classification of Organisms
2. Bacteriology I
3. Bacteriology II
4. Protists
5. Plant Diversity I (Lower Plants)
6. Plant Diversity II (Higher Plants)
7. Fungi
8. Animal Diversity I (Invertebrates)
9. Animal Diversity II (Vertebrates)
10. Plant Structure and Function I
11. Plant Structure and Function II
12. Animal Structure and Function I
13. Animal Structure and Function II
14. Ecology
15. Conservation Biology

#### V. APPROPRIATE READINGS

##### Reading assignments may include but are not limited to the following:

##### I. Sample Text Title:

or

1. Recommended - Raven *Biology*, ed. 8th (or newer) McGraw-Hill, 2008,
2. Recommended - Campbell and Reece *Biology*, ed. 8th (or newer) Pearson, 2007,

##### II. Other Readings

- Global or international materials or concepts are appropriately included in this course  
 Multicultural materials and concepts are appropriately included in this course

If either line is checked, write a paragraph indicating specifically how global/international and/or multicultural materials and concepts relate to content outline and/or readings.

The study of biology is inconceivable without a global approach, i.e. ecology is the interaction of the living with the environment; therefore biology instruction must have a global scope.

**VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:**

Students in this course will be graded in at least one of the following four categories. Please check those appropriate. A degree applicable course must have a minimum of one response in category A, B, or C.

|                           |   |   |                     |
|---------------------------|---|---|---------------------|
| <b>A. Writing</b>         |   |   |                     |
| Check either 1 or 2 below |   |   |                     |
| X                         | <b>1. Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.</b>                                |   |                     |
|                           | <b>2. Substantial writing assignments are NOT required. If this box is checked leave this section blank. For degree applicable courses you must complete category B and/or C.</b> |   |                     |
| X                         | a) essay exam(s)  | X | d) written homework |
| X                         | b) term or other paper(s)   |   | e) reading reports  |
| X                         | c) laboratory report(s)   |   | f) other (specify)  |

**Required assignments may include but are not limited to the following:**

- Exams will have essay questions.
- Students will complete a written research project and present it using PowerPoint.
- Written laboratory reports will be required for all lab exercises.

Sample essay questions:

- Describe the life history of a pine and indicate the structures that are part of the gametophyte generation, and those that are part of the sporophyte generation.
- List and describe the four unique characteristics of the Phylum Chordata, and explain how these structures have evolved within the vertebrates.

|   |                      |   |                       |
|---|----------------------|---|-----------------------|
| <b>B. Problem Solving</b>   |                      |   |                       |
| Computational or non-computational problem-solving demonstrations, including: |                      |   |                       |
| X   | a) exam(s)           | X | d) laboratory reports |
| X   | b) quizzes           | X | e) field work         |
| X   | c) homework problems |   | f) other (specify):   |

**Required assignments may include but are not limited to the following:**

- Students will construct an evolutionary tree based on homologous characters
- Students will construct/use a dichotomous key to identify organisms
- Students will use mathematical formulae to construct population growth models

Sample problem solving questions:

- In a particular ecosystem, energy flows from grass to crickets to frogs to herons. Based on the assumption of typical efficiency of energy transfer, how many calories will be available to the herons if there were 100,000 calories of grass?
- The carrying capacity for a population is estimated at 500; the population size currently is 400; and  $r_{max}$  is 0.01. What is  $dN/dt$ ?

|  |                         |   |                         |
|--|-------------------------|---|-------------------------|
| <b>C. Skill demonstrations, including:</b> |                         |   |                         |
| X  | a) class performance(s) | X | c) performance exams(s) |
| X  | b) field work           | X | d) other (specify)      |

**Required assignments may include but are not limited to the following:**

- Students will use microscopes in many laboratory exercises.
- Students will use binoculars and spotting scopes in field exercises
- Students will use dissection equipment in many laboratory exercises.
- Students will use computers for a Power Point presentation.

|   |                    |   |                     |
|---|--------------------|---|---------------------|
| <b>D. Objective examinations including:</b> |                    |   |                     |
| X   | a) multiple choice | X | d) completion       |
| X   | b) true/false      |   | e) other (specify): |

|   |                   |  |
|---|-------------------|--|
| X | c) matching items |  |
|---|-------------------|--|

**COURSE GRADE DETERMINATION:**

Description/Explanation: Based on the categories checked in A-D, it is the recommendation of the department that the instructor's grading methods fall within the following departmental guidelines; however, the final method of grading is still at the discretion of the individual instructor. The instructor's syllabus must reflect the criteria by which the student's grade has been determined. (A minimum of five (5) grades must be recorded on the final roster.)

If several methods to measure student achievement are used, indicate here the approximate weight or percentage each has in determining student final grades.

Example of possible weight determination for final grade: 40% lecture exams/final 25% lab exams 25% lab reports and other activities 10% research project

**VII. EDUCATIONAL MATERIALS**

For degree applicable courses, the adopted texts, as listed in the college bookstore, or instructor-prepared materials have been certified to contain college-level materials.

| Validation Language Level (check where applicable): | College-Level Criteria Met |               |
|---|----------------------------|---------------|
|   | YES                        | NO            |
| Textbook  | <u>  X  </u>               | <u>      </u> |
| Reference materials                                 | <u>  X  </u>               | <u>      </u> |
| Instructor-prepared materials                       | <u>  X  </u>               | <u>      </u> |
| Audio-visual materials                              | <u>  X  </u>               | <u>      </u> |

Indicate Method of evaluation:

- Used readability formulae (grade level 10 or higher)
- Text is used in a college-level course   X
- Used grading provided by publisher
- Other: (please explain; relate to Skills Levels)

|  |               |               |
|--|---------------|---------------|
| <i>Computation Level</i> (Eligible for MATH 101 level or higher where applicable)                      | <u>      </u> | <u>  X  </u>  |
| Content  |               |               |
| Breadth of ideas covered clearly meets college-level learning objectives of this course                | <u>  X  </u>  | <u>      </u> |
| Presentation of content and/or exercises/projects:   |               |               |
| Requires a variety of problem-solving strategies including inductive and deductive reasoning.          | <u>  X  </u>  | <u>      </u> |
| Requires independent thought and study   | <u>  X  </u>  | <u>      </u> |
| Applies transferring knowledge and skills appropriately and efficiently to new situations or problems. | <u>  X  </u>  | <u>      </u> |

List of Reading/Educational Materials

Recommended - Raven *Biology*, ed. 8th (or newer) McGraw-Hill, 2008,

Recommended - Campbell and Reece *Biology*, ed. 8th (or newer) Pearson, 2007,

General access necessary for students to obtain information to write a term/research paper and prepare a class presentation.

Comments:

- X   This course requires special or additional library materials (list attached).
- X   General access necessary for students to obtain information to write a term/research paper and prepare a class presentation.
- X   This course requires special facilities:
- Biology Teaching Lab. Ability to visit local areas for short field trips.

Attached Files:

**BASIC SKILLS ADVISORIES PAGE** The skills listed are those needed for eligibility for English 125, 126, and Math 101. These skills are listed as the outcomes from English 252, 262, and Math 250. In the right hand column, list at least three major basic skills needed at the beginning of the target course and check off the corresponding basic skills listed at the left.

Check the appropriate spaces.

- Eligibility for Math 101 is advisory for the target course.
- Eligibility for English 126 is advisory for the target course.
- Eligibility for English 125 is advisory for the target course.

If the reviewers determine that an advisory or advisories in Basic Skills are all that are necessary for success in the target course, stop here, provide the required signatures, and forward this form to the department chair, the appropriate associate dean, and the curriculum committee.

**CONTENT REVIEW**

|                   |
|-------------------|
| <b>REQUISITES</b> |
| No requisites     |