

MAR 11 1995

LSC Use Only  
Number: \_\_\_\_\_  
Action: \_\_\_\_\_  
Date: \_\_\_\_\_

UWUCC Use Only 94-27  
Number: 93-806  
Action: App 3/28/95  
Date: Senate App 5/2/95

**CURRICULUM PROPOSAL COVER SHEET**  
**University-Wide Undergraduate Curriculum Committee**

**I. Title/Author of Change**

Course/Program Title: BI 112 Principles of Biology II  
Suggested 20 Character Course Title: Prin. of Biology II  
Department: Biology  
Contact Person: Dr. Sandra J. Newell

**II. If a course, is it being Proposed for:**

Course Revision/Approval Only  
 Course Revision/Approval and Liberal Studies Approval  
 Liberal Studies Approval Only (course previously has been approved by the University Senate)

**III. Approvals**

Robert P. Henderson  
Department Curriculum Committee

[Signature]  
Department Chairperson

[Signature]  
College Curriculum Committee

W. S. Cole  
College Dean\*

\_\_\_\_\_  
Director of Liberal Studies  
(where applicable)

\_\_\_\_\_  
Provost (where applicable)

\*College Dean must consult with Provost before approving curriculum changes. Approval by College Dean indicates that the proposed change is consistent with long range planning documents, that all requests for resources made as part of the proposal can be met, and that the proposal has the support of the university administration.

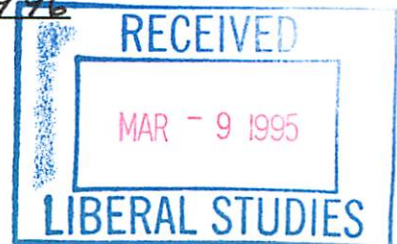
**IV. Timetable**

Date Submitted  
to LSC: \_\_\_\_\_  
to UWUCC: \_\_\_\_\_

Semester to be  
implemented:  
Spring, 1996/1997

Date to be  
published in Catalog:  
1995 1996

*re-submitted*



**V. DESCRIPTION OF CURRICULUM CHANGE**

## 1. Catalog description

BI 112 Principles of Biology II

Prerequisite: BI 111

4 credits  
3 lecture hours  
3 lab hours  
(3c-3l-4sh)

Introduces the student to principles of biology, specifically in the topics of reproduction, development, evolution, ecology, and animal behavior. Develops skills in the use of the scientific method. Designed for biology majors.

## Course Syllabus

### 1. CATALOG DESCRIPTION

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### II. COURSE OBJECTIVES

1. Students will demonstrate an understanding of the general biological principles relating to reproduction and development, evolution, ecology, and animal behavior.
2. Students will know the basic terminology and the fundamental processes associated with reproduction and development, evolution, ecology, and animal behavior.
3. Students will gain an understanding of the role that women and minorities have played in the discovery of knowledge related to the specific topics of the course.
4. Students will develop skills in using the scientific method, including formulating hypotheses, designing experiments to test hypotheses, collecting and analyzing data, and interpretation of results. Meeting this objective also requires the students to be able to think critically about scientific observations and problems.
5. Students will develop skills in communicating experimental methodology, results, and conclusions.
6. Students will gain an appreciation for the unity and beauty of biology as a science.
7. Students will gain an appreciation of the significance of biologists to the human endeavor.

### III. COURSE OUTLINE

#### Lecture

- A. Reproduction and Development (1/3 semester)
  1. Why sex?
  2. Sex and the single cell
  3. Plant reproduction
  4. Development in flowering plants
  5. Animal reproduction
  6. Human reproduction: Hormonal control of complex processes
  7. Embryology
  8. Mechanisms of cellular differentiation
  9. Cell interactions in development

- B. Evolution (1/3 semester)
1. Genetic basis of evolution
  2. Natural selection and adaptation
  3. Origin of species
  4. Concepts of phylogeny
- C. Animal Behavior and Ecology (1/3 semester)
1. Behavioral patterns
  2. Social behavior and animal societies
  3. Evolution of behavior
  4. Physiological ecology: Limits on distribution and abundance
  5. Population dynamics and life history evolution
  6. Community structure: The interaction among species
  7. Ecosystem structure and function

Laboratory Exercises (tentative outline)

- |         |   |
|---------|---|
| Week 1  | Plant Development I - Hormones and Tissue Culture                   |
| Week 2  | Genetic Drift I - Chance and Evolution                              |
| Week 3  | Natural Selection - Computer Simulation                             |
| Week 4  | Evolution of Flight   |
| Week 5  | Phylogeny - Caminalcules  |
| Week 6  | Vertebrate Development I - Environmental Effect on Frog Development |
| Week 7  | Habitat Selection in Isopods  |
| Week 8  | Predator-Prey Interactions  |
| Week 9  | Vertebrate Development II   |
| Week 10 | Plant Development II  |
| Week 11 | Genetic Drift II  |
| Week 12 | Observation, Hypothesis Formation, and Field Ecology (field trip)   |
| Week 13 | Pond Ecology (field trip)   |
| Week 14 | Ecological Succession (field trip)                                  |

IV. EVALUATION METHODS

The final grade for the course will be determined as follows:

- 60% Tests. Three tests consisting of multiple choice, completion, true-false, matching, or essay.
- 40% Laboratory Reports. Most laboratory experiments will require a written report in the format of a scientific journal article: introduction, methods, results, conclusions. Each report will be approximately 4-5 pages long, and there will be approximately 10 reports during the semester. Reports will be graded on content (i.e., the ability of the student to conduct the experiment and interpret the results) and mechanics (i.e., the ability of the student to communicate).

V. REQUIRED TEXTBOOKS, SUPPLEMENTAL BOOKS AND READINGS

- Textbook: Campbell, N.A. 1990. Biology, 2nd ed. Benjamin/Cummins Publishing Co., Inc. Redwood City, CA
- Textbook: Laboratory Manual for Principles of Biology II, prepared by the Biology Department, available at Kinkos.
- Supplemental readings may be required from the scientific literature.

## VI. SPECIAL RESOURCE REQUIREMENTS

Students may be required to purchase one computer disk for use in the laboratory.

## VII. BIBLIOGRAPHY

- Drickamer, L.C. and Vessey, S.H., Animal Behavior: Concepts, Processes, and Methods, 2nd edition, Prindle, Weber & Schmidt, Boston, MA, 1986.
- Futuyma, D.J., Evolutionary Biology, 2nd edition, Sinauer Associates, Sunderland, MA, 1986.
- Gilbert, S.F., Developmental Biology, 2nd edition, Sinauer Associates, Sunderland, MA, 1988.
- Ricklefs, R.E. Ecology, 3rd edition, W.H. Freeman and Company, New York, NY, 1990.

## Course Analysis Questionnaire

### A. DETAILS OF THE COURSE

- A1. The course will be the second semester of a two-semester sequence designed to introduce students to the principles of biology. The sequence is primarily for majors in biology and will form the foundation for advanced courses in biology. A biology student is expected to take the sequence in the freshman year. We do not expect a large enrollment of non-biology students. This course is not being proposed for inclusion in the Liberal Studies course list.
- A2. The development of this course is part of a revision in the B.S. and B.A. programs in biology. These changes are described in the proposal for program revision.
- A3. The course follows the traditional type of offering by the department.
- A4. The course has never been offered at IUP on a trial basis.
- A5. The course is not a dual-level course.
- A6. The course will not be taken for variable credit.
- A7. Most universities in the United States offer a one-year introductory biology sequence for biology majors. See the Appendix.
- A8. No professional society, accrediting authority, law, or other external agency mandates the contents of the course.

### B. INTERDISCIPLINARY IMPLICATIONS

- B1. The course will be taught by one or two instructors. One instructor could teach the course in a given semester; but because of the diversity of topics and the time commitment necessary to prepare laboratory exercises, two instructors would be able to provide a higher quality experience for the students. When two instructors are involved in the course, the teaching load will be equally split between them.
- B2. This is the second course of a two course sequence. The proposal for the first course is included in the proposal for program revision.
- B3. There are no overlaps between this course and courses taught in other departments. Some of the topics covered in this course overlap with BI 103-104. However, BI 103-104 is designed specifically for non-majors and does not cover the topics in the depth required for biology majors. In addition, the laboratory exercises in the proposed course focus more specifically on skills necessary for biologists-in-training. BI 112 Principles of Biology II is a much more rigorous course designed to introduce students to biology as a profession.
- B4. Seats in this course can be made available to students in the School of Continuing Education.

**C. IMPLEMENTATION****C1. Resources**

- a. Faculty currently in the Biology Department can teach this course.
- b. Laboratory rooms and lecture facilities are available in Weyandt Hall.
- c. The equipment necessary to implement this course is already available in the biology department. Future equipment needs will be met through the standard departmental procedures for procuring equipment.
- d. Laboratory supplies will be obtained through standard departmental procedures for budgeting funds for supplies.
- e. Library materials are currently adequate.
- f. No travel funds are required for the course.  
Laboratory exercises involving field trips will use university-owned vans.

**C2.** None of the resources for this course are from a grant.

**C3.** This course will be offered every Spring semester and, when feasible, in Summer Session II. The first course in the sequence will be offered every Fall semester and, when feasible, in Summer Session I.

**C4-5.** In recent years 80-120 students enter the biology program each year. The space available in the laboratory room limits the size of the laboratory sections to 24 students. Size of the lecture section will be a compromise between the need for small classes to improve interactions between the instructor and the students and the need to distribute faculty load among all courses in the department.

**C6.** No professional society mandates any component of the course.

**C7.** This will be a required course for biology majors. The program revision describes the number of free electives and total credits in the program.

Universities offering similar courses:

1. Boston College: BI 200 and 201, 202 and 203

BI 200 Introductory Biology I (F: 3)

An introduction to living systems at the molecular, cellular, organismal and population levels of organization. Three lectures per week. Required for biology majors.

BI 201 Introductory Biology Laboratory I\* (F: 1)

One three-hour laboratory period per week. Required of all students taking BI 200.

BI 202 Introductory Biology II (S: 3)

A continuation of BI 200. Required for biology majors. *The Department*

BI 203 Introductory Biology Laboratory II\* (S: 1)

One three-hour laboratory period per week. Required of all students taking BI 202.

*Mary Albert*

2. Bowling Green State University: BIOL 204, 205

†BIOL 204. Concepts in Biology I (S) I, II, III (on demand). Introduction to ecological and evolutionary biology, Mendelian and population genetics, and the major groups of plants, animals and microbes. Three one-hour lectures, one three-hour lab and one two-hour recitation. Field trips required. Lab fee.

†BIOL 205. Concepts in Biology II (S) I, II, III (on demand). Introduction to molecular and cellular biology, physiology and organ systems. Three one-hour lectures, one three-hour lab and one one-hour recitation. Lab fee.

3. Duquesne University: 111, 112

111, 112. General Biology. 4 cr. each  
Introduction to the scientific study of life at the molecular, cellular and organismal level. It involves consideration of relevant structure, function, development, reproduction, inheritance, evolution and ecology. This course provides the basic information and concept necessary for understanding living systems, their activity and interrelationships. 111 is prerequisite to 112. Lecture and laboratory.

4. University of Notre Dame: 103, 104

103-104. *Biological Sciences I and II*

(3-3-4)(3-3-4) Hunt

Prerequisite: CHEM 117-118 are to be taken concurrently.

Introduction to living organisms, with emphasis on biological processes and principles. Restricted to biological science majors.

5. University of Toledo: 211 and 212, 213 and 214, 215 and 216

211—FUNDAMENTALS OF LIFE SCIENCE I. 4 hours. A general introduction to cell structure and function, energy processing in plants and animals, basic genetics, and molecular biology. Four hours lecture. (Fall, D/N; Winter, D/N; Summer, D) 155:211

212—FUNDAMENTALS OF LIFE SCIENCE LABORATORY I. 1 hour. Corequisites: Biol. 211 and Chem. 110. Intended for science majors only. A series of laboratory experiments which supplement the material discussed in 211. Three hours laboratory (Fall, D/N; Winter, D/N; Summer, D) 155:212

213—FUNDAMENTALS OF LIFE SCIENCE II. 4 hours. A general introduction to the anatomy, physiology, and development of plants and animals. Four hours lecture. (Winter, D/N; Spring, D/N; Summer, D) 155:213

214—FUNDAMENTAL OF LIFE SCIENCE LABORATORY II. 1 hour. Corequisites: Biol. 213 and Chem. 111, 121. Intended for science majors only. A series of laboratory experiments which supplement the material discussed in 213. Three hours laboratory (Winter, D/N; Spring, D/N; Summer, D) 155:214

215—FUNDAMENTALS OF LIFE SCIENCE III. 4 hours. A general introduction to basic principles of ecology, behavior, population biology, and systematics. Four hours lecture. (Fall, D/N; Spring, D/N; Summer, D) 155:215

216—FUNDAMENTALS OF LIFE SCIENCE LABORATORY III. 1 hour. Corequisites: Biol. 215 and Chem. 112 and 122. Intended for science majors only. A series of laboratory experiments which supplement the material discussed in 215. (Fall, D/N; Spring, D/N; selected Summers, D) 155:216