

MAR 11 1994

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

UWUCC Use Only  
Number: 93-80d 94-29  
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 220 General Zoology  
Suggested 20 Character Course Title: General Zoology  
Department: Biology  
Contact Person: Dr. Robert S. Prezant

**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

[Signature]  
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:  
Fall, ~~1996~~ 1997

Date to be  
published in Catalog:  
~~1995~~ 1996

*re-submitted*



**V. DESCRIPTION OF CURRICULUM CHANGE****1. Catalog Description****BI 220 General Zoology****3 credits  
5 class hours  
(2c-3l-3sh)****Prerequisites: BI 111 and 112 or permission of instructor**

**Examination of the evolution, form and function of all major animal phyla from sponges through chordates. Interactive lecture/laboratory sessions follow a phylogenetic approach to the Animal Kingdom and incorporate essentials of animal ecology, physiology, functional morphology and behavior.**

## Course Syllabus

### I. CATALOG DESCRIPTION

BI 220 General Zoology 3 credits  
5 class hours  
(2c-3l-3sh)

Prerequisites: BI 111 and 112 or permission of instructor

Examination of the evolution, form and function of all major animal phyla from sponges through chordates. Interactive lecture/laboratory sessions follow a phylogenetic approach to the Animal Kingdom and incorporate essentials of animal ecology, physiology, functional morphology and behavior.

### II. COURSE OBJECTIVES

1. Students will gain an appreciation of animal biodiversity from all major biomes.
2. Students will demonstrate a working knowledge of the evolutionary trends in the Animal Kingdom.
3. Students will develop a knowledge of the morphological, physiological, behavioral and ecological aspects of all major animal taxa.
4. Students will demonstrate an ability to ask appropriate questions on the concepts and ideas that concern zoology.

### III. COURSE OUTLINE

Lecture/Lab Schedule (Each lecture/lab period will be 2.5 hours). Reading assignments are indicated for both the laboratory manual [in brackets] and the textbook.

1. Metazoan origins: roots in the "protozoa" [4] Chap. 1, 3, 15, 17 (in part)  
Porifera: cellular grade of organization  
Introduction to Major Animal Phyla; use of taxonomic keys; phylogeny
2. Cnidaria: tissue grade of organization [5] Chap. 17 (in part)  
Porifera and Cnidaria diversity, cell types, behavior and Porifera dissections
3. Cnidaria (cont.)  
Cnidaria dissections and life cycles
4. Body cavities; bilateral symmetry Chap. 10

5. **Platyhelminthes: organ grade of organization [6]** **Chap. 18**  
**Platyhelminthes; form, function, life cycles**
6. **Platyhelminthes (cont.)**  
**Platyhelminthes behavior, regeneration**
7. **Pseudocoelomates: the rise of a body cavity?** **Chap. 19**  
**The most successful "Aschelminthes": the Nematoda**
8. **Pseudocoelomates (cont.) [7]**  
**"Aschelminthes" (Nematoda, Rotifera, Gastrotricha): form, function and behavior**
9. **LECTURE/LAB EXAM**
10. **Annelida: eucoely and metamerism [9]** **Chap. 21**
11. **Annelida (cont.)**  
**Annelida diversity, anatomy, behavior**  
**Polychaete functional morphology of feeding**  
**Oligochaete locomotion and reproduction**  
**Hirudinea locomotion and feeding**
12. **Mollusca: the origin of the molluscs and torsion** **Chap. 20**
13. **Mollusca (cont.) [8]**  
**Mollusca; diversity, morphology**
14. **Mollusca (cont.)**  
**Mollusca; behavior**  
**Gastropod locomotion, feeding, reproduction, larvae**  
**Bivalve ciliary currents, cardiac system, locomotion, dispersal, reproduction**  
**Cephalopod functional morphology**
15. **Arthropoda: the most successful phylum** **Chap. 22, 23**
16. **Arthropoda (cont.) [10]**  
**Arthropoda; diversity, functional morphology**  
**Chelicerata, Crustacea, Uniramia**
17. **Arthropoda (cont.)**  
**Arthropoda; behavior**  
**Chelicerata locomotion, feeding, web construction**  
**Crustacea respiration, feeding, locomotion, mating**

and aggreton, shell swapping hermit crabs

18. LECTURE/LAB EXAM
19. Echinodermata; the early deuterostomes [11] Chap. 25  
Echinodermata; diversity
20. Echinodermata (cont.)  
Echinodermata; morphology and behavior  
Comparative anatomy  
Locomotion, feeding, respiration, water vascular system
21. "Invertebrate" Chordata; the Urochordata [12] Chap. 26  
Diversity and behavior  
Ascidian water flow; respiration, feeding
22. Vertebrata: Functional changes with a backbone. Chap. 27  
Chordata; fish diversity, morphology [13]
23. Vertebrata (cont.) Chap. 28, 29  
Chordata; reptile and amphibian form, function, diversity
24. Vertebrata (cont.)  
Chordata; fetal pig form and function [18]
25. Vertebrata (cont.)  
Chordata; fetal pig form and function (cont.)
26. Vertebrata (cont.) Chap. 30  
Chordata; Bird functional morphology
27. Vertebrata (cont.) Chap. 31  
Chordata; Mammal functional morphology
28. "Functional unknown" lab; an "unknown" organism will challenge  
your ability to discern the habitat of species "x" as well as determine  
its mode of feeding, locomotion, reproduction, etc.
29. LECTURE/LAB EXAM

#### IV. EVALUATION METHODS

**LECTURE/LAB EXAMS** are worth 30% each for a total of 90% of your grade. These exams will combine and challenge your knowledge of material obtained in both the lecture and laboratory portions of this course. As such, each exam will include objective questions and practicum questions.

The remaining 10% is designated for two short abstracts (5% each) of "animals in the news". These assignments are due midway through the term and one week before terms end. They are to be one page typed summaries and opinions concerning any recent events that involve any animals or zoological research that has been reported in the press. Creditable news magazines or newspaper articles are acceptable and must be fully cited. A copy of the article must be turned in along with the summary. These topics will be discussed in class. [egs. endangered species, anticancer agents obtained from animals, exotic invading species, blood tests from horseshoe crabs, new taxa found, crash in biodiversity, etc.]

**BONUS POINTS:** There will be a series of optional seminars, labs and field trips available during the term. These will be listed separately from your standard syllabus. Participation in these extra activities can add up to 21 extra points to your final grade total. Each activity, up to three, attended will add 7 points to your final total.

Attendance must be verified at each activity. Examples of these activities include:

- Guest seminars (as advertised appropriate to Gen. Zool.)
- Optional research labs or field excursions with research biologist
- Field trip to museums, zoos, field labs, etc. as scheduled
- Weekend field trips (eg. to Wallop's Island Marine Science Consortium) [can add up to 14 pts]

The final course grade will be based on the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	< 60%

#### V. REQUIRED TEXTBOOKS, SUPPLEMENTAL BOOKS AND READINGS

Miller, S. & Harley, J. P. Zoology. 1992, W. C. Brown, 759pp soft cover

**LAB MANUALS:** Dolphin. Zoology. [numbers in brackets refer to readings from this manual

Kinkos addendum lab manual; readings will be assigned

## VI. SPECIAL RESOURCE REQUIREMENTS

None.

## VII. BIBLIOGRAPHY:

[Thousands of articles and books have been published on the topic of zoology. The very few listed below represent some recent texts that consolidate zoological concepts, ideas and factual information.]

Brusca, R. C. and G. J. Brusca. 1990. *Invertebrates*. Sinauer Associates, Inc. Pub., MA

Dorit, R. L., Walker Jr., W. F. & Barnes, R. D. 1991. *Zoology*. Saunders College Publ., Philadelphia.

Harris, C.L. 1992. *Concepts in Zoology*. Harper Collins Pub., N.Y.

Hickman Jr., C. P., Roberts, L. S. & Hickman, F. M. 1990. *Biology of Animals*. Time Mirror/Mosby College Publ., St. Louis.

Meglitsch, P. A. and F. R. Schram. 1991. *Invertebrate Zoology*. Oxford University Press, NY

Miller, S.A. and J.P. Harley. 1992. *Zoology*. Wm. C. Brown Pub., IA

Mitchell, L. G., Mutchmor, J. A. & Dolphin,

W. D. 1988. *Zoology*. Benjamin/Cummings Pub. Co., Inc. CA

Willmer, P. 1990. *Invertebrate Relationships, Patterns in Animal Evolution*. Cambridge University Press, Cambridge

## READINGS

You will be expected to read the appropriate assigned material prior to coming to classes. This includes laboratory and lecture readings. Texts are indicated above. Laboratory readings are from appropriate lab manuals indicated directly on the syllabus.

Additional readings from the text will support discussions on the various systems covered. Your text offers specific chapters on, for instance, the nervous system, circulatory system and digestive system, that will be drawn upon to complement required readings.

**COURSE PHILOSOPHY:** This course combines lecture and laboratory sessions into individual sections that meet twice weekly. There will be no separation of lecture and lab. General Zoology is offered as a single, comprehensive overview of major animal taxa where no line is drawn between passive (lecture material) and active (hands-on, laboratory experiences) learning. Merging lab and lecture sessions will provide a sense of unity to the course, an appropriate "glue" to merge conceptual, factual and hands-on learning experiences. Exams will reflect the philosophy that a separation of lecture and lab will support the false notion that these are separate learning activities. Exams will thus combine standard essay and short answer questions with more practicum oriented questions. We believe this approach will help unify zoological concepts and ideas with

more basic animal biology and encourage students to appreciate the beauty of and threat to the overall biodiversity of this planet.



## Course Analysis Questionnaire

### A. DETAILS OF THE COURSE

- A1. This course will be one of three diversity courses proposed for Biology majors. It will be taken by students who have completed Principles of Biology I and II. Most students will likely take this course in their sophomore year. The course is designed for Biology majors and is not proposed for inclusion in the Liberal Studies course list.
- A2. This course is proposed as part of a major revision in the Biology Department BS program. These changes are described in the proposal for program revision. This course will replace BI 120, Animal Biology.
- A3. The course does not follow the traditional type of offering in this department. It will combine an historically separate lab and lecture course into a single unit that strives to unite student thought, derived from lecture, and actual student experience, as historically derived in laboratory sessions. Lecture and lab will be "taught" during single experiences, twice per week, that offer information, ask questions, challenge the students and offer the students material to solve questions and problems they raise. See Appendix 1 for the rationale behind this approach.
- A4. This specific course has never been offered at IUP on a trial basis. BI 120, the course it will replace, is the historically offered course in Zoology within the Biology Department.
- A5. This course will not be a dual-level offering.
- A6. This course will not be offered for variable credit.
- A7. Most colleges and universities offer General Zoology or Animal Biology as part of their undergraduate program in Biology. See Appendix II.
- A8. The content of this course is not mandated by any professional society, accrediting authority, law or external agency.

### B. INTERDISCIPLINARY IMPLICATIONS

- B1. The course will be taught by one instructor per section.
- B2. No additional or corollary courses are needed with this course. Upper level courses in Zoology, already offered (Herpetology, Ornithology, Vertebrate Anatomy, etc.), are frequent courses students take after gaining an initial interest in Zoology.

B3. There is no overlap between this course and courses taught in other departments. Some of the information will complement courses, however, in Geoscience dealing with paleontology.

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 room and lecture facilities are available in Weyandt Hall. Lecture and lab will be combined and taught in a single laboratory room.
- c. Course can be taught with equipment in department.
- d. Current departmental budget for Animal Biology will be used to purchase supplies.
- e. Library materials are weak in this area but will be supplemented by personal faculty libraries and optional trips to the University of Pittsburgh library.
- f. No additional travel funds will be needed.

C2. None of the resources will be from grants

C3. The course will be offered every semester.

C4. Three sections of combined lab/lecture will be offered in the Fall semester and four in the spring semester.

C5. A combined lab/lecture section will accommodate 24 students. This number is limited by available seating and facilities in the laboratory design.

C6. No professional society mandates any component of this course.

C7. This course will be part of a revised BS program in Biology. Plant Biology, General Zoology and Principles of Microbiology will compose the three required diversity courses taken by Biology majors. It will be a pre-requisite for upper level zoology courses. The program revision describes the number of free electives and total credits in the program.

#### D. Miscellaneous

## Appendix I

In October 1990 a meeting on "The Scholarship of Teaching" was convened at Iona College. At that meeting Dr. Clair L. Gaudiani, President of Connecticut College reinforced a notion of teaching shortcomings outlined by Dr. Ernest L. Boyer. According to these two speakers, and several others at that meeting, what we have lost is the community of scholarship that unites faculty and student. Gaudiani noted that academic leaders must do all they can to "stimulate a common life of teachers and students." Boyer suggests that that "community begins in the classroom." We have reformulated this course, at least in part, with this notion in mind.

The most novel, and yet we perceive as basic, aspect of this course will be combining lecture and laboratory sessions into single sections. This approach is being advocated at the national level as the most efficient and appropriate mode of teaching science courses. It is clear that there is no separation easily made between lecture and laboratory in a given Biology course. Being able to document notions being covered is a powerful tool to reinforce concepts, maintain student attention and excitement and stimulate appropriate questions. The development of a combined laboratory and lecture is also being pursued by our Plant Biology program at the same level. Animal Biology, as taught on campus during the summer, is essentially taught as a combined lecture/lab course to a smaller set of students. It is clear this format offers the most flexibility to the instructor in elucidating concepts, in demonstrating organismal functionality, and in stimulating faculty-student interaction (read in part, community), one important issue called for in the recent discussions on education reform.

Appendix II. Universities offering similar courses to General Zoology.

Illinois State University (BS194): General Zoology

194 GENERAL ZOOLOGY 4 US-3 F.S  
*Lecture and lab. Formerly BSC 190.*  
Classification, morphology, physiology, genetics, evolution, and ecology of representative animal phyla.

292 INVERTEBRATE ZOOLOGY 4 F  
*BSC 194 req. Lecture and lab.*  
Phylogeny, comparative functional anatomy, embryology, ecology, and natural history of the invertebrates.

California State University (BI312; 313): Vertebrate Biology and Invertebrate Zoology

312. Vertebrate Biology (3)

Prerequisite: Biology 101 or 106 and 107 and concurrent enrollment in Biology 392F. Introduction to Vertebrate Biology including aspects of their evolution, ecology, life history, and behavior. Lecture 2 hours, laboratory 3 hours.

313. Invertebrate Zoology (3)

Prerequisite: Biology 101 or 106-106L and 107-107L, and concurrent enrollment in 392F. Biology and classification of the invertebrate animals, with emphasis on marine forms. Evolutionary and adaptive implications of form and function will be considered. Lecture 2 hours, laboratory 3 hours.

University of Wisconsin-Eau Claire (BI104, 105): General Zoology and Animal Kingdom

104 General Zoology  
4 crs (2-4). F. Sp. Su. GE-II.  
The anatomy, physiology, embryology, and heredity in animals. Emphasis is on vertebrates, especially man, pig, and frog.

105 Animal Kingdom  
4 crs (2-4). Sp (F. Su when possible). P.  
Biol 104. GE-II.  
Representative animals of major phyla, stressing diversity, adaptation, ecology, life history, and relationships.

East Tennessee State University (BI3410, 3460): Vertebrate and Invertebrate Zoology

3460. Invertebrate Zoology (4 hours)—Prerequisites: BISC 1100/1101, 1200/1201, 1300/1301, or equivalent. Morphology, biology, life cycles, and relationships of the invertebrate organisms. Two hours lecture plus two two-hour laboratories per week.

3410. Vertebrate Zoology (4 hours)—Prerequisites: BISC 1100/1101, 1200/1201, 1300/1301, or equivalent. Biology, collection, identification, museum preparation, and natural history of vertebrates. Lecture, laboratory, and field studies. Emphasis on vertebrates of Eastern U.S. Two hours lecture and two two-hour laboratories per week.

East Kentucky University (BS141): General Zoology

141 General Zoology. (4) I, II. Morphology, physiology, comparative anatomy, development, life history, evolution, and diversity of animals.  
2 Lec/4 Lab. Gen. Ed. 13.

New York University (BI V23.0012): Animal Diversity

Animal Diversity V23.0012. Prerequisite: V23.0011 or equivalent. Lecture and laboratory. 4 points. — An introductory course for science majors designed to acquaint the student with the basic problems of existence faced by animals (i.e., of locomotion, respiration, coordination, etc.), and their diverse responses to these common problems. Lectures provide the general concepts to understand the themes underlying the diversity observed in the laboratory. Both a study of animal diversity (exemplified by some major phyla) and the detailed analysis of the structure and functioning of a single animal species.

MAIL> extract tt:  
From: GROVE::RGENDRON  
To: DRCHRDSN  
CC: RGENDRON  
Subj: Bio Curriculum

"Rob Gendron" 24-MAR-1995 12:29:36.62

To UWUCC:  
Re: Biology Proposals 4/25/26  
Responses to our questions

Darlene,

I have made the corrections in the BI111 and Program proposals and sent the pages to you via campus mail. (yes, received + placed in proposals)

I have asked Bob Prezant and Bill Dietrich to comment on the question the committee had regarding BI105, BI210 and BI220. What follows are their slightly edited e-mail messages to me. As you can see, the library holdings are not so weak as to preclude the teaching of BI210 and BI220, which are both introductory courses. In their proposals Drs. Prezant and Dietrich have simply reiterated the plea for more support for the library. In this they probably reflect the feelings of the Biology Department, and probably many other faculty.

As Dr. Prezant's reply indicates, we foresee no problem in meeting the need for Cell Biology, even with the reduced class size.

Rob Gendron

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From Bob Prezant:

"Weak library holdings" signifies the current state of the University library for all Biology materials. Having said that: There is sufficient material in our zoology holdings in the IUP library to run the BI220 course as an introductory level majors course. The "weakness" stems from a lack of depth in those holdings. Students wishing to pursue deeper aspects of zoology, as introduced in BI220, will be challenged by our holdings.

BI105: The total number of seats for BI105 has not been reduced. With enrollment management taking effect for Nursing and with our Biology majors and Medical Technology students no longer taking BI105 (but instead taking Principles), the 2-3 sections of 48 students each should suffice. Teaching this course outside of Weyandt Hall is not a requirement; merely a suggestion to keep those students taking the course on their "home base". The course will be scheduled where appropriate rooms are available.

From Bill Dietrich:

Regarding BI210, Botany:

The library holding are weak but not enough so that we are unable to teach the course as described in the proposal. We presently supplement the holdings with our personal books and journals.

The reply of the UWCC implies that the Biology department can do something about the woeful state of funding of the IUP library. As near as I know, we can only complain. The real question is: What will the university do to alleviate the problem. The library has been a low priority for funding for quite a while and the Biology department did not make or enforce that decision.