

**RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE**

BIOL 247: Vertebrate Zoology

I. Basic Course Information

- A. Course Number and Title: BIOL 247 – Vertebrate Zoology
- B. New or Modified Course: Modified
- C. Date of Proposal: Semester: Fall Year: 2020
- D. Effective Term: Fall 2021
- E. Sponsoring Department: Science & Engineering
- F. Semester Credit Hours: 4
- G. Weekly Contact Hours: 6 Lecture: 3
 Laboratory: 3
 Out of class student work per week:
 7.5
- H. Prerequisites: BIOL 102 – General Biology II or permission of instructor
- I. Laboratory Fees: NO
- J. Name and Telephone Number or E-Mail Address of Department Chair and Divisional Dean at time of approval:
Department Chair: Ed Carr, Edward.Carr@raritanval.edu
Divisional Dean: Sarah Imbriglio, sarah.imbriglio@raritanval.edu

II. Catalog Description

Prerequisites: BIO 102 – General Biology II or permission of instructor.
The biology of vertebrate animals. Students will be introduced to the biology, evolution, and diversity of vertebrate species around the world, and will learn to identify the fish, reptile, amphibian, bird and mammal species of the region. Labs consist of field trips to local natural areas or related institutions (e.g., zoos, museums, animal rehabilitation centers, trout hatchery). One evening and two weekend day trips required. Offered in Spring semester.

III. Statement of Course Need

This course broadens our biological science offerings to include foundational courses for students interested in organismal biology and ecology concentrations, specifically with regard to vertebrate animals (bony fishes, amphibians, reptiles, mammals and birds). This course will complement other existing courses with a strong organismal and field component, including Field Botany and will provide a strong foundation for future academic and career pursuits in Biology, Zoology, Veterinary Science and Animal Science. This course may also be of interest to students and Somerset and Hunterdon County residents with a recreational interest in nature study, specifically with regard to the biology, natural history and identification of animals in our area.

The course will make use of the high natural diversity of species and habitats existing in NJ (mountains to ocean) and the large number of groups and institutions that are actively working on the biology and conservation of vertebrate species in our area, and which will serve as excellent resources for the class. Some of these related groups and institutions include the NJ Audubon Society (Hillsborough), NJ Conserve Wildlife (Frenchtown), NJ Department of Fish and Game, Endangered and Non-Game Species Program (Clinton), Raptor Trust (Basking Ridge), Woodlands Wildlife Preserve (Pittstown), U.S. Fish and Wildlife Service (Basking Ridge), Pequest Trout Hatchery, American Museum of Natural History (NYC), Turtleback Zoo (West Orange), Bronx Zoo (NYC), and others.

- A. This course has a weekly lab component. The labs are essential for providing first-hand opportunities for students to learn to identify vertebrates in the wild by both sight, sound, and residual signs (e.g., tracks, scat), to observe the habitat relations and seasonality of vertebrates and their behaviors in their natural settings, and to learn basic field methods of wildlife biology.
- B. This course is designed for transfer to academic degree programs at four-year institutions, specifically as a program elective in programs/majors such as Ecology, Biology, Conservation and/or Environmental Science. This course does **not** typically transfer as a specific General Education course or a specific program requirement. This course is similar to the Vertebrate Zoology or related courses offered at the following local institutions:
 - Brookdale Community College (BIOL-206)
 - Monmouth University (BY 203)
 - Bergen Community College (BIOL-225)
 - East Stroudsburg University (BIOL-221)
 - Rutgers University (BIOL-325)

IV. Place of Course in College Curriculum

- A. Free Elective

- B. This course does not serve as a General Education course.
- C. This course meets the 200-level Electives for Biology Option A.S. majors, and the Environmental Science Elective requirement for the Environmental Science A.S., and Environmental Studies A.A.
- D. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, www.njtransfer.org; for all other colleges and universities, go to the individual websites.

V. **Outline of Course Content**

A. Introduction

B. Evolution, Diversity and Taxonomy of Vertebrates

1. Chordates and the Origin of Vertebrates
 - a. Amniotes and non-Amniotes
 - b. Notochords and Comparative Zoology
2. Taxonomy and Classification
 - a. Species Concepts
 - b. Major Groups of Vertebrates
3. Evolutionary Processes and Perspectives
 - a. Vertebrates in Earth's History
 - i. Ages of Fishes, Reptiles, Birds and Mammals
 - b. Natural Selection, Sexual Selection and Genetic Drift
 - c. Homologous Traits and Convergent Evolution

C. Cartilaginous and Bony Fishes

1. Fish Biology and Diversity
2. Fisheries Management and Fish Conservation

D. Amphibians and Life on Land

1. Metamorphosis
2. Exchange of Water and Gases
3. Tetrapods and Major Groups of Amphibians
 - a. Caecilians
 - b. Anurans
 - c. Salamanders
4. Amphibian Diversity and Conservation

E. Reptiles

1. Synapsids and Sauropsids
2. Turtles and Crocodylians
3. Lizards, Snakes and Tuatara
4. Reptile Diversity and Conservation

F. Birds

1. Evolution and Relation to Dinosaurs
2. Feathers and Flight
3. Anatomy and Physiology
4. Behavior and Reproduction
5. Major Groups of Birds
6. Bird Diversity and Conservation

G. Mammals

1. Endothermy and Ectothermy
2. Origin of Synapsids
3. Prehistoric Mammals and Quaternary Extinctions
4. Major Groups – Monotremes, Marsupials and Placentals
5. Anatomy and Physiology
6. Behavior and Reproduction
7. Mammal Diversity and Conservation

VI. General Educational and Course Learning Outcomes:

A. General Educational Learning Outcomes:

At the completion of the course, students will be able to:

1. apply scientific methods to identify vertebrate species of the region and the world, and to interpret their behaviors and habitats (GE-NJ 3, *);
2. evaluate ethical issues and situations related to the effects of human activities on vertebrates and their environments (GE-NJ ER, *)

(* Embedded Critical Thinking)

B. Course Learning Outcomes:

At the completion of the course, students will be able to:

1. explain the evolutionary origins, relations, and diversity of vertebrates;
2. describe the physical and behavioral features of vertebrates in the context of their environments

C. Assessment Instruments

Given the outcomes described above, the following assessment methods may be used:

1. laboratory products
2. research papers
3. demonstrations
4. essays
5. journals

VII. Grade Determinants

The following may be used to determine the final grade:

- A. mid-term and final exam
- B. field quizzes
- C. research projects
- D. book report
- E. presentations

- F. service learning
- G. laboratory assignments

Given the goals and outcomes described above, the following may be used in the course:

- A. lecture/discussion
- B. small-group work
- C. computer-assisted instruction
- D. guest speakers
- E. laboratory
- F. field trips
- G. student collaboration
- H. independent study

VIII. Texts and Materials

The following types of course materials may be used:

- A. Suggested Texts:
 1. Pough, F.H. et al. 2008. Vertebrate Life; 8th Ed. Benjamin Cummings
 2. Sibley, D.S. 2000. The Sibley Guide to Birds. National Audubon Society. Chanticleer Press, Alfred A. Knopf, New York.
 3. Reid, F. 2006. A Field Guide to the Mammals of North America. (4th Ed) (Peterson Field Guide Series). Houghton Mifflin.
 4. Conant, R. and J.T. Collins. 1998. A Field Guide to the Reptiles and Amphibians of Eastern/Central North America (4th Ed.) (Peterson Field Guide Series). Houghton Mifflin.
- B. Articles from scientific journals and periodicals
- C. Field Journals
- D. Student Writing
- E. Films and Documentaries
- F. Internet Databases and Information Sources
- G. Library Article Databases

(Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

XI. Resources

- A. RVCC van and/or bus rental (not currently available);
- B. Library journal databases (JSTOR, ScienceDirect) and other print and electronic resources;
- C. Natural areas on campus and elsewhere;
- D. Field guides, posters, specimens, and literature from RVCC Science Library
- E. Spotting scope and binoculars
- F. Mist nets, Sherman traps, and other related field equipment for animal studies