BIO-1815: SPECIAL TOPICS IN ORNITHOLOGY

Cuyahoga Community College

Viewing: BIO-1815 : Special Topics in Ornithology

Academic Term:
Fall 2026

Subject Code
BIO - Biology

Course Number:
1815

Title:
Special Topics in Ornithology

Catalog Description:
Ornithology is the study of birds (Class: Aves). The lecture portion of the course will detail the biology of birds, i.e. avian origins and evolution, anatomy and physiology, behavior, ecology, diversity, and conservation. The laboratory section of the course will provide hands-on field experiences and training for studying wild birds. You will learn to identify by sight and sound ~150 species of birds that occur commonly in Ohio. You will learn field techniques, such as diversity sampling, mist netting and banding, and data collection on behavior.

Credit Hour(s):
4

Lecture Hour(s):
3

Lab Hour(s):
3

Requisites

Prerequisite and Corequisite
None.

Outcomes

Course Outcome(s):
Analyze questions arising in science and daily life using the scientific method.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Information Literacy: Demonstrate contextual awareness of the research process through the reflective discovery of the production and value of information, the use of information in the creation of new knowledge, and ethical participation in the use of information in communities of learning.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):
1. Define the steps of the scientific method in order.
2. Differentiate between a hypothesis and prediction.
3. Frame questions, hypotheses, and predictions to relate dependent and independent variables.
4. Develop relevant data collection protocols to address research questions.
5. Explain what objective and subjective means as related to observations.
6. Distinguish between type I and type II errors.
7. Demonstrate the use of the scientific method to solve problems in daily activities.

8. Design your own research project investigating the relationship between dependent and independent variables of wild birds.

Course Outcome(s):

Create a report and communicate the results of a research project in written and oral formats.

Essential Learning Outcome Mapping:

Oral Communication: Demonstrate effective verbal and nonverbal communication for an intended audience that is clear, organized, and delivered effectively following the standard conventions of that language.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Write in a technical style that mirrors peer-reviewed journals.
2. Use an online searchable database to explore academic topics in peer-reviewed journals.
3. Organize all aspects of a research project in the established flow of logic, i.e. introduction, methods, results, and discussion.
4. Create figures to visually represent quantitative relationships of variables.
5. Organize and curate a literature cited section.
6. Teach an audience about your research project using engaging graphics, hand gestures, and vocal intonations.

Course Outcome(s):

Apply knowledge of physical and behavioral characters to identify Ohio's birds in the field.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Oral Communication: Demonstrate effective verbal and nonverbal communication for an intended audience that is clear, organized, and delivered effectively following the standard conventions of that language.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Course Outcome(s):

Understand the principles of evolution and how the process results in diversity.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Information Literacy: Demonstrate contextual awareness of the research process through the reflective discovery of the production and value of information, the use of information in the creation of new knowledge, and ethical participation in the use of information in communities of learning.

Objective(s):

1. Understand randomness and non-randomness with respect to fitness.
2. Understand evolution as a process and as an outcome of the process.
3. Distinguish between the four major evolutionary processes and understand that they occur simultaneously.
4. Explain the processes of allopatric and sympatric speciation.
5. Distinguish between the biological and phylogenetic species concepts and how they result in different species classifications.
6. Create a taxonomic tree given evolutionary relationships among taxa.

Course Outcome(s):

Understand the origins of Aves and their unique characteristics.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Information Literacy: Demonstrate contextual awareness of the research process through the reflective discovery of the production and value of information, the use of information in the creation of new knowledge, and ethical participation in the use of information in communities of learning.

Objective(s):

1. Understand the relationships between the major taxa of Dinosauria.
2. Explain the evolutionary relationship of birds as a taxon within Dinosauria.
3. Contrast birds with other groups of organisms.
4. Distinguish the characteristics unique to birds.
5. Contrast the characteristics of 18 orders of birds found in Ohio.

Course Outcome(s):

Explain the efficiency of avian flight as a result of the interplay between anatomy and physiology.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Information Literacy: Demonstrate contextual awareness of the research process through the reflective discovery of the production and value of information, the use of information in the creation of new knowledge, and ethical participation in the use of information in communities of learning.
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):

1. Explain the origins and evolution of avian flight and dinosaur feathers.
2. Identify the features and types of feathers.
3. Explain the role of pigments in reflecting color in feathers and bare parts.
4. Identify the bones within the avian skeleton.
5. Identify the muscles responsible for flight.
6. Explain the physics of avian flight.
7. Understand how the digestive, circulatory, respiratory, and urinary systems synergistically reduce body weight.
8. Perceive an avian environment using the senses that birds possess.

Course Outcome(s):

Understand the behavior in which birds engage as a function of survival, which is a means to reproduce.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Information Literacy: Demonstrate contextual awareness of the research process through the reflective discovery of the production and value of information, the use of information in the creation of new knowledge, and ethical participation in the use of information in communities of learning.

Objective(s):

1. Differentiate between the different kinds of avian migration and the processes involved.
2. Explain the selection pressures responsible for migration.
3. Distinguish between the navigation mechanisms birds possess to travel between territories that are hundreds to thousands of miles apart.
4. Characterize the selection pressures of foraging style and diet on morphology, especially in bill shape.
5. Understand the mechanism and benefits of visual and auditory communication in birds.

Course Outcome(s):

Understand the avian reproductive system and reproductive behavior.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Information Literacy: Demonstrate contextual awareness of the research process through the reflective discovery of the production and value of information, the use of information in the creation of new knowledge, and ethical participation in the use of information in communities of learning.

Objective(s):

1. Distinguish between territories and home ranges.
2. Understand the benefits, acquisition, and defense of mates and resources.
3. Distinguish between the processes of male and female choice.
4. Explain how the avian reproductive system yields offspring.
5. Explain the function of and characteristics of sexual displays.
6. Explain the processes of mating and development of offspring.
7. Understand the nest construction process and differentiate between the kinds of nests.

Course Outcome(s):

Understand the roles that birds play in an ecological community.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Information Literacy: Demonstrate contextual awareness of the research process through the reflective discovery of the production and value of information, the use of information in the creation of new knowledge, and ethical participation in the use of information in communities of learning.

Objective(s):

1. Distinguish between the levels of an ecological hierarchy.
2. Identify an ecosystem service and distinguish between the different types.
3. Distinguish among roles in a tropic pyramid.
4. Distinguish between the different types of intraspecific and interspecific interactions.

Methods of Evaluation:

Lecture– quizzes, exams, and response essays to peer-reviewed literature

Lab– a full-course research project with a written manuscript and oral presentation; field identification quizzes.

Course Content Outline:

What is science, and the scientific process

The four processes of evolution: mutation, drift, flow and natural selection

Biological and phylogenetic species concepts

Avian origin with clade Dinosauria and subsequent evolution and diversification

Avian anatomy and physiology

Reproduction and development

Physics of avian flight and locomotion

Migration and navigation mechanisms

Foraging behavior and bill morphology

Communication

Reproduction and development

Senses

Ecology

Religious Accommodation

Before reviewing the course schedule, students should carefully review the following religious accommodation policy and other required instructional policies:

Religious Accommodation:

Students seeking an accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor with written notice of the specific dates for which the student requires an accommodation and must do so not later than fourteen (14) days after the first day of instruction. Please submit requests for accommodations at this link: https://portal2.tri-c.edu/ReligiousAccommodation/ Religious Accommodation Form. Students with questions about their religious accommodations under Ohio's Testing Your Faith Act may contact the College's Office of General Counsel and Legal Services by phone at 216.987.4856 or via email at legal@tri-c.edu.

Other Required Instructional Policies:

https://www.tri-c.edu/student-resources/curriculum/documents/syllabus-part-b.pdf

Weekly Schedule

	Topics
Week 1	Syllabus and course introduction; what is a bird?
Week 2	The scientific process and evolution
Week 3	Taxonomy, species concepts, isolating mechanisms
Week 4	Avian origins, dinosaurs, avialans
Week 5	Avian diversity of Ohio
Week 6	Anatomy and physiology: skeletal and muscular systems
Week 7	Anatomy and physiology II: digestive, renal, and respiratory systems
Week 8	Feathers and coloration
Week 9	Flight and other locomotion
Week 10	Migration
Week 11	Navigation mechanisms
Week 12	Diets, foraging, and bill morphologies
Week 13	Communication
Week 14	Reproduction: mating systems, behavior, and territories
Week 15	Reproduction: fertilization, egg development, and care
Week 16	Conservation Finals Week

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Required/Recommended Readings

Readings will be from one of the below recommended textbooks, as selected by the individual instructors.

- Sibley, D. A. *The Sibley Guide to Birds of Eastern North America*.
- Morrison, M. L., A. D. Rodewald, G. Voelker, M. R. Colón, and J. F. Prather. *Ornithology*.

Resources for the Instructor

Morrison, M. L., A. D. Rodewald, G. Voelker, M. R. Colón, and J. F. Prather. *Ornithology*. 1. Baltimore, MD: Johns Hopkins University Press, 2018.

Sibley, D. A. *The Sibley Guide to Birds of Eastern North America*. 2. New York; Alfred A. Knopf, Inc., 2014.

Additional Resources for the Instructor

8x42 binoculars- Nikon Monarch, Bushnell Legend M Series, or Vortex Diamondback

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