I. Catalog Information

BIOL 5  Biology of Birds  5 Unit(s)

(See general education pages for the requirement this course meets.)

Advisory: English Writing 1A or English as a Second Language 5.

Four hours lecture, three hours laboratory, (including Saturday field trips).

A general introduction to the biology of birds and the relationships between birds and people around the world. The course will examine general avian anatomy and physiology with emphasis on diversity and bird identification and the ecology, behavior and conservation of selected bird species.

SLO (1): Assess the impacts of human activities on the diversity and populations of birds.

II. Course Objectives

A. Analyze the scientific method as applied to the biology of birds and the contributions to ornithology by scientists of diverse backgrounds.

B. Describe birds as flying organisms and the adaptations of birds to flight.

C. Appreciate global avian diversity.

D. Identify common species of birds living in the local area.

E. Analyze physiological challenges posed to birds by varying physical conditions of diverse environments.

F. Examine and compare the diet and feeding adaptations of different birds.

G. Examine the social behavior of birds.

H. Compare residency and migration strategies of birds.

I. Compare breeding systems and reproductive behaviors of different bird species.

J. Explore the ecology and conservation of bird populations.

K. Examine the roles of birds in historical and modern human cultures.

III. Essential Student Materials

None

IV. Essential College Facilities

None

V. Expanded Description: Content and Form
A. Analyze the scientific method as applied to the biology of birds and the contributions to ornithology by scientists of diverse backgrounds.
   1. Rationale for the scientific method
   2. Application of scientific methods to the study of birds
      a. Field studies: e.g. Margaret Morse Nice studies of Song Sparrows and Frances James studies of habitat relationships
      b. Laboratory studies: e.g. Fernando Nottebohm studies of vocal learning
B. Describe birds as flying organisms and the adaptations of birds to flight.
   1. Wing function: lift and thrust
   2. Feather structure and functions
   3. Weight reduction, power, and sensory adaptations
   4. Respiratory anatomy and oxygen demands
   5. Contrasts with flightless birds
C. Appreciate global avian diversity.
   1. Examine the variation in world birds exemplified by the major orders of birds
   2. Examine the classification of varieties of birds within these major orders
D. Identify common species of birds living in the local area.
   1. Examine surface anatomy of birds relevant to identifying local species
   2. Explore behavior and voice as identification aids
   3. Examine how plumage varies within populations
      a. Molt and plumage cycles
      b. Sexual, age, and individual differences
   4. Recognize particular species as part of the collective bird assemblage of designated local habitats
E. Analyze physiological challenges posed to birds by varying physical conditions of diverse environments.
   1. Metabolism and energy budgets
   2. Body temperature and thermoregulation
   3. Water conservation adaptations
F. Examine and compare the diet and feeding adaptations of different birds.
   1. Sensory adaptations for detecting food
   2. Bill structure and specialization in relation to feeding
   3. Feeding behaviors
   4. Digestive systems of birds with specializations relative to diet
G. Examine the social behavior of birds.
   1. Developing behaviors: innate, imprinted and learned behaviors
   2. Vocal communication: song and call production and functions
   3. Visual communication: color patterns, displays, and social signals
4. Spacing behavior and territoriality
5. Coloniality
6. Flocking

H. Compare residency and migration strategies of birds.
   1. Annual cycles: breeding, molt, migration, wintering
   2. Migration vs. residency
      a. Relative advantages and disadvantages of migration and residency
      b. The migration process: energetics, orientation, and navigation
      c. Tropical - temperate migrants: life in two worlds

I. Compare breeding systems and reproductive behaviors of different bird species.
   1. Mating systems: monogamy, polygyny, polyandry, promiscuity
   2. Effects of sexual selection
   3. Courtship behavior
   4. Parental care systems: uniparental, biparental, cooperative, brood parasitism
   5. Nests and incubation; egg production and clutch size
   6. Development and care of young

J. Explore the ecology and conservation of bird populations.
   1. Life-history patterns and population regulation
   2. Species diversity patterns and assembly rules for bird communities
   3. Food web interactions
      a. Destructive foraging
      b. Pest control
   4. Threats, conservation and remediation of populations around the world
      a. Agriculture, e.g. traditional shade-grown coffee farms vs. sun-grown coffee agribusiness; organic farms vs. pesticide-intensive agriculture
      b. Habitat alteration, e.g. deforestation in Pacific northwest and tropics
      c. Introduced predators and competitors, e.g. New Zealand, Guam, Palo Alto
      d. Wildlife refuges; integrating birds and human needs, e.g., western-style reserves, community-based systems in Cameroon, Brazil

K. Examine the roles of birds in historical and modern human cultures.
   1. Birds as symbols: e.g. Asian art, Native American narratives, European poetry, religious symbolism
   2. Birds as food and resource for human consumption
      a. Hunting, egg harvesting, and feather collecting
      b. Husbandry and artificial selection
         1. Traditional production
         2. Factory farming and egg production
3. Birds living with people
   a. Pets, therapy animals, and "watch-fowl"
   b. Falconry and fishing cormorants
   c. Spectator competitions: e.g., cock fighting and pigeon racing
4. Birds as disease vectors

VI. Assignments
   A. Required reading assignments from text
   B. Written and oral report on a particular local bird species (Bird-of-the-day)
   C. Field study of an aspect of ornithology with a written report
   D. Cooperative lab work and field trips

VII. Methods of Instruction
   Lecture and visual aids
   Discussion of assigned reading
   Discussion and problem solving performed in class
   Homework and extended projects
   Field observation and field trips
   Collaborative learning and small group exercises
   Laboratory experience which involve students in formal exercises of data collection and analysis

VIII. Methods of Evaluating Objectives
   A. Two or three midterm exams including multiple-choice and/or essay components
   B. Reports on a particular local bird species demonstrating ability to summarize library materials in written and oral forms
   C. Identification quiz demonstrating recognition of selected local bird species.
   D. Written report on field study, showing ability to collect, analyze, and present scientific data
   E. Final exam including multiple-choice and/or essay components that requires students to summarize, integrate, and critically analyze and apply concepts examined throughout the course

IX. Texts and Supporting References
   A. Examples of Primary Texts and References
   B. Examples of Supporting Texts and References

X. Lab Topics

A. Specialization of the general vertebrate skeleton for flight
B. Feather structure and function
C. Gross anatomy of the bird
D. Chick development
E. Principle avian orders
F. Diversity within selected avian orders
G. Field identification and survey methods
H. Woodland bird ecology
I. Shorebird ecology
J. Urban bird ecology
K. Habitat preservation, enhancement & restoration for targeted bird species
L. Bird behavior