

**SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE MARIE, ON**



COURSE OUTLINE


Course Title: ANIMAL BIOLOGY/ECOLOGY

Code No.: BIO228 Semester: 4

Program: FISH & WILDLIFE TECHNICIAN

Author: HARVEY ROBBINS

Date: JAN 1998 Previous Outline Date: NEW

Approved:  **Dean, Natural Resources Programs**
Date January 1998

Total Credits: 3 Prerequisite(s): None
Length of Course: 3 hrs/week X 16 weeks
Total Credit Hours: 48

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For additional information, please contact Brian Punch, Dean, Natural Resources Programs,
(705) 759-2554, Ext. 688.

COURSE NAME-----
CODE NO.**I. COURSE DESCRIPTION:**

(NOTE: revised to reflect the 4th semester placement of this Course in the program)

After an initial review of basic ecological principles, this course provide the student with an opportunity to look at the interrelationships of selected animal groups in their respective ecosystems. Specifically bacteria and worms and their role as recyclers, parasites as specialized animals, and invertebrates in lake environments are studied. The impact of pollution and its monitoring through changes in population size and health are covered. Analyses of stomach and scat contents are used to determine the relationship of other animal groups to their prey are done. Emphasis throughout the course is on individual adaptations of animal groups to unique environments and to the challenges presented by that environment.

II Learning Outcomes and Elements of the Performance:**A. Learning Outcomes**

1. Describe and explain basic ecological principles as related to animal populations.
2. Describe and monitor the role of recyclers in our environment.
3. Describe the role, significance and mode of operation of parasites.
4. Describe the impact of pollutants on aquatic environments and monitor these impacts.
5. Use stomach and scat analyses to determine predator-prey relationships and relate to growth rates.
6. Determine the significance of the presence of aquatic invertebrate groups and relate specific adaptations to specific environmental conditions.
7. Identify terrestrial insects to orders and describe the interrelationships between them.
8. Describe how selected major groups of animals have evolved over time to move into new environments.
9. Using data from selected wildlife populations, describe the role of abiotic factors on population levels.

B. Learning Outcomes and Elements of the performance:

Upon completion of this course the student will demonstrate the ability to:

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1. Describe and explain basic ecological principles as related to animal populations.

Potential Elements:

5%

- discuss ecosystem components and boundaries
- describe the components of and examples from each trophic level
- visually describe the flow of energy and nutrients in ecosystems
- express numbers of organisms typically found at each trophic level

2. Describe and monitor the role of recyclers in our environment.

Potential elements:

10%

- discuss the role of bacteria in ecosystems
- discuss the levels of bacteria and their significance found in a variety of aquatic ecosystems
- determine the level of bacteria in water using the standard plate count
- establish a red worm recycling composter and monitor the impact of a selected food type on population level

3. Describe the role, significance and mode of operation of parasites.

Potential Elements:

10%

- list examples of the various groups of organisms that cause disease and/or are parasitic
- discuss the relationship between a parasite/disease organism and its host
- describe selected disease/parasite life cycles found in wildlife populations
- observe and draw selected parasites and relate their structure to their life style

4. Describe the impact of pollutants on aquatic environments and monitor these impacts.

Potential Elements:

10%

- discuss the processes of biomagnification and bioaccumulation and their significance on ecosystems and their living components
- discuss some methods of monitoring the health of ecosystems through population levels
- describe the response of introduced organisms to a new ecosystem
- discuss the use of biological controls for limiting the levels of introduced organisms

5. Use stomach and scat analyses to determine predator-prey relationships and relate to growth rates.

Potential Elements:

15%

- analyse contents of the stomachs of selected fish, deer, beaver and other animals to determine predator-prey relationships
 - analyse scat contents to determine predator-prey relationships
 - relate diet to growth rate wherever possible
 - prepare a technical report in proper format
6. Determine the significance of the presence of aquatic invertebrate groups and relate to specific environmental conditions.

Potential Elements:

20%

- determine physio-chemical parameters in a low oxygen lake environment
- repeat measurements in an oligotrophic lake with healthy oxygen levels
- collect aquatic invertebrates from each of the above environments
- identify invertebrates as completely as possible
- using appropriate references, determine habitat and trophic relationships (niche) and special adaptations for each organism present
- perform a predator-prey experiment on a "community" of invertebrate and relate results to the known trophic relationships of the species present
- prepare a technical report on the findings

7. Identify terrestrial insects to orders and describe interrelationships between them.

Potential Elements

10%

- discuss life cycles and ecology of selected insect groups
- make a collection of insects from the duff and soil layers from beneath the snow
- identify to order those insects present
- using appropriate references, determine trophic relationships of important groups found
- prepare a technical report of findings

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8. Describe how selected major groups of animals have evolved over time to move into new environments.

Potential Elements

5%

- observe selected sections of "Life on Earth" series and take notes
 - discuss the important adaptations of selected animal groups that have enabled them to colonize new habitats
9. Using data from selected wildlife populations, describe the role of abiotic factors on population levels.

Potential Elements

15%

- determine what changes in population level and biomass have occurred in the redworm recyclers composting experiment
- combine class data and prepare a technical report (with the help of the Internet) on the results obtained and why
- using a set of data on a specific wildlife population, summarize and visually present results of analysis
- relate above results to weather severity index data and draw conclusions on the impact of weather on the population
- present findings orally to classmates

III TOPICS:

NOTE: * Topics in bold represent laboratory/field activities and /or assignments.

January

Introduction

- animals and their ecological relationships
- review basic ecology
- ecological pyramids

Bacteria and other Recyclers

- role and importance in ecosystems, levels in waters
- **standard plate count lab***
- **red worm composters experiment set-up**

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CODE NO.Jan.
(cont'd)

Viruses and Bacteria -diseases and their cycles

Parasites and Their Life Cycles

- specialized animals adapted to specialized environments
- **drawings of parasites to show features**

Feb.

Aquatic Pollution

- types of pollutants and their effect on the physical environment
- biomagnification and bioaccumulation
- biomonitoring of populations
- introduced species and their population dynamics
- biological controls

Stomach and Scat Analyses and Growth Rates

- relation between diet and growth in fish, deer and possibly beaver
- **laboratories on stomach contents and scat contents**
- **analysis of growth data report**

MID-TERM TEST

March

Aquatic Invertebrate Adaptations

- to physical conditions in the environment
- to conditions resulting from pollution
- **field collection and analysis**
- **predator/prey relationships experiment**
- **research report on adaptations of specialized groups to special environments**

Terrestrial Insects - features of orders of insects

- life cycles and ecology
- **field collection from duff and soil layers beneath the snow**
- **lab identification**
- **technical report**

April

Animal Evolution and adaptation

- selected sections of the "Life on Earth": series

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April (cont'd)

Abiotic Factors

- winter severity index record
- response of wildlife populations to climatic extremes
- **presentations on findings**
- **report on the red worm composting experiment**

FINAL TERM TEST**IV. REQUIRED RESOURCES:**

As presently determined, resources will be provided by the instructor or obtained through the library or outside agencies.

V. EVALUATION PROCESS/GRADING SYSTEM:

Most reports will be completed in groups. The presentations will be done by each individual student. Evaluation will be based on the following:

Assignments/Reports -	60%
Term tests -	30%
Participation/Attendance-	<u>10%</u>
	100%

All assignments **must** be completed for course credit. Grades for late assignments will be reduced 10% per day late. Assignments due during the semester will **not** be accepted at semester end for course credit.

Grades will be assigned as follows:

A+	-	over 85%
A	-	75-85%
B	-	66-74%
C	-	60-65%
R	-	< 60%

A rewrite for theory tests may be available for those who need it and have shown interest and participation throughout the course.

COURSE NAME-----
CODE NO.**VI. SPECIAL NOTES:****Animal Biology/Ecology - BIO 228**

Report Marking

<u>SECTION</u>	<u>MARK</u>	<u>Basis of Marking</u>
1. Introduction/Purpose	10	Conciseness, completeness
2. Method	10	Conciseness, completeness
3. Results	20	Organization, titles/enumeration of tables, figures; neatness, accuracy, completeness
4. Discussion and Conclusions	40	Organization, conciseness, completeness, research work
5. References	10	Accuracy of citations in text, accuracy of reference list, thoroughness
6. Appendices	10	Sufficiency of supporting materials, calculations etc.

All reports must be word processed. In most cases reports will be done by groups as determined in the laboratory. Students missing a laboratory without documented reason or prior approval will have 25% deducted from their report mark.

Special Needs

If you are a student with special needs (eg. Physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717 or 491 so that support services can be arranged for you.

COURSE NAME-----
CODE NO.Plagiarism

Students should refer to the definition of “academic dishonesty” in the “Statement of Students Rights and Responsibilities.”

Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course, as may be decided by the professor.

In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Advanced Standing

Students who have completed an equivalent post-secondary course should bring relevant documents to the Coordinator, Natural Resources Programs.

Retention of Course Outlines

It is the responsibility of the student to retain all course outlines for possible future use in gaining advanced standing at other post-secondary institutions.

Substitute course information is available at the Registrar’s Office.

VII. PRIOR LEARNING ASSESSMENT:

Please contact the Prior Learning Assessment Office (E2203) for further information.