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

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Date: JAN 1999 **Previous Outline Date:** JAN98

Approved: _____ Dec 15/98
Dean, Natural Resources Programs — Date

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

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. The impact of the weather as an abiotic factor impacting on animal populations is studied. The 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. 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:

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 beaver, and lake trout to determine predator-prey relationships
- analyse scat contents to determine predator-prey relationships
- analyse owl pellets to determine predator-prey relatinships
- 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: **23%**

- 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
- 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

8. Using data from selected wildlife populations, describe the role of abiotic factors on population levels.

Potential Elements **17%**

- 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**

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, and possibly beaver
- **laboratories on stomach contents and scat contents and the makeup of owl pellets**
- **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**
- **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**
- **identification and trophic relationships quiz**

April

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:

Animal Biology/Ecology -BIO 228 Laboratory Manual
All other resources needed will be provided or obtained from library sources.

V. EVALUATION PROCESS/GRADING SYSTEM:

Students are to work in groups of no more than three. Once a group has been formed, the member's names will be recorded for each project by the instructor. No changes will be permitted unless agreed to by the instructor and all members of the group. Evaluation will be based on the following:

Assignments/Reports -	50%
Final Assignment/Presentation -	10%
Term tests -	30%
Participation/Attendance-	10%
	100%

All assignments and the presentation **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. See the details below for marking of assignments.

Grades will be assigned as follows:

A+	-	over 90%	= 4.00
A	-	80-89%	= 3.75
B	-	70-79%	= 3.00
C	-	60-69%	= 2.00
R	-	< 60%	= 0.00

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

VI. SPECIAL NOTES:

Animal Biology/Ecology - BIO 228

Report Marking

SECTION	MARK	Basis of Marking
1. Introduction/Purpose	10	Conciseness, completeness
2. Method	5	Conciseness, completeness, address any changes made to the procedure
3. Results	25	Organization, titles/enumeration of tables, figures; neatness, clarity, 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.

NOTE: There is a bonus of up to 10% for analyses and/or presentation methods over and above that normally expected. This may be given at the discretion of the professor for things like computerized analyses or presentation and unusually thorough research into a topic.

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.

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.