

COURSE DESCRIPTION:**I.**

This course will consist of a series of modules that are designed to give the student exposure to state-of-the-art equipment and techniques involved in the study of natural resources. Partners from outside the College are expected to participate in the design and implementation of some of these classes. There will be a series of labs and research topics intended to widen the scope of knowledge and skills of the students. Modules will include some of the following: bioassays, pellet/scat analysis, aquatic invertebrate collection through the ice, soil; analysis and bomb calorimetry. Data collection, analysis, and report writing will be emphasized.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. **Using pellet and scat analysis, determine the food habits of selected birds and animals.**

Potential Elements of the Performance:

- using purchased owl pellets, analyse their contents for evidence of prey eaten
- using bone identification sheets, identify bones of prey eaten
- using a hair identification key, identify species eaten by barn owls
- using hair identification key, determine species of fur bearers from scats of selected predators
- identify vegetative matter remaining in the scat of vegetarians or omnivores
- prepare a technical report, including a food web with identified relationships, on the findings

This learning outcome will constitute approximately 10% of the course.

2. **Analyse lake trout stomachs to ascertain the ecology of the deep waters of Lake Superior.**

Potential Elements of the Performance:

- make appropriate notes on the ecology of lake trout in Lake Superior as presented to you
- using the specimens provided, identify, enumerate and weigh the prey found in lake trout and whitefish stomachs from Lake Superior
- using a selected set of data, analyze the results of a portion of this study
- prepare a technical report on the ecology of the deep waters of Lake Superior and include the pertinent ecological relationships

This learning outcome will constitute approximately 10% of the course.

3. **Perform a winter lake survey to determine conditions present and the adaptations of invertebrates living there.**

Potential Elements of the Performance:

- determine physio-chemical parameters in the two lake environments
- collect aquatic invertebrates from each of the above environments in both deep and shallow waters
- identify invertebrates as completely as possible
- using appropriate references, determine habitat and trophic relationships (niche) and special adaptations of each organism present and relate to environmental conditions
- estimate number of invertebrates of selected species present in each lake
- prepare a technical report on the findings

This learning outcome will constitute approximately 30% of the course.

4. **Use a bomb calorimeter and traditional soil chemistry analyses to estimate energy and nutrient levels in browse selected by herbivores.**

Potential Elements of the Performance:

- analyse the caloric value of wildlife browse species from different sites using a bomb calorimeter
- prepare browse sample pellets for combustion
- determine soil pH using a pH meter
- determine soil phosphorus content using an atomic absorption procedure
- prepare calibration curves for parameters to be analyzed
- relate the caloric value of the browse species with the chemical analysis of the soil
- calibrate and standardize instruments required
- prepare a technical report on the findings

This learning outcome will constitute approximately 25% of the course

5. **Use a bioassay analysis to determine the toxicity of a herbicide.**

Potential Elements of the Performance:

- prepare samples of a given range of concentrations for testing purposes
- perform a traditional static bioassay using rotenone as a toxin of sideswimmers
- analyze the results of the experiment in the traditional manner by plotting appropriate graphs
- prepare a technical report of the findings along with their significance

This learning outcome will constitute approximately 25% of the course.

LAB RESEARCH TECHNIQUES
COURSE NAME

NRT 321
CODE NO.

III. TOPICS:

1. Owl pellet & scat analysis
2. Lake trout stomach analysis
3. Winter Lake Survey
4. Bomb Calorimetry
5. Soil Analysis
6. Bioassay –herbicide toxicity

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Lab Research Techniques NRT 321 Laboratory Manual

All other resources needed will be provided or obtained from library sources

V. EVALUATION PROCESS/GRADING SYSTEM:

Lab Reports/Assignments 100%

(see breakdown in outline above and lab manual)

All assignments and the presentation **must** be completed for course credit. Grades for late assignments will be reduced 10% per day late.

Students missing a laboratory/field trip without a provable documented valid reason will be assigned a group for report writing purposes and will receive only 50% of the grade the other group members receive.

LAB RESEARCH TECHNIQUES
COURSE NAME

NRT 321
CODE NO.

The following semester grades will be assigned to students in postsecondary courses:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 493 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student 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/program, as may be decided by the professor/dean. 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.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean’s secretary. Students will be required to provide a transcript and course outline related to the course in question.