

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Environmental Monitoring & Assessment

CODE NO. : NRT 254 SEMESTER: 4

PROGRAM: Fish and Wildlife Technician

AUTHOR: T. Winter

DATE: January 2006 PREVIOUS OUTLINE DATED: N/A

APPROVED:

DEAN

DATE

TOTAL CREDITS: 4

PREREQUISITE(S): Nil

HOURS/WEEK: 4

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For additional information, please contact Colin Kirkwood, Dean
School of Technology, Skilled Trades & Natural Resources
(705) 759-2554, Ext. 688

I. COURSE DESCRIPTION:

This course will provide the student with an understanding of world and regional environmental issues. Ways of detecting, describing and quantifying the effects of pollutants through field and laboratory analysis will be included. Types and sources of pollution in our water and air, monitoring strategies and legislation governing pollution including the introduction of exotic species, will be discussed. The development of environmental statements as applied to new resource based projects will also be covered.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Discuss ecosystems, their components and associated terminology, ecological relationships, and types and sources of pollutants.

Potential Elements of the Performance:

- Explain key ecological concepts related to energy, biomass, bioaccumulation and biomagnification.
- Competently perform respiration focused laboratory experiments, including preparation of several test specimens in a variety of closed system environments.
- Record data, and calculate metabolic rates in relation to dissolved oxygen, carbon dioxide and pH.
- Summarize and analyze results in a comprehensive standardized technical report format.

(This outcome will constitute 20% of the course's grade)

2. Discuss physiochemical characteristics of water including nitrogen and phosphorous cycles, acid deposition and buffering in lakes.

Potential Elements of the Performance:

- Explain terms and processes of light penetration, eutrophication, annual temperature profiles, and nutrient cycles.
- Explain the impacts of radioactivity, petroleum products, and heavy metals on freshwater systems.
- Undertake field work in winter conditions; perform data collection and proper water sample collection and assessment techniques using field survey equipment.

- Complete a spectrophotometric analysis of phosphorous in soil.
- Complete a scrapbook of recent articles pertaining to aquatic environment pollution.

(This outcome will constitute 25% of the course's grade)

3. Discuss pollution monitoring with respect to physio-chemical measurements, and toxicology.

Potential Elements of the Performance:

- Explain methods of measurement and acceptable parameters for a multitude of physio-chemical features.
- Explain effects of a toxicant, and degree of toxicity to living organisms, and testing limitations.
- Explain the purpose and procedure of bioassays.
- Attend research labs where function and capabilities of analyzing equipment and techniques will be discussed.
- Complete a research summary of a pollutant and its environmental impacts.

(This outcome will constitute 20% of the course's grade)

4. Discuss pollution in regard to bio-monitoring, the biological assessment of water quality, and sampling design.

Potential Elements of the Performance:

- Explain how bio-monitoring is performed, sampling theory advantages and disadvantages, and stratification design.
- Collect invertebrates using field sampling equipment (Ekman dredge) and complete a species analysis and invertebrate population estimation.
- Plate preparation and bacterial coliform sample inoculation, plate count and colony survey assessment.
- Completion of comprehensive reports of experimental findings including discussion of water-borne fecal pollutants.

(This outcome will constitute 20% of the course's grade)

5. Discuss atmospheric pollutants and monitoring methodologies, legal responsibilities and latest trends in pollution.

Potential Elements of the Performance:

- Demonstration of air quality monitoring station.
- Explain legislation pertaining to pollution, roles and responsibilities of compliance.
- Discuss proper sampling procedures.
- Explain latest trends in environmental pollution.

(This outcome will constitute 15% of the course's grade)

III. TOPICS:

1. **Pollution and Ecological Relationships**
2. **Freshwater Systems**
3. **Types and Sources of Pollutants**
4. **Monitoring of Pollution – Physio-Chemical Measurements and Toxicology**
5. **Monitoring of Pollution – Populations and Ecosystems**
6. **Monitoring of Pollution – Atmospheric Conditions**
7. **Introduction to Legal Responsibilities and Trends in Pollution**

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. Environmental Monitoring and Assessment (NRT254) Study Guide
2. Environmental Monitoring and Assessment (NRT254) Lab Manual
3. Laboratory coat and glasses
4. Snowshoes, compass, field notebook, and clipboard.

V . EVALUATION PROCESS/GRADING SYSTEM:

Students will be evaluated on the basis of achievement of learning outcomes. These will be determined by:

1. Assignments

* All assignments are of equal value **Total value 15%**

2. Laboratory Experimentation and Reports

* Demonstration of fish respiration (5 %)
 * Respiration, photosynthesis and net productivity (6 %)
 * Winter lake survey (8 %)
 * Invertebrate collection and population estimation (8%)
 * Spectrophotometric analysis of phosphorous (7%)
 * Standard Bacterial Plate Count (6%)
 * Analytical Labs – Sault Ste Marie (5%) **Total value 45%**

3. Theory tests

* Test 1 (Unit 1-4) - midterm exam **20%**
 * Test 2 (Unit 5-7) - final exam **20%**

All Reports will be completed and submitted using the Natural Resources Programs Standard Technical Report Format.

All assignments and lab reports must be submitted to pass the course. Late submissions will be penalized -10% per school day late. Students who miss tests will not have an opportunity to rewrite without valid excuse.

Attendance is mandatory at all labs and field trips. In the event of an excused absence, students will be required to make up an alternate lab or assignment on their own time. Failure to attend two labs and/or field trips will result in an immediate "F" grade.

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% | 3.00 |
| B | 70 - 79% | 3.00 |
| C | 60 - 69% | 2.00 |

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| 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.

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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.