

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY  
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

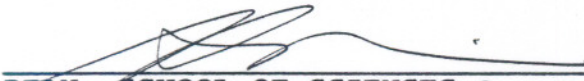
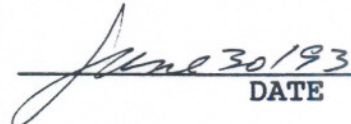
COURSE TITLE: WATERSHED MANAGEMENT

✓ CODE NO.: FOR 318-4 SEMESTER: VI

PROGRAM: FISH AND WILDLIFE TECHNOLOGIST  
/INTEGRATED RESOURCE MANAGEMENT TECHNOLOGIST

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DATE: MAY 1993 PREVIOUS OUTLINE DATED: SEPTEMBER 1992

APPROVED:    
DEAN, SCHOOL OF SCIENCES & NATURAL RESOURCES DATE



WATERSHED MANAGEMENT

FOR 318-4

COURSE NAME

COURSE NUMBER

TOTAL CREDIT HOURS: 64

PREREQUISITE(S): None

**I. PHILOSOPHY/GOALS:**

This course has been developed to provide field managers with a knowledge of the processes that take place within forested watersheds and to present measures that may be used to minimize any negative effects that forest development might have on aquatic environments.

**II. STUDENT PERFORMANCE OBJECTIVES:**

Upon successful completion of this course the student will:

1. Define important terms and describe concepts relating to watershed descriptions.
2. Describe the important physical properties of both standing and running water affecting management.
3. Explain the factors that affect lake productivity and describe the four lake productivity classes.
4. Describe how lake ecosystems function and be able to explain terms such as lake turnover, thermal and oxygen stratification and seiches.
5. Describe the processes that continually shape stream channels through erosion and deposition of sediments.
6. Measure and calculate stream velocity and discharge using several methods.
7. Describe the run-off process and explain methods by which run-off in any area can be decreased.
8. Name and describe the different types of natural run-off control structures that exist throughout the forest lands of Ontario.
9. Describe the potential effects of Forest Management activities on aquatic ecosystems and present methods of carrying out forest operations while minimizing the potential for aquatic ecosystem damage.
10. Explain good practices which should be carried out when planning and building forest access roads and water crossings.
11. Describe the shore processes at work, building and eroding the shorelines of Ontario's lakes.
12. Recommend shoreline protection measures which will protect shoreline areas from erosion.
13. Outline the erosion process along streambank and ditchbank areas.
14. Suggest technically correct methods of minimizing streambank erosion in a variety of situations.

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III. TOPICS TO BE COVERED:

Unit 1 - Forest Hydrology

- description of a watershed
  - size, stream order
  - drainage density
- the water cycle

Unit 2 - Properties of Water in Lakes

- specific heat
- water density relationships
  - lake stratification
- classes of lakes based on water turnover, productivity
- oxygen distribution
- seiches

Unit 3 - Properties of Flowing Water

- current and stream characteristics
  - channel patterns
  - erosion and deposition of sediments
- methods of measuring stream velocity and discharge

Field Trip - measuring streamflow and discharge

Unit Test #1

Unit 4 - Controlling Run-off

- what is run-off and what factors affect it
- methods to control run-off
- natural water storage structures
  - wetlands, beaver dams

Field Trip - evaluating the effect of beaver dams on stream characteristics

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III. TOPICS TO BE COVERED: (Continued)

Unit 5 - Effects of Timber Management on Watersheds

- coldwater and warmwater fish species and their environmental requirements
- potential effects of forest harvesting on water quality and quantity
- potential effects of forest pesticides on aquatic ecosystems
- description of pesticides available for forestry use
- ways to minimize (potentially) harmful effects on watersheds caused by forest management activities

Unit 6 - Detection of Water Pollution Using Biological Indicators

- environmental requirements of fish
- biological indicators of pollution
  - Biotic and Diversity Indices

Field Trip - evaluating stream water quality

Unit Test #2

Unit 7 - Constructing Forest Access Roads and Watercrossings

- potential negative environmental effects caused by construction
- legislation and standards which must be adhered to when constructing forest roads and water crossings
- proper planning, construction, maintenance and abandonment of forest roads and water crossings
- sediment control plans

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III. TOPICS TO BE COVERED: (Continued)

Unit 8 - Shoreline Management

- description of shore forms
- processes at work building and eroding shorelines
- description of shoreline protection measures
- devices available to protect shorelines and build beaches

Field Trip - evaluating shoreline protection measures

Unit 9 - Field and Streambank Erosion

- types of erosion described and processes associated with them explained
- streambank erosion caused features described
- methods available to prevent or minimize streambank erosion presented

Unit Test #3

IV. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS ETC.)

Unit Tests (3)	60%
Assignments	40%

GRADING:

A+	- 90 - 100%
A	- 80 - 89%
B	- 70 - 79%
C	- 60 - 69%
R	- less than 60%

Approximately six major assignments will be assigned during the semester; one connected with each of the field trips. Some assignments will be done in groups, others individually. Assignments are normally due two weeks after being assigned. All field trip associated assignments must be completed in order to pass the course.

Marks are cumulative and 60% is considered a passing grade. There is no rewrite option.