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SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: WATERSHED MANAGEMENT

CODE NO.: FOR222-4 SEMESTER: III

PROGRAM: FORESTRY /FISH & WILDLIFE/RENEWABLE RESOURCE/ PARKS & OUTDOOR RECREATION/ ABORIGINAL RESOURCE TECHNICIAN

AUTHOR: BOB CURRELL

DATE: JUNE 1996 PREVIOUS OUTLINE DATED: JUNE 1995

APPROVED: _____ June 28/96

DEAN, SCHOOL OF SCIENCES AND NATURAL RESOURCES DATE

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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 be able to:

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 Flowing Water

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

Unit 3 - Properties of Water in Lakes

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

Unit Test #1

Unit 4 - Shoreline Management

- description of shore forms
- processes at work building and eroding shorelines
- description of shoreline protection measures

Unit 5 - Controlling Run-off

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

Unit 6 - Field and Streambank Erosion

- types of erosion, erosion processes
- features of streambank erosion
- methods available to prevent or minimize streambank erosion

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III. TOPICS TO BE COVERED: (Continued)

Unit Test #2

Unit 7 - Effects of Timber Management on Watersheds

- the timber management process
- environmental requirements of coldwater and warmwater fish species
- potential effects of forest harvesting on water quality and quantity
- potential effects of forest pesticides on aquatic ecosystems
- ways to potentially minimize harmful effects on watersheds caused by forest management activities

Unit 8 - Constructing Forest Access Roads and Watercrossings

- potential negative effects caused by construction
- applicable legislation and standards
- proper planning, construction, maintenance and abandonment of forest roads and water crossings
- sediment control plans

Unit Test #3

IV. EVALUATION METHODS:

Unit Tests (3)	70%
Assignments	30%

- Lake properties assignment
- Streamflow Report
- Roadbuilding, Harvesting Assignment
- Shore Protection Assignment

GRADING:

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

V. REQUIRED STUDENT RESOURCES:

Study Guide; Watershed Management 1995. Sault College

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VI. ADDITIONAL STUDENT RESOURCES:

A listing of references used is provided for each unit in the study guide.

VII. SPECIAL NOTES:

Students with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.