

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

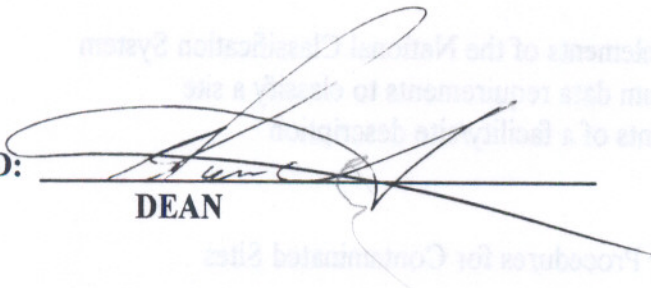
COURSE TITLE: INTRODUCTION TO SITE REMEDIATION

CODE NO.: ENV 330-4 SEMESTER: VI

PROGRAM: ENVIRONMENTAL ENGINEERING TECHNOLOGY

AUTHOR: BRAD KIRK

DATE: FEBRUARY 1997 PREVIOUS OUTLINE DATED: NEW

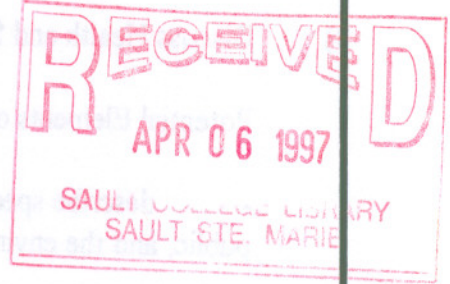
APPROVED: 
DEAN

MARCH 26, 1997
DATE

TOTAL CREDITS: 4

PREREQUISITE(S): NONE

LENGTH OF COURSE: 16 WEEKS TOTAL CREDIT HOURS: 64 HOURS



INTRODUCTION TO SITE REMEDIATION
COURSE NAME

ENV330-4
CODE NO.

- I. COURSE DESCRIPTION:** This course introduces guidelines and techniques for the decommissioning of industrial sites in a safe manner and in compliance with regulations. Methods for treating and monitoring contaminated soils and groundwater will be discussed. Field sampling and laboratory analysis methods are introduced.
- II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**
(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

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

- 1) Discuss the National Guidelines for Decommissioning Industrial Sites.

Potential Elements of the Performance:

- identify relevant Federal and Provincial Legislation
- describe the stages of decommissioning planning
- describe the phased approach to site decommissioning
- discuss the development of cleanup criteria

- 2) Describe the National Classification System for Contaminated Sites

Potential Elements of the Performance:

- describe the basic elements of the National Classification System
- identify the minimum data requirements to classify a site
- describe the elements of a facility/site description

- 3) Discuss Health and Safety Procedures for Contaminated Sites

Potential Elements of the Performance:

- describe special precautions which must be taken for the protection of workers, the public, and the environment

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II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE
(Continued)

4) Describe the Movement of Groundwater and Contaminant Flow

Potential Elements of the Performance:

- describe unconfined and confined aquifers
- describe the basics of groundwater hydraulics, hydraulics of wells, and the determination of piezometric head distribution
- describe the sources of groundwater contamination and transport processes

5) Describe Remediation Techniques for Cleaning Contaminated Soils and Groundwater

Potential Elements of the Performance:

- describe methods of soil treatment, including:
 - low temperature thermal desorption;
 - bioremediation;
 - vapour extraction;
 - solvent extraction;
 - soil washing;
 - soil flushing;
 - chemical fixation/stabilization
- describe methods of in-situ and “pump and treat” groundwater treatment, including:
 - air sparging;
 - steam sparging;
 - air stripping;
 - carbon adsorption;
 - biological treatment;
 - uv/ozone/hydrogen peroxide oxidation

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- 6) Describe the Basic Considerations in Sampling Contaminated Sites and Analyzing the Samples

Potential Elements of the Performance:

- describe methods of sampling soils, sediments, surface water and groundwater
- describe methods of preserving and storing samples
- describe techniques of evaluating data

III. TOPICS:

- 1) National Guidelines for Decommissioning Industrial Sites
- 2) National Classification System for Contaminated Sites
- 3) Health & Safety Procedures for Contaminated Sites
- 4) Groundwater & Contaminant Flow
- 5) Remediation Techniques
- 6) Research Techniques
- 7) Case Studies

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

There is no text prescribed for this course. The instructor will give handouts as needed, to supplement material presented in class.

V. EVALUATION PROCESS/GRADING SYSTEM

The final course grade will be based on the aggregate score of a series of tests to be held throughout the semester. Dates for all tests will be announced approximately one week in advance and attendance at all tests is mandatory.

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

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VI. SPECIAL NOTES:

- 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, 491 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 post-secondary institutions.
- Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.
- Substitute Course Information is available at the Registrar's Office.

VII. PRIOR LEARNING ASSESSMENT

Students who wish to apply for advanced credit in the course should consult the instructor.

