

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

COURSE OUTLINE

COURSE TITLE; HAZARDOUS WASTE MANAGEMENT  
CODE NO. WTR 329-4 SEMESTER: VI  
PROGRAM: WATER RESOURCES/ENVIRONMENTAL ENGINEERING TECHNOLOGY  
Author: JOHN K. THEIL/LORY VANDERZWET  
DATE: APRIL 1995 PREVIOUS OUTLINE DATED: APRIL 1992

APPROVED:  DEAN  y^3..f?5 DATE

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HAZARDOUS WASTE MANAGEMENT

WTR 329-4

**COURSE NAME**

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**TOTAL CREDIT HOURS**            64

**PREREQUISITE(S):** CHM230, WTR201, WTR226

**I. PHILOSOPHY/GOALS:**

Hazardous wastes range in nature from common household trash to complex materials in industrial wastes, sewage sludge, agricultural residues, mining refuse and pathological wastes. The purpose of this course is to assess the various types of hazardous wastes, and to determine appropriate handling, waste treatment and disposal techniques.

**II. STUDENT PERFORMANCE OBJECTIVES:**

Upon successful completion of this course, the student will be able to:

1. Identify and classify hazardous wastes according to current practices.
2. Identify the types and sources of solid wastes and the influencing factors related to physical and chemical composition and waste generation rates.
3. Describe materials flow in society, reduction in raw materials usage, reduction in solid wastes quantities, re-use of materials, materials recovery, energy recovery, and solid waste management.
4. Evaluate landfilling with respect to site selection, landfilling methods and operations, occurrence of gases and leachate in landfills, and movement and control of landfill gases and leachate.
5. Evaluate procedure for physical, chemical and biological treatment of liquid industrial and hazardous wastes.
6. Describe thermal incineration fundamentals.

**III. TOPICS TO BE COVERED:**

1. Origin and Nature of Hazardous Wastes
  2. Regulatory Requirements for Generators of Hazardous Waste
  3. Types, Sources and Properties of Solid Wastes
  4. Landfilling - Site Selection, Operation and Control of Gas and Leachate Production
  5. Treatment Technologies - Physical, Chemical, and Biological
  6. Thermal Incineration Fundamentals
- Interim Test/Final Examination

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**IV. LEARNING ACTIVITIES**

|   | <u>Hours</u> |
|---|--------------|
| 1. Introduction   |              |
| - define "hazardous wastes"   |              |
| - discuss origins of hazardous wastes   |              |
| - calculate quantities of hazardous wastes generated  | 6            |
| - discuss entry routes of hazardous wastes into the environment   |              |
| - list methods used to treat hazardous wastes   |              |
| 2. Regulatory Requirements  |              |
| - list relevant regulations with regards to hazardous waste and solid waste generation, handling, storage, etc. | 6            |
| - discuss details of Reg. 362 (Waste Management - PCB's)  |              |
| - discuss details of Reg. 347 (General Waste Management)  |              |
| - discuss the 3-R's regulations   |              |
| 3. Solid Wastes   |              |
| - define "Solid Wastes"   |              |
| - discuss types, sources and properties of solid wastes   |              |
| - describe material flows in society  |              |
| - calculate quantities of solid wastes generated  | 5            |
| - explore methods through which solid wastes can be diverted from landfill sites                                |              |
| 4. Landfilling  |              |
| - evaluate landfill sites, methods and operations   |              |
| - calculate theoretical quantities of gases and leachates generated in landfill sites                           | 12           |
| - discuss methods used to control the flow of gases and leachates generated in a landfill site                  |              |
| 5. Treatment Technologies   |              |
| - evaluate the technologies (physical, chemical, biological) available for treatment of hazardous wastes        |              |
| - determine which treatment(s) is most suitable for a given waste   | 12           |
| - discuss special considerations required for transportation and storage of hazardous wastes                    |              |
| 6. Thermal Incineration Fundamentals  |              |
| - discuss incineration procedures available with current regulations  | 2            |
| - determine which wastes are suitable for incineration  |              |
| - discuss incineration fundamentals   |              |

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**V. METHOD OF EVALUATION:**

|                   |     |              |
|-------------------|-----|--------------|
| Assignments       | 20% | Grading:     |
| Interim Test      | 30% | A+ 90 - 100% |
| Final Examination | 50% | A 80 - 89%   |
|                   |     | B 70 - 79%   |
|                   |     | C 60 - 69%   |

A passing grade will be based on a minimum composite grading of 60%. Students obtaining a composite grading of 55 to 59% may be allowed to complete a supplementary examination.

**VI. REQUIRED STUDENTS RESOURCES:**

Regulation 347 - General Waste Management, Ministry of the Environment & Energy

**VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY:**

Peavy, Howard S., Donald R. Rowe, George Tchobanpolous. Environmental Engineering, McGraw-Hill Book Company, Toronto.

Pfeffer, John T. Solid Waste Management Engineering

Viessman Jr., Warren, Mark J. Hammer. Water Supply and Pollution Control, Harper & Row, Publishers, New York

**VIII. 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.