


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 ENGINEERING TECHNOLOGY  
Author: JOHN K. THEIL  
DATE: JANUARY 1997 PREVIOUS OUTLINE DATED: APRIL 1995

APPROVED:   
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DATE: <sup>g^p^L^ ^-^ ^y</sup> ^7/9-?

HAZARDOUS WASTE MANAGEMENT

WTR 329-4

**COURSE NAME**

**COURSE NUMBER**

**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.

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**III. TOPICS TO BE COVERED:**

**HOURS**

1. Course Introduction	2
2. Origin and Nature of Hazardous Wastes Componets of a Hazardous Waste Treatment Facility	3
3. Regulatory Requirements for Generators of Liquid Industrial and Hazardous Waste	4
4. Types, Sources and Properties of Solid Wastes	8
5. Landfilling - Site Selection, Operation and Control of Gas and Leachate Production	12
6. Treatment Technologies - Physical, Chemical, and Biological	12

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**IV. LEARNING ACTIVITIES**

Hours

- |   |    |
|---|----|
| 1. Introduction   |    |
| - define "hazardous wastes"   |    |
| - discuss origins of hazardous wastes   |    |
| - list methods used to treat hazardous wastes   | 5  |
| <br>  |    |
| 2. Regulatory Requirements  |    |
| - list relevant regulations with regards to hazardous waste and solid waste generation, handling, storage, etc. | 4  |
| - discuss details of Reg. 347 (General Waste Management)  |    |
| - discuss the 3-R's regulations   |    |
| <br>  |    |
| 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  | 8  |
| - explore methods through which solid wastes can be diverted from landfill sites                                |    |
| <br>  |    |
| 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                  |    |
| <br>  |    |
| 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                    |    |

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**V. METHOD OF EVALUATION:**

		Grading;
Interim Test	35%	
Final Examination	65%	A+ 90 - 100%
		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

Henry, J. Glynn, Gary W. Heinke. Environmental Science and Engineering. Prentice Hall

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

Peavy, Howard S., Donald R. Rowe, George Tchobangolous. 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.

## LATE POLICY

### ADDENDUM TO COURSE OUTLINES

SEMESTER — SUMMER 1997

COURSE: WTR 329

Students will be assessed the following academic penalties for late submission of assignments/laboratory assignments.

Assignments are due at the start of each scheduled class.

#### **ASSIGNMENTS (Where Applicable)::**

##### **Late Assessment**

- 20% if not submitted when due
- \*10% additional for each successive day
- 100% if submitted post marking

#### **LABORATORY ASSIGNMENTS (Where Applicable)::**

##### **Late Assessment**

- Attendance:**
- 20% first late infraction
  - 50% second late infraction
  - 100% third and successive Infraction(s)

- Write-ups:**
- Due by 12 noon one week from date of experiment. Students have the option to submit write-ups at the beginning of any scheduled lecture or lab on the due date.

##### **Late Assessment**

- 20% if not submitted when due
- \*10% additional for each successive day
- 100% if submitted post marking

\* Students are aware that they risk a mark of "zero" if lateness goes beyond two (2) days.

Assignments should be submitted directly to the Professor to ensure that they are not misplaced. The Professor is not responsible for assignments deposited through his office door/mailbox.