

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: INDUSTRIAL PROCESSES

CODE NO.: ENV100-4 SEMESTER: I

PROGRAM: ENVIRONMENTAL ENGINEERING TECHNICIAN/
WATER RESOURCES ENGINEERING TECHNOLOGY/
PULP & PAPER ENGINEERING TECHNOLOGY

AUTHOR: MANFRED ENGEL/LORY VANDERZWET

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APPROVED: *Alcock*
DEAN

December 01/95
DATE



INDUSTRIAL PROCESSES

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TOTAL CREDIT HOURS: 48

I. PHILOSOPHY/GOALS:

The student will obtain information necessary to understand the intersection between people, industry and the environment. Problems related with consumption growth, urbanization and waste generation are discussed. Various industrial processes are studied, highlighting the wastes produced by these industries and the treatment options available for these wastes.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will:

1. Display a knowledge of the relationship between population growth, standard of living and the impact on the environment.
2. Describe selected industry processes with emphasis on discharge and treatment of wastes.
- 3) Describe general methods of waste treatment processes.

III. TOPICS TO BE COVERED:

- 1) Nature and Scope of Environmental Problems.
- 2) Population and Economic Growth (Urbanization).
- 3) Energy Sources and Consumption patterns.
- 4) Human Environmental Disturbances (Acid Rain, Greenhouse, Smog)
- 5) Common Waste Treatment Processes.
- 6) Selected Industrial Processes.

IV. LEARNING ACTIVITIES/REQUIRED RESOURCES:

Topic/Unit - 1 - Nature and Scope of Environmental Problems

Learning Activities: (Learning Outcomes)

- Examine the basic causes of environmental problems.
- Study Land - Waste - Air interactions.
- Study Waste Cycle for consumer society.

Resources:

- Chapter 1 of Text.

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IV. LEARNING ACTIVITIES/REQUIRED RESOURCES: (cont'd)

Topic/Unit - 2 - Population and Economic Growth

Learning Activities:

- Study patterns of population growth in various regions of the world and its effect on the environment.
- Discuss the demand on resources and waste production as it relates to the study of living.
- Study the problem of urbanization and its effect on the environment.

Resources:

- Chapter 2 of Text.

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Topic/Unit - 3 - Energy Consumption

Learning Activities:

- Identify Conventional and Non-Conventional sources of energy.
- Study consumption patterns for various regions.
- Identify the impact of energy production and use on the environment.

Resources:

- Chapter 3 of Text.

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Topic/Unit - 4 - Human Environmental Disturbances

Learning Activities:

- Discuss the impacts of human activity on the environment on a global scale.
- Study the problem of Acid Rain and the Greenhouse Effect.
- What is the potential impact on the future?

Resources:

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IV. LEARNING ACTIVITIES/REQUIRED RESOURCES: (cont'd)

Topic/Unit - 5 - Common Industrial Treatment

Learning Activities: Study and understand the following processes:

Mechanical Processes

- Solid - Solid separation
- Solid - Liquid separation

Chemical Processes

- Ion - exchange
- Activated carbon process
- Fluidized bed

Biological Treatment

- Activated Sludge Process
- Fixed Film Process
- Digestion
- Lagoons

Resources:

- Handouts provided by faculty.

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Topic/Unit - 6 - Industrial Processes

Learning Activities: Study and understand the following processes:

Pulp & Paper

- CMP/CTMP
- Sulphite pulping
- Groundwood

Mining

- Environmental problems associated with mining methods
- Milling processes
- Smelting processes

Steel-Making

- Coking
- Pickling
- Rolling

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Topic/Unit - 6 - Industrial Processes (cont'd)

Metal Finishing

- Galvanizing
- Electroplating
- Heat treatment
- Washing and cleaning

Petro Chemicals

- Refining and petro chemicals
- Plastics
- Organic chemicals

Food Processing

- Meat processing
- Dairy industry
- Canneries and frozen foods
- Fish packing
- Brewing and distilling

Resources:

V. EVALUATION METHODS:

Evaluation will be based upon four written tests (20% each) and four assignments (20% total)

- Test 1 - Topics 1 and 2
- Test 2 - Topics 3 and 4
- Test 3 - Topic 5
- Test 4 - Topic 6

VI. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor or P.L.A. Coordinator.

VII. REQUIRED STUDENT RESOURCES:

Environmental Science & Engineering by Henry & Heinke

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.