

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

COURSE OUTLINE

COURSE TITLE: ATMOSPHERIC POLLUTANTS

CODE NO.: ENV 300-3 SEMESTER: IV

PROGRAM: ENVIRONMENTAL TECHNICIAN/WATER RESOURCES TY

AUTHOR: D. TROWBRIDGE/LORY VANDERZWET

DATE: MARCH 1995 PREVIOUS OUTLINE DATED: APRIL 1994

APPROVED: *R. Gosh* *March 30, 1995*  
DEAN DATE



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TOTAL CREDIT HOURS: 48

PREREQUISITE(S): CHM 104

**I. PHILOSOPHY/GOALS:**

This course deals with the nature and effects of atmospheric pollutants and their control. An overview of pollutant types, effects and causes will be presented as well as current methods of control, monitoring and dispersion modelling.

**II. STUDENT PERFORMANCE OBJECTIVES:**

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

1. Identify the causes and effects of the common pollutants in the air.
2. Describe the effect of meteorological factors on atmospheric pollution.
3. List and describe the current control devices used in industry.
4. Describe the air monitoring instruments and their use in determining the Air Quality Index. (AQI)

**III. TOPICS TO BE COVERED:**

1. Causes and Effects of Atmospheric Pollutants
2. Particulate and Gaseous Pollutants
3. Meteorological Factors and Dispersion Modelling
4. Air Pollution Control Equipment and Application
5. Air Monitoring Systems and Determination of Air Quality Index
6. Air Pollution Case Studies: Greenhouse Effect, Acid Rain, Ozone Depletion, Noise Pollution

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**LEARNING ACTIVITIES:**

**Hours**

- |   |   |
|---|---|
| 1. Introduction   | 6 |
| . Discuss the origins of Air Pollution                      |   |
| . Discuss the causes of Air Pollution                       |   |
| . Examine the types of Substances that Pollute              |   |
| . Explain the effects of Air Pollution                      |   |
| . Present past Air Pollution Episodes                       |   |
| 2. Airborne Particulate Matter                              | 6 |
| . Classify Airborne Particulate Matter                      |   |
| . Calculate Terminal Settling Velocity                      |   |
| . Calculate Visibility and Coefficient of Haze (COH)        |   |
| . Discuss the effects of Particulate Matter                 |   |
| . Explain Monitoring Devices                                |   |
| . Present Legislation Standards                             |   |
| 3. Gaseous Pollutants                                       | 6 |
| . Discuss types of Gaseous Pollutants                       |   |
| . Discuss the effects of Gaseous Pollutants                 |   |
| . Explain Photochemical Smog                                |   |
| . Explain Monitoring Devices                                |   |
| . Present Legislation Standards                             |   |
| 4. Climatology and Meteorology                              | 6 |
| . Discuss Basic Atmospheric Properties                      |   |
| . Discuss Wind, Stability and Turbulence                    |   |
| . Explain Smoke Dispersion and Atmospheric Stability        |   |
| . Perform Dispersion Calculation                            |   |
| . Interpret Wind and Pollution Roses                        |   |
| 5. Control of Air Pollution                                 | 6 |
| . Discuss the following types of pollution control devices: |   |
| Cyclones  |   |
| Wet Scrubbers   |   |
| Baghouse Filters  |   |
| Electrostatic Precipitators                                 |   |
| Adsorption Devices  |   |
| Catalytic Combustion and Converters                         |   |
| . Discuss devices used for Odour Control                    |   |

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|----|---|---|
| 6. | Predicting Air Pollutant Concentrations           | 6 |
|    | . Use the following:                              |   |
|    | . Pollution Dispersion Models                     |   |
|    | . Plume Rise Models                               |   |
|    | . Point of Impingement Calculations               |   |
|    | to determine air pollutant concentrations         |   |
| 7. | Legislation                                       | 6 |
|    | . Discuss Environmental Protection Act of Ontario |   |
|    | and other relevant regulations                    |   |
|    | . Discuss Ontario's Clean Air Program             |   |
|    | . Explain Air Quality Index                       |   |
|    | . Discuss Transboundary Issues                    |   |
| 8. | Air Monitoring                                    | 6 |
|    | . Discuss Air Monitoring Networks                 |   |
|    | . Locate Monitoring Stations and Equipment        |   |
|    | . Explain Sampling Procedures and Equipment       |   |
|    | . Explain Analytical Techniques                   |   |
| 9. | Testing   | 3 |

IV. EVALUATION METHODS:

Tests	-	Midterm	30%
		Final	40%
Assignments & Quizzes			30%
			<u>100%</u>

All assignments must be submitted to pass the course.  
Marks are cumulative and 60% is considered a pass.

A+ = 90%      A = 80-89%      B = 70-79%      C = 60-69%

V. REQUIRED STUDENT RESOURCES:

Henry, J.G. and Heinke, G.W., Environmental Science and Engineering,  
Englewood Cliffs, New Jersey, Prentice Hall 1989.

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**VI. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY  
BOOK SECTION:**

Periodical Section

1. Environmental Science and Engineering \*
2. Environment
3. Journal of Air and Waste Management \*

Audiovisual Section

1. Greenhouse Effect \*\*
2. Air is for Breathing\*\*

\* In Departmental Reading Room

\*\* In College Media Services

**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.