

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

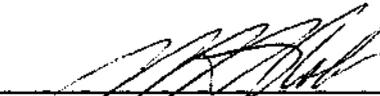
COURSE OUTLINE

Course Title: ADVANCED WASTEWATER TREATMENT
Code No.: WTR 311-5
Program: WATER RESOURCES ENGINEERING TECHNOLOGY
Semester: SIX
Date: MAY, 1986
Author: SUBHASH VERMA

New:

Revision;

APPROVED:


Chairperson


Date

CALENDAR DESCRIPTION

ADVANCED WASTEWATER TREATMENT

WTR 3 11-5

Course Name

Course Number

PHILOSOPHY/GOALS;

To present basic knowledge and practices, theories, and applications relevant to the wastewater treatment of wastewaters. The course work will involve biological, physical and chemical processes, and sludge treatment and disposal methods. The objectives of the course and the course outline are given on the attached.

METHOD OF ASSESSMENT (GRADING METHOD):

Laboratory & Field Exercises	25%
Three Unit Tests	75%

GRADING:

A - 80-100%
B - 70- 79%
C - 60- 69%
D - 50- 59%

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.

REFERENCES:

Water Supply ^ Pollution Control, by Warren Viesman, Jr. and Mark J. Hammer 4th Edition, Harper and Row Publishers, New York.

TEXTBOOK(S):

Wastewater Treatment, by Donald W. Sundstrom and Herbert E. Klei, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632

Water and Wastewater Technology (SI Version) by Mark J. Hammer. John Wiley & Sons

Industrial Water Pollution ^ Origins, Characteristics and Treatment, by Nelson L. Nemerson. Addison-Wesley Publishing Company, Don Mills, Ont.

Water Quality, by George Tachobanoglous and Edward D. Schoreder. Addison-Wesley Publishing Company, Don Mills, Ontario.

COURSE OUTLINE

1 Passing of Sludges (Chapter 13)

- 1.1 Sources, Characteristics and Quantities of Waste Sludges
- 1.2 Arrangement of Unit Processes in Sludge Disposal
- 1.3 Gravity Thickening
- 1.4 Flotation Thickening
- 1.5 Sludge Digestion
- 1.5 Vacuum and Pressure Filtration

2. Water Quality and Pollution (Chapters 15, 8)

- 2.1 Stream Loading
- 2.2 Types and Sources of Stream Pollution
- 2.3 Aeration and Deoxygenation of Stream Waters
- 2.4 An Elementary Water Quality Model

3. Advanced Wastewater Treatment Processes (Chapter 14)

- 3.1 Effluent Standards and Flow Equilization
- 3.2 Selection of Advanced Wastewater Treatment Processes
- 3.3 Granular Media Filtration
- 3.4 Carbon Adsorption
- 3.5 Phosphorus Removal
- 3.6 Nitrogen Removal
- 3.7 Wastewater Reclamation

COURSE OUTLINE...continued

4. Industrial Waste Treatment Process (Reference)

4.1 Food Industry

4.2 Pulp & Paper

4.3 Steel and Mining

4.4 Chemical

OBJECTIVES

The student will be able to:

1. Identify the physical, chemical and biological characteristics of wastewater.
2. Classify treatment processes with respect to the method and degree of treatment, and sludge handling.
3. Determine sludge characteristics and estimate the quantities of sludges.
4. Classify the sludge treatment process and to estimate the volume of sludge digesters.
5. Determine the capacity of equilization basins.
6. Calculate the nutrient loading due to waste discharges from municipal and industrial plants.
7. Perform calculations related to deoxygenation of stream water.
8. Calculate assimilative capacity of a given water system using an elementary water quality model.
9. Describe the various physical, chemical and biological processes for phosphorous and nitrogen removal.
10. Perform design calculations for physical treatment processes, including sedimentation, thickening, flotation, filtration, centrifugation, adsorption and membrane separation.

OBJECTIVES...continued

11. Perform design calculations for chemical treatment processes, including neutralization, coagulation, ion exchange, oxidation and disinfection.
12. List and describe the treatment methods for industrial wastes including food, pulp and paper, steel and chemical industries.