

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

COURSE OUTLINE

TITLE; WASTEWATER TREATMENT - THEORY (DISTANCE EDUCATION)

CODE NO.: WTR 228-2 **SEMESTER:** III

1 ^ **PROGRAM:** ENVIRONMENTAL ENGINEERING

AUTHOR: SUBHASH C. VERMA

DATE: JULY/93 **PREVIOUS OUTLINE DATED:** DEC/92

APPROVED:
DEAN

V ^ ^//^J
DATE

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TOTAL CREDIT HOURS: 45

PREREQUISITE(S): NONE

I. PHILOSOPHY/GOALS:

To present basic knowledge and practices, theories, and applications relevant to wastewater flows and characteristics, treatment processes, and plant operations.

II. STUDENT PERFORMANCE OBJECTIVES:

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

1. Assess and evaluate wastewater flows and characteristics.
2. Perform basic designs of unit treatment processes, including preliminary settling facilities, aerobic biological processes, secondary settling tanks.
3. Determine plant operation requirements, including process control, performance evaluation, and maintenance.
4. Perform laboratory tests and analyses relevant to plant performance.
 - a) Determine the organic and hydraulic loading based on BOD, SS and average flow.
 - b) Estimate the amount of sludge to be wasted, based on the selected solids retention time.
 - c) Observe the sludge blanket and check loading both for primary and secondary clarifiers.

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III. TOPICS TO BE COVERED:

1. Wastewater Flows and Characteristics
 - 1.1 Domestic Wastewater
 - 1.2 Industrial Wastewater
 - 1.3 Infiltration and Inflow
 - 1.4 Municipal Wastewater
 - 1.5 Evaluation of Wastewater
2. Preliminary and Primary Wastewater Processing
 - 2.1 Unit Operations
 - 2.2 Preliminary Treatment
 - 2.3 Primary Treatment
3. Secondary Treatment
 - 3.1 Activated Sludge
 - extended aeration
 - step aeration
 - conventional aeration
 - contact stabilization
 - high rate
 - 3.2 Stabilization Ponds
 - 3.3 Fixed Growth Systems
 - rotating biological contractors
 - trickling filters
 - 3.4 Household Disposal Units
4. Characteristics and Quantities of Waste Sludges
5. Operation of Wastewater Treatment Systems

IV. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS ETC.)

The final mark to be assigned will be based on aggregate as shown below:

Laboratory 30%

Unit Tests 70%

 I 20%

 II 20%

 III 30%

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IV. EVALUATION METHODS: (INCLUDES ASSIGNMENTS, ATTENDANCE REQUIREMENTS ETC.) (cont'd)

GRADING:

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 55-59% may be allowed to complete a supplementary examination.

V. REQUIRED STUDENT RESOURCES:

Water and Wastewater - Technology (SI Version) by Mark J. Hammer, John Wiley & Sons, 2nd Edition.

Laboratory Skills for Plant Operators, Vol. 2 - Ministry of the Environment, 135 St. Clair Ave. W., Toronto, Ontario, M4V 1P5.

Laboratory Manual - WTR226, by S. Verma; Sault College, June 1992.

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

Standard Methods, by AWWA-WPCF-APHA, 1015 15th Street N.W., Washington, D.C. 20005

Water Quality, by Tchobanoglous, G., Schroeder, E.D., Addison-Wesley Publishing Company, Don Mills, Ontario

Environmental Engineering, Peavey, H., Donald, R., Tchobanoglous, G, McGraw-Hill Book Company, Toronto

Water Supply and Pollutional Control, Viessman, Warren, Hammer, M.J., Fourth Edition, Harper and Row Publishers

VII. SPECIAL NOTES:

If required, changes will be made. However, students will be notified prior to any changes.