

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

COURSE OUTLINE

COURSE TITLE: WATER TRANSPORTATION SYSTEMS

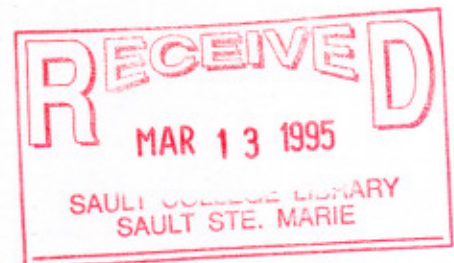
CODE NO.: CIV 317-5 SEMESTER: IV

PROGRAM: ENVIRONMENTAL / WATER RESOURCES ENGINEERING TECHNOLOGY

AUTHOR: JOHN THEIL

DATE: FEBRUARY 1995 PREVIOUS OUTLINE DATED: FEBRUARY 1992

APPROVED: *John Theil* *Feb. 28/95*  
DEAN DATE



WATER TRANSPORTATION SYSTEMS

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TOTAL CREDIT HOURS: 80

PREREQUISITE(S): WTR 330 - HYDRAULICS

I. PHILOSOPHY/GOALS:

To introduce the basic principles and procedures for the design of water distribution, sanitary sewer, and storm drainage systems.

II. STUDENT PERFORMANCE OBJECTIVES:

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

1. Apply the basic principles of hydraulics and hydrology applicable to water distribution, sanitary sewer, and storm drainage systems.
2. Select appropriate design parameters pertinent to various population densities and land uses.
3. Perform basic design of water and sewer systems.
4. Determine pump head-discharge curves.
5. Select pumping units for high lift pumping stations for water distribution and sanitary sewer systems.

III. TOPICS TO BE COVERED:

Topics	Hours
1. Hydraulics and Hydrology	12
Water Pressure	
Pressure-Velocity-Head Relationships	
Flow in Pipes Under Pressure	
Head and Friction Losses	
Hazen Williams Equation	
2. Pumps and Pumping Stations	15
Pump Characteristics	
System Characteristics	
Pump Operating Point	
Power and Efficiency	

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III. TOPICS TO BE COVERED: (continued)

Topics	Hours
3. Water Distribution System	15
Flow in Pipe Networks	
Water Quantity and Pressure Requirements	
Piping Networks	
Distribution Pumping and Storage	
Design Layout of Distribution Systems	
4. Sanitary Sewer System	12
Gravity Flow in Circular Pipes	
Design Flows	
Sewage Lift Stations	
System Design	
5. Storm Drainage	10
Amount of Storm Runoff	
Rainfall Intensity-Duration Curves	
Design Considerations	

IV. EVALUATION METHODS:

Assignments/Exercises	20%
Interim Test	25%
Final Examination	55%
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% to 59% may be allowed to complete a supplementary examination.

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V. REQUIRED STUDENT RESOURCES:

TEXTBOOKS:

Hammer, Mark J.; Water and Wastewater Technology, Second Edition; John Wiley and Sons.

Guidelines for the Design of: Sanitary Sewage Works, Storm Sewers, Water Distribution Systems, Water Storage Facilities; Ministry of the Environment.

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

1. Mott, Robert (1990), Applied Fluid Mechanics, Third Edition, Charles E. Merrel Publishing Company, Toronto.
2. Gupta, Ram S. (1989), Hydrology and Hydraulic Systems, Prentice Hall, Englewood Cliffs, New Jersey.
3. Peavy, H.S., Rowe et al. (1985), Environmental Engineering, McGraw-Hill Book Company, Toronto.
4. WPCP (1982), Design and Construction of Sanitary and Storm Sewers, Manual of Practice No. 9.
5. Tchobouoglous, G. (1981), Wastewater Engineering: collection and Pumping of Wastewater, McGraw-Hill Book Company, Toronto.

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.

Eighty percent attendance is required for successful completion of the course.