SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: Water Supply and Treatment

CODE NO. : WTR 201 **SEMESTER:** IV

PROGRAM: Environmental Technician-Water

AUTHOR: *Subhash Verma, P.Eng*

DATE: 01 01 **PREVIOUS OUTLINE DATED:** June 1997

APPROVED: "B. Punch"

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Chair **DATE**

TOTAL CREDITS: 5

HOURS/WEEK: 5

I. PHILOSOPHY/GOALS:

To present basic knowledge and practices, theories and applications relevant to sources of water supply, treatment processes, quality parameters and plant operations.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course the student will demonstrate the following:

1. Describe the water quality parameter and identify various types of water treatment processes.
    - Understand the importance of safe drinking water
    - Name main water treatment process
    - Perform dosage and dosage rate calculations
    - Prepare solutions of desired strengths and determine feed rates

2. Understand the principle of coagulation and flocculation and factors affecting these processes.
    - Name commonly used coagulants and coagulant aids
    - Work the stoichiometric requirement of the coagulants
    - Compare slow mixing and rapid or flash mixing
    - Perform jar testing to optimize coagulant dose

3. Describe the sedimentation units and solid contact units.
    - Describe four zones of sedimentation
    - Show the main application of solid contact units
    - Calculate detention time, overflow rate and mean flow velocity
    - Estimate the quantity of chemical sludge produced

4. Understand the importance of filtration and describe the factors affecting the performance efficiency,
    - Compare slow and rapid sand filtration
    - List main compounds of a gravity filter system
    - Describe the operation control of filtration
    - Calculate filtration rate and unit filter run volume

5. Describe various methods of disinfecting water.
    - Name chlorine compounds commonly used for water supplies
    - Understand the various phases of break point chlorination
    - Operate and control chlorination equipment
    - Calculate desired dosages and quantities of hypochlorite required to make chlorine solutions

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE CONT'D

6. Describe the chemistry of water softening.
    - Name minerals causing hardness in water
    - Describe the methods of softening water
    - Calculate hardness based on iron content
    - Calculate the lime and soda-ash dosages

7. Describe the treatment methods for control of iron, manganese and taste and odour problem in drinking water supplies.
    - Describe various methods of iron and manganese control
    - Identify the substances causing taste and odour problems
    - Compare aggressive and scaling water
    - Identify major factors affecting corrosion

III. TOPICS:

1.0 Introduction
2.0 Coagulation and Flocculation
3.0 Sedimentation
4.0 Filtration
5.0 Disinfection
6.0 Fluoridation
7.0 Softening
8.0 Iron and Manganese Control
9.0 Adsorption
10.0 Stabilization

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Water and Wastewater Technology by Mark J. Hammer and Hammer Junior, Prentice Hall, 7th edition, 2008

Course Manual by S. Verma, Environmental Training Services Inc., 2008

V. EVALUATION PROCESS/GRADING SYSTEM:

Final mark in the course will be based on:

Laboratory Work	-	25%
Tests	-	50%
Quiz	-	25%

A passing grade will be based on a composite grading of 50%.

Grade	Definition	Grade Point Equivalent
A+	90 - 100%	4.00
A	80 - 89%	4.00
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 - 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:

Disability Services:
If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Retention of Course Outlines:
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Communication:
The College considers ***WebCT/LMS*** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the ***Learning Management System*** communication tool.

Plagiarism:
Students should refer to the definition of "academic dishonesty" in *Student Code of Conduct*. Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:
The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

Tuition Default:

Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of <*choose November, March, or June*> will be removed from placement and clinical activities. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.