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: Jan 2012 **PREVIOUS OUTLINE DATED:** Jan 2011

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

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

7. Describe the treatment methods for control of iron, manganese and taste and odour problems 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%

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:

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session. *It is the departmental policy that once the classroom door has enclosed, the learning process has begun. Late arrives will not be granted admission to the room*