SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE:	ENVIRONMENTAL SCIENCE		
CODE NO. :	ENV 103	**SEMESTER:**	1
PROGRAM:	ENVIRONMENTAL/ CIVIL /ARCH./ CONSTRUCTION TECHNICIAN		
AUTHOR:	DAVID TROWBRIDGE		
DATE:	Aug 2008	**PREVIOUS OUTLINE DATED:**	June 2007
APPROVED:	**"Corey Meunier" CHAIR**		**Sep16 08 DATE**
TOTAL CREDITS:	3		
PREREQUISITE(S):	None		
HOURS/WEEK:	3 hours/week		

I. COURSE DESCRIPTION:

This is an introductory course covering the fundamentals of science related to the study of engineering technology. The course provides students with an understanding of the basic concepts of ecology, an introductory survey of biological concepts and the fundamentals of chemistry as applied to water and wastewater treatment. This will also provide the background to prepare students for an introduction to the process of environmental impact assessment. Practical aspects are presented in laboratory sessions throughout the course.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Demonstrate an understanding of the role of environmental science and technology.

   Potential Elements of the Performance:
   - describe the steps in the scientific method;
   - using the scientific method demonstrate how to solve a given problem;
   - describe and give examples of the various levels of organization of matter;
   - identify the environmental aspects of contemporary society including solid waste management, water supply and treatment and wastewater collection and treatment;

2. Explain basic ecological concepts, including energy flow, food chain and food web

   Potential Elements of the Performance:
   -define basic terms including ecosystem, environment, community, habitat, niche;
   -describe the energy flow in ecosystems;
   -distinguish between a food chain and food web;
   -trace the flow of nutrients in the primary nutrient cycles;
   -describe the elements of limnology;
   -define eutrophication and explain its cause;
   -state the ecosystem approach to describing the interactions in the environment;
   -describe the ecosystem concept and ecological sustainability;
   -describe the causes and impacts of the major global environmental problems;
   -state the meaning and importance of biological diversity;

-explain the pollution prevention approach;

3. Describe the fundamental biological systems and their position within the ecosystem

   Potential Elements of the Performance:
   -list the characteristics of living organisms;
   -identify the function of the main parts of plant and animal cells;
   -describe the function of the various organelles within a cell;
   -describe the physiological effects on the environment of animals, humans, plants and micro-organisms;
   -describe the structure of bacteria, fungi, and viruses and their growth and reproduction;
   -name and describe the main biological contaminants in drinking water;
   -name and describe the main biological organisms found in wastewater treatment processes;

4. Apply proper microbiological, zoological and botanical classification

   Potential Elements of the Performance:
   -use correct convention in writing scientific names;
   -explain the basis for classifying organisms;
   -categorize selected examples of organisms into their respective taxonomic groups;
   -identify the impact of bacteria, fungi and viruses on water supply;
   -describe the role of indicator organisms in identifying environmental impacts;
   -use a compound microscope to observe and draw cellular material

5. Describe basic strategies for obtaining nutrients and trace their intake and movement through the cell.

   Potential Elements of the Performance:
   -explain the role of micro-organisms in the treatment of wastewater
   -differentiate between the process of diffusion and osmosis in cells
   -summarize the processes of photosynthesis and respiration and their relationship to ecosystem function;
   -describe the interactions between the atmosphere, earth, water, plant, animal and microbiological systems;

6. Apply the fundamentals of chemistry in theory and in practical situations.

   Potential Elements of the Performance:

-differentiate between mass, weight, volume, density, states of matter, mixtures, solutions, and suspensions;
-relate characteristics of elements to their position in the Periodic Table;
-read and apply information from the Periodic Table including atomic symbols, atomic mass and atomic number;
-distinguish between metals, non-metals and inert gases;
-describe the chemical processes used to treat water and wastewater;

7. Interpret the language of chemistry including chemical symbols for the elements, compounds and chemical equations.

   Potential Elements of the Performance:
   -describe and name ionic and covalent compound, organic and inorganic materials, acids and bases;
   -explain and use the pH scale;
   -describe the chemical and physical properties of water and their relationship to ecosystem functions;
   -write and balance chemical equations including those common in water and wastewater treatment;

8. Perform chemical calculations related to environmental situations.

   Potential Elements of the Performance:
   -calculate neutralization requirements for acidic or basic conditions based on a simple titration;
   -calculate gram molecular weights and determine the numbers of moles of a given mass of substance;
   -calculate the amount of material consumed or produced in chemical reaction;
   -determine the concentration of solutions and carry out the procedure for diluting solutions;
   -calculate the amount of a given solution needed to react with a given amount of material;
   -define and calculate dissolved oxygen (DO) and biochemical oxygen demand (BOD)

9. Utilize correct laboratory techniques and safe working practices in a laboratory setting.

   Potential Elements of the Performance:
   -discuss and apply safe lab procedures including the handling of dangerous materials;
   -demonstrate knowledge of the Workplace Hazardous Materials

Information System;
-demonstrate use of balances, pH measuring devices, burettes, and common lab glassware;
-determine to within acceptable accuracy an unknown quantity by following a laboratory procedure;

10. Perform chemical calculations related to environmental situations.

Potential Elements of the Performance:
- describe the elements considered in the EA process including impacts on water, air and natural species
- discuss noise levels impacts and calculations
-list the steps required when undertaking a project governed by the Environmental Assessment Act;
-distinguish between Class Environmental Assessment and Individual EA;
-explain the requirement and process for public participation in EA;
-describe the components of an Environmental Study Report (ESR)

III. TOPICS:

1. Role of environmental science
2. Principles of ecology
3. Principles of biology
4. Principles of chemistry
5. Environmental Assessment

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Basic Environmental Technology, Jerry A. Nathanson, Second Edition, 2000, Prentice Hall

Laboratory coat and safety glasses

V. EVALUATION PROCESS/GRADING SYSTEM:

There will be two major tests during the semester, plus quizzes and assignments or projects on various topics. A final grade will be determined based on the aggregate score of all work according to the following weighting;

Tests and quizzes	*= 60%*
Laboratory work, assignments	*= 40%*
Total	*100%*

The following semester grades will be assigned to students:

Grade	Definition	*Grade Point Equivalent*
A+	90 – 100%	4.00
A	80 – 89%	
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:

Special Needs:
If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 703 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.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.