



CAMOSUN COLLEGE
School of Trades and Technology
Department of Civil Engineering Technology

CIVE 278
Water and Waste Management
Winter 2020

COURSE OUTLINE

Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

1 Instructor Information

Instructor	Perry Peterson	
Office hours	See office door	
Location	TEC 105	
Phone	Cell 250 812 2214	Alternative: Office 250 370 4401
E-mail	petersonp@camosun.bc.ca	
Website	http://civil.camosun.bc.ca/student/	

2 Prerequisites

- C in CIVE 271
- C in CHEM 180

3 Hours and Credits

Course Activity

- Lecture (Direct Instruction)

Hours / Week	Instruction – No of Weeks (Q=11; S=14; “P or S” = 7)
5	14

Credits = 4

4 Short Description

Students learn the theory and practice of domestic water supply and distribution as well as the collection, treatment and disposal of wastewater. The impact of waste discharges to the environment and the management of solid waste are presented. Water quality concerns and common pathogens in Canada and other parts of the world are also discussed.

5 Intended Learning Outcomes

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

- Describe environmental issues such as water supply and waste management in a civil engineering context.
- Identify common domestic water supply contaminants, their maximum allowable concentrations (MAC) and their effects on human health.
- Describe the public health and environmental effects of wastewater discharges.

- Describe water and wastewater treatment options for removal of common contaminants and possible reuse of treated wastewater.
- Relate applicable laws and regulations to water supply and effluent discharges.
- Describe options for the treatment, disposal and beneficial reuse of sewage sludge.
- Describe disposal of treated effluent with respect to legal and technical requirements.
- Select components and design small on-site wastewater treatment and disposal.
- Predict flow patterns and hydraulically size components of a water or wastewater treatment plant.
- Describe of common methods of odour control and other operational considerations within wastewater collection and treatment systems.
- Identify components of an engineered landfill
- Discuss waste reduction programs and developments in energy recovery initiatives.

6 Course Content and Schedule

Global issues relating to engineering practice, environmental issues, law, and ethics are presented in terms of water and wastewater management practice. The course uses a combination of activities - Lectures, Interactive Activities & Discussions, Case Studies, and Field Trips – to provide a framework for the learner. These will offer opportunities for the learner to consider, discuss and describe the role of the Civil Engineering Technologist as a member of the water and wastewater project team. **Engaged classroom participation** is key to successful outcomes of this course.

Week	Topic
1	Course Overview, Common mineral contaminants, Case studies: Bangladesh, Minamata, Flint
2	Introduction to waterborne microbiology, Common pathogens, Groundwater, Case studies: Elmira, Walkerton, North Battleford
3	Introduction to municipal water treatment: disinfection and filtering; Case study: London Cholera Epidemic
4	Membrane filter, Introduction to water distribution system design, Case Study: Walkerton
5	Introduction to water distribution system design
6	Water rights and water resource planning; Case studies: Aral Sea, Dead Sea and Cochabamba Dams and Reservoirs;
7	Reading Week
8	Review; Midterm Exam
9	Intro to sewage, preliminary and primary treatment; Case study: London Sewer System
10	Preliminary and primary treatment, Clarifier Operation
11	Secondary treatment, Tertiary treatment, Sludge processing, Sewage testing
12	On-site treatment, odour control, disposal; Case Study: Victoria Sewage Outfall
13	Sludge Disposal, Introduction to solid waste management, engineered sanitary landfill
14	Review
15	Exam Week
	Field Trip Friday Mornings - To Be Announced: <ul style="list-style-type: none"> • CRD Japan Gulch Water Treatment Plant and Sooke Lake Reservoir • CRD Water Quality Control Lab • CRD Core Area Sewage Treatment • Possible CRD Hartland Landfill Site

7 Basis of Student Assessment

<i>Component</i>	<i>Weighting %</i>	<i>Comments</i>
Assignments*	60	*See Additional Information Below
Mid-term Exam	20	
Final Exam	20	Final exam will test only on material after the midterm
TOTAL	100	

8 Required Materials

- a) Text – reading and multimedia presentations will be assigned on course web site

9 College Supports, Services and Policies

Immediate, Urgent, or Emergency Support

If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ <http://camosun.ca/about/mental-health/emergency.html> or <http://camosun.ca/services/sexual-violence/get-support.html#urgent>

College Services

Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at <http://camosun.ca/>

College Policies

Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at <http://camosun.ca/about/policies/>. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

10 A Safe Place for EVERYONE

The nature of the subject matter in this course requires the development of critical thinking of which the self-evaluation of default beliefs is an element. However, IT IS VERY IMPORTANT TO DIFFERENTIATE BETWEEN APPROPRIATE CHALLENGES TO IDEAS AND BELIEFS AND THE VIOLATION OF OUR NEED TO CREATE A SAFE ENVIRONMENT that will allow every student to participate fully. Equity, diversity, and inclusion (EDI) are central to Camosun's culture and values. The Camosun community and the engineering community at large commit to pursuing equity in education regardless of race, heritage, religion, gender or gender identity, and ability. We learn best when we feel safe. Inappropriate, hateful or demeaning comments or actions will not be tolerated. Your suggestions on how to make your experience here better are encouraged and appreciated. Please let me or the department chair know ways to improve your experience at Camosun. If you wish to know more about Camosun's EDI policy, please see the EDI page on the college's website: <http://camosun.ca/about/policies/equity-diversity-inclusion.html>

11 Grading System

- Standard Grading System (GPA)
- Competency Based Grading System

See [Camosun Grading Policy E-1.5](#)

12 Class Policies

- Late assignments will be permitted only with permission from instructor prior to the due date by way of email.
- Field trips will have reports assigned that can ONLY be completed if you attend the field trip.
- Your average grade on the final and the midterm must be over 50% to pass the course.

13 Additional Information

Instrument #	Type of Instrument	Max Grade
1	Labs - study log	10%
2 to 6	Assignments (Essay and Calculations)	30%
7	Reflections	10%
8	Field Trips (Questionnaires)	10%
9	Test 1	20%
10	Test 2	20%

Possible Evaluation and Feedback Rubric Items		TIME
1.	GENERAL Describe environmental issues in water supply and waste management project from a civil engineering fact/evidence-based context.	10
	<ul style="list-style-type: none"> • Show respect and empathetic understanding for the diverse opinions, values, belief systems and contributions of others. • Describe the rights, roles and responsibilities of the civil engineering technologist as a member of the water and wastewater project team. • Consider theory and research of relevant disciplines when assisting in designing, building and operating water and wastewater management projects. 	
2.	PLANNING: Gather facts necessary for solving water and wastewater engineering problems.	25
	<ul style="list-style-type: none"> • Identify the project stakeholders and their needs (including public), value their input. • Identify relevant legislation and bylaws that apply in specific situations e.g., Drainage Act (1990), Lakes and Rivers Improvement Act (1990), Water Resources Act (1990) etc. • Read and interpret the results of impact studies and assessments for specific water and wastewater projects. • Identify and formulate technological solutions that mitigate the negative economic, social and environmental impacts of water and wastewater needs. • Evaluate technologies with a lower carbon footprint 	

3. DESIGN: Participate in the design and modelling phase of water and wastewater management projects by applying engineering concepts, technical mathematics and principles of science to the review, produce and/or modify project plans:	25
<ul style="list-style-type: none">· Use water and wastewater/environmental technology terminology correctly in written and oral communication.· Select and apply standards, codes and procedures to participate in the design of water and wastewater project components.· Apply standard mathematical and scientific formulas, techniques and computer models accurately.· Identify and Apply the principles of sustainable development, combining environmental stewardship and economic performance in project work· Plan and implement checks to ensure calculations and/or design concepts are accurate· Seek assistance to resolve situations in the analysis, design, or construction of water and wastewater project that are beyond the scope of the technologists training, knowledge or legal authority	
4. OPERATE: Coordinate and perform quality control testing and evaluate equipment, materials and methods used in the operation and maintenance of water and wastewater projects.	10
<ul style="list-style-type: none">· Select and apply established industry techniques including computer models to analyze the performance of water and wastewater systems.· Review and analyze the specifications, limitations, use and safety aspects of testing equipment.· Perform, coordinate and/or supervise quality control sampling and testing, interpret results and make necessary adjustments or changes.	