CAMOSUN COLLEGE

ENVIRONMENTAL TECHNOLOGY

COURSE OUTLINE

ENVR103 ENVIRONMENTAL MICROBIOLOGY

This course focuses on microbiological concepts and practices particularly related to the environment. Topics include prokaryotic cell structure and function, growth and control, metabolism, sanitary microbiology, microbial ecology and biotechnology.

OFFERED:	Winter
CREDIT:	2
IN-CLASS WORKLOAD:	1 lec, 2 lab
OUT-OF-CLASS WORKLOAD:	3
PREREQUISITES:	Biol 224 and ENVR 110

Learning Outcomes

Upon successful completion of ENVR 103 the student will be able to:

Use their knowledge of sterile lab technique to work safely with microorganisms in a lab environment.

Apply their understanding of the critical role of microorganisms in maintaining and remediating the environment to assess the consequences of human activities.

Grading system

A+	95-100%	B-	70-74%
A	90-94%	C+	65-69%
A-	85-89%	C	60-64%
B+	80-84%	D	50-59%
B	75-79%	F	0-49%

PART B: COURSE DETAILS

Course Content Outline:

1. Introduction to Microbiology: Importance of microbes in the environment, historical perspectives, classification schemes.
2. Prokaryotic Cell Structure and Function: contrast with Eukaryotic cell structure, cell shape and arrangement, cell membrane, gram positive and negative cell wall, cytoplasm, flagella, pilli, nucleoid, endospores, glycocalyx.
3. Growth and Control: Significance of exponential growth, growth curve, control of microbial growth by heat, radiation, filtration and chemicals.
4. Metabolism: Nutritional types based on energy and carbon source, transport across membranes, aerobic respiration, anaerobic respiration, fermentation.
5. Sanitary Microbiology: Microbial examination of water, testing for total and fecal coliforms by MF and MPN methods, BOD, water purification methods, primary, secondary and tertiary sewage treatment, anaerobic digestion.
6. Microbial Ecology: Symbiotic relationships among microbial populations, between microbes and plants or animals, microbial involvement in biogeochemical cycles, Acid Mine Drainage, biomagnification.
7. Biotechnology: Introduction to genetic engineering, use of naturally occurring and genetically modified microorganisms in industrial, agricultural, and environmental applications.

Laboratory Exercises:

1. Microscopy
2. Isolation Techniques
3. Bacterial Stains
4. Media Preparation and Autoclave Sterilization
5. Chemical Control of Microbial Growth
6. Oxygen Requirements and UV Radiation
7. Culture Media
8. Enterobacteriaceae
9. Detecting Coliform Bacteria in Water
10. Manometric Method for Measurement of BOD
11. Ames Test
12. Soil Bacteria: The Nitrogen Cycle
13. Bioremediation

Basis of Student Assessment:

Lecture: 50% of course mark
- Midterm 20%
- Final 30%

Laboratory: 50% of course mark
- Quiz 1 15%
- Quiz 2 15%
- Quiz 3 15%

Prelab quizzes, assignments, reports, etc. 5%

Required Materials:

- Lab Manual, includes textbook excerpts as reference material
- Lab coat, to be kept in the microbiology lab