

CAMOSUN COLLEGE  
ENVIRONMENTAL TECHNOLOGY DEPARTMENT

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## **ENVR 206B ENVIRONMENTAL BIOTECHNOLOGY**

### Course Objectives

The student will be able to:

1. Culture and subculture plant explants under sterile conditions.
2. Successfully use the tools of biotechnology including DNA extraction techniques, restriction enzymes, *Agrobacterium*, agarose gel electrophoresis, PCR and protoplast fusion.
3. Be familiar and competent in molecular biology techniques.
4. Explain the principles of bioremediation and phytoremediation.
5. Explain the principles of genetic engineering and biotechnological techniques and their application to agriculture and the environment.
6. Explain the principles and list the factual content of the course.

### Course Outline

1. Introduction to Environmental Biotechnology

Overview of biotechnology pertaining to the Environmental field.

2. Plant Tissue Culture Techniques

Students should competently and efficiently work in laminar flow hoods, employing sterile techniques to culture and subculture plant tissue explants.

3. Genetic Engineering and Molecular Biology

An overview of the principles and techniques involved in the engineering of “designer “ organisms for industry, agriculture or for use in biodegradation and bioremediation. Use *Agrobacterium* and tissue culture techniques to introduce a foreign gene into selected plants.

4. Biological Degradation, Bioremediation and Phytoremediation

A look at the increasing use of microorganisms, microbial metabolic processes and plants to break down environmental poisons and clean soil and water.

5. Poster/Oral Presentation

Groups of students will research an organism that has been or is being used in biodegradation, bioremediation, and phytoremediation or is a product of genetic engineering. The students will incorporate their findings into a research paper and poster and present these to the other class members.

6. Final Exam

Understand the basic principles of the course.

## COURSE SCHEDULE - BIOLOGY 206B – Fall 2002

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The schedule, which follows, is an attempt to outline the weekly activities of the class. It is subject to change or modification as the need arises.

Week	Date	Lecture	Labs
1	Sept. 4-6	Introduction to Environmental Biotechnology	<ul style="list-style-type: none"> <li>• Lab. 1 - Characteristics of <i>Agrobacterium</i></li> <li>• Grafting</li> <li>• Lab. 2 Transformation</li> </ul>
2	Sept. 10-13	Review of DNA and Molecular Biology	<ul style="list-style-type: none"> <li>• Lab. 1 - Characteristics of <i>Agrobacterium</i></li> <li>• Lab. 2 Transformation</li> </ul>
3	Sept. 17-20	Tools in Biotechnology - <i>Agrobacterium</i>	<ul style="list-style-type: none"> <li>• Lab. 2 Transformation</li> <li>• Lab. 3 Isolation of DNA</li> </ul>
4	Sept. 24-27	Tools: Recombinant DNA Technology - Restriction enzymes.	<ul style="list-style-type: none"> <li>• Lab. 4 Protoplast fusions</li> </ul>
5	Oct. 1-4	Tools: electrophoresis	<ul style="list-style-type: none"> <li>• Lab. 5 Restriction digests</li> </ul>
6	Oct. 8-11	<b>Quiz #1 - individual</b>	<ul style="list-style-type: none"> <li>• Lab. 5 electrophoresis of digests</li> </ul>
7	Oct. 15-18	NO LECTURE	<ul style="list-style-type: none"> <li>• NO ENVR. 206B Lab (Thurs)</li> <li>• ENVR. 211 EXAM (Fri)</li> </ul>
8	Oct. 22-25	Tools: Polymerase Chain Reaction	<ul style="list-style-type: none"> <li>• Lab. 6 PCR (Thurs)</li> <li>• Envr. FIELD TRIP (Fri)</li> </ul>
9	Oct. 29 - Nov. 1	Biotechnology and Agriculture - introduction	<ul style="list-style-type: none"> <li>• Lab. 6 PCR</li> </ul>
10	Nov. 5-8	Biotechnology and Agriculture - where do we go from here	<ul style="list-style-type: none"> <li>• Case studies debate - Agriculture</li> </ul>
11	Nov. 12-15	Biotechnology and the Environment	<ul style="list-style-type: none"> <li>• Lab. 7 phytoremediation</li> </ul>
12	Nov. 19-22	Presentations	<ul style="list-style-type: none"> <li>• Case studies debate - environment</li> </ul>
13	Nov. 27-29	Presentations	<ul style="list-style-type: none"> <li>• Completion of all Labs</li> </ul>
14	Dec. 4-6	Presentations	

Exam #1	15%
Exam #2 (during final exam period)2	5%
Presentation	20%
Lab. Worksheets and assignments	40%