



**School of Arts & Science
ENVIRONMENTAL TECHNOLOGY DEPARTMENT**

**ENVR 206B-X01A, X01B
Environmental Biotechnology
Semester/Year, 2009F**

COURSE OUTLINE

The Approved Course Description is available on the web @
<http://camosun.ca/learn/programs/envr/study.html>

Ω Please note: this outline will be electronically stored for five (5) years only.
It is strongly recommended students keep this outline for your records.

1. Instructor Information

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|-----|---------------|---|--------------------|--|
| (a) | Instructor: | Anna Colangeli, PhD | | |
| (b) | Office Hours: | Posted on Office Door | | |
| (c) | Location: | Fisher 246 | | |
| (d) | Phone: | 250-370-3456 | Alternative Phone: | |
| (e) | Email: | colangel@camosun.bc.ca | | |
| (f) | Website: | http://online.camosun.bc.ca | | |

2. Intended Learning Outcomes

Upon completion of this course the student will be able to:

1. Culture and subculture plant explants under sterile conditions.
2. Use the tools of biotechnology, including DNA extraction techniques, restriction enzymes, agarose gel electrophoresis, PCR and protoplast fusion and discuss these molecular biology techniques.
3. Use *Agrobacterium* and tissue culture techniques to introduce foreign genes into selected plants.
4. Explain the principles of bioremediation and phytoremediation.
5. Research Case studies in alternative energy, bioplastics, biomimicry, and constructed wetlands. Explain and discuss the advantages and disadvantages of these technologies
6. Explain the principles of genetic engineering and biotechnological techniques and their application to the environment.

3. Required Materials

- (a) Texts - none
- (b) Lab manual and lecture notes are found in the course D2L site.

4. Course Content and Schedule

Lecture: F202 Wednesday 10:30 – 11:20

Labs: F222 Thursday 9:30 – 11:50 OR 1:30 – 3:50

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. 9, 10 | Introduction to Environmental Biotechnology: more than just Genetic Engineering | <ul style="list-style-type: none"> Review of Lab skills Lab. 1 - Tissue Culture Lab. 8 - Phytoremediation – discussion of experimental setup |
| 2 | Sept. 16,17 | History of Biotechnology | <ul style="list-style-type: none"> Lab. 1 - Tissue Culture – continue Lab. 8 Phytoremediation – set up |
| 3 | Sept. 23,24 | Review of DNA and Molecular Biology | <ul style="list-style-type: none"> Lab. 1, 8 – continue Lab. 2 - Isolation of DNA |
| 4 | Sept. 30 Oct. 1 | Tools in Biotechnology <ul style="list-style-type: none"> Recombinant DNA technology | <ul style="list-style-type: none"> Lab 1, 8 -continue Lab. 3 - Protoplast Fusion |
| 5 | Oct. 7,8 | Tools continued... <ul style="list-style-type: none"> Electrophoresis, PCR | <ul style="list-style-type: none"> Lab 1,8 - continue Lab. 4 - Restriction digests |
| 6 | Oct. 14,15 | Tools continued... <ul style="list-style-type: none"> <i>Agrobacterium</i> and cloning | <ul style="list-style-type: none"> Lab. 1,8 – continue Lab. 4 - electrophoresis of digests |
| 7 | Oct. 21,22 | Exam #1 | <ul style="list-style-type: none"> NO LABS |
| 8 | Oct. 28,29 | Case Studies: Alternative Energy - Solar | <ul style="list-style-type: none"> Lab. 8 Analysis of phytoremediation results |
| 9 | Nov. 4, 5 | Case Studies: Alternative Energy – from waste products | <ul style="list-style-type: none"> Lab. 5 - Characteristics of <i>Agrobacterium</i> |
| 10 | Nov 11 Nov 12 | Holiday | <ul style="list-style-type: none"> Labs 1, 5 continue Lab. 6 - PCR <p>Phytoremediation Report Due: Nov. 14</p> |
| 11 | Nov. 18, 19 | Case Studies: Bioplastics: the good, bad and ugly | <ul style="list-style-type: none"> Labs 1, 5, 6 continue Lab. 7 – GMO Investigations |
| 12 | Nov. 25, 26 | Case Studies: Biomimicry: what can nature teach us | <ul style="list-style-type: none"> Labs 1, 7 - continue |
| 13 | Dec. 2, 3 | Case Studies: Constructed Wetlands – biotech for the future | <ul style="list-style-type: none"> All assignments due |
| 14 | Dec. 9,10 | | <ul style="list-style-type: none"> NO LABS |

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|------------------------------------|-----|
| Exam #1 | 15% |
| Exam #2 (during final exam period) | 25% |
| Phytoremediation report | 10% |
| Case Study assignments | 10% |
| Lab. Worksheets and assignments | 40% |

6. Grading System

Standard Grading System (GPA)

| Percentage | Grade | Description | Grade Point Equivalency |
|------------|-------|---|-------------------------|
| 90-100 | A+ | | 9 |
| 85-89 | A | | 8 |
| 80-84 | A- | | 7 |
| 77-79 | B+ | | 6 |
| 73-76 | B | | 5 |
| 70-72 | B- | | 4 |
| 65-69 | C+ | | 3 |
| 60-64 | C | | 2 |
| 50-59 | D | Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite. | 1 |
| 0-49 | F | Minimum level has not been achieved. | 0 |

Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at camosun.ca for information on conversion to final grades, and for additional information on student record and transcript notations.

| Temporary Grade | Description |
|-----------------|--|
| I | <i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family. |
| IP | <i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. <i>(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)</i> |
| CW | <i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement. |

7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services or the College web site at camosun.ca.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services and on the College web site in the Policy Section.

ADDITIONAL COMMENTS AS APPROPRIATE OR AS REQUIRED