CAMOSUN COLLEGE	***School of Arts & Science*** ***ENVIRONMENTAL TECHNOLOGY DEPARTMENT*** **ENVR 206B-X01A, X01B** **Environmental Biotechnology** **2016 Fall**

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

(a)	Instructor:	Ian Browning,		
(b)	Office Hours:	Posted on Office Door and online		
(c)	Location:	P326		
(d)	Phone:	250-370-3342	Alternative Phone:	
(e)	Email:	browning@camosun.ca		
(f)	Website:	https://online.camosun.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, biomimicry, bioremediation, phytoremediation 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

4. Texts – none

(b) Lab manual and lecture notes are found in the course D2L site.

4. Course Content and Schedule

Lecture: Ewing 201 Friday 14:30-15:20 P.M.
Labs: F222 Wednesday 12:00 – 14:20 (A) 15.00pm – 17.20pm (B).

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	Labs	Lecture
1	Sept. 7,10	Review of Lab skills **Lab. 8** – Phytoremediation – overview and discussion of experimental setup	Introduction to Environmental Biotechnology: more than just Genetic Engineering
2	Sept. 14,16	**Lab. 1** – Tissue Culture **Lab. 8** – Phytoremediation – set up	Review of DNA Review of Molecular Biology
3	Sept. 21, 23	**Lab. 1** – Tissue Culture – cont'd **Lab. 8** Phytoremediation – cont'd standard curves	Tools in Biotechnology - Recombinant DNA technology
4	Sept. 28, 30	**Lab. 1, 8** – continue **Lab. 2** - Isolation of DNA	Tools in Biotechnology - Restriction enzymes
5	Oct 5, 7	**Lab 1, 8** –continue **Lab. 3** – Protoplast Fusions	Tools continued… Electrophoresis, PCR
6	Oct. 12, 14	**Lab 1,8** – continue **Lab. 4a –** Restriction digests	Tools continued…
7	Oct. 19, 21	**Lab. 1,8** – continue **Lab. 4b** – electrophoresis of DNA **Lab. 8** Analysis of phytoremediation results	*Agrobacterium* and cloning Conclusion of DNA Theory
8	Oct. 26, 28	**Lab. 5** – Characteristics of *Agrobacterium*	**Exam #1 –** includes all lecture material to date and Labs 1 to 4a
9	Nov. 2, 4	**Labs 1, 5** continue **Lab. 6** – PCR – PV92 loci	Case Study presentations #1
10	Nov 9	**Lab. 6 -** electrophoresis of PCR products	**NO LECTURE**
11	Nov. 16, 18	**Labs 1, 5 -** continue **Lab. 7** – GMO Investigations	Case Study presentations #2
12	Nov. 23, 25	**Labs 7** – electrophoresis of GMO products	Case Study presentations #3
13	Dec 7,9	**NO LAB**	Case Study presentations #4
14	Dec. 14, 16	**NO LAB**	**NO LECTURE**

Mark Breakdown:

Exam #1	**15%**	
Final Exam	**20%**	
Phytoremediation report	**20%**	**(due Nov. 16th)**
Case Study assignments (four)	**20%**	**(due Dec. 9nd)**
Lab. Worksheets and assignments	**25%**	

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	*Incomplete*: 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	*In progress*: 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. *(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)*
CW	*Compulsory Withdrawal:* 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.