Douglas College

Course Information

A: Division: INSTRUCTIONAL

DATE: January 9, 1998

B: Department: SCIENCE & TECHNOLOGY

New Course: X

Revision of Course Information form: ____

DATED: ____

C: BIOLOGY 301 (Subject & Course No.)

D: ENVIRONMENTAL GENETICS (Descriptive Title)

E: 3 (Semester Credit)

F: Calendar Description: This course is a study of the influence of the environment on genetic systems and the implications of genetic manipulation for the environment. The course will highlight environmental issues arising from practise and research in agriculture (e.g. monoculture, hybridization, interspecies gene transfer, cloning, gene manipulation), medicine (e.g. carcinogenesis, mutagenesis, antibiotics, disease, immunity), and other human activities.

Summary of Revisions:
(Enter date & section)
Ex: Section C,E,F, &R

G: Type of Instruction:

	Hours Per Week/ Per Semester	
Lecture	2	Hrs.
Laboratory	____	Hrs.
Seminar	2	Hrs.
Clinical Experience	____	Hrs.
Field Experience	____	Hrs.
Practicum	____	Hrs.
Shop	____	Hrs.
Studio	____	Hrs.
Student Directed Learning	____	Hrs.
Other	____	Hrs.
TOTAL	4	HOURS

H: Course Prerequisites:
Biology 110 and Biology 210

I: Course Corequisites:

J: Course for which this course is a pre-requisite

K: Maximum Class Size:
35

L: College Credit Transfer X

College Credit Non-Transfer ____

M: Transfer Credit:
Requested X
Granted ____
Specify Course Equivalents or Unassigned Credit as Appropriate

U.B.C. BIOL 3
S.F.U. BISC 3
U. Vic. BIOL 1.5
OTHER:

COURSE DESIGNER(S)

DEAN

VICE PRESIDENT (Instruction)

REGISTRAR

N: Textbooks and materials to be purchased by students
(Use Bibliographic Form):

Holden, J., Peacock, J., & Williams, T. Genes, Crops and the Environment. Cambridge University Press. UK 1993
Various selected journal articles.

O. Course Objectives:

Upon successful completion of this course the student should be able to:

1. Describe the roles of chromosomes and genes in heredity.
2. Describe the roles of genes and the environment in the determination of phenotype.
3. Describe the general ways in which genetic manipulation has contributed to the development of agricultural products.
4. Describe using examples, how genetic knowledge has been used to control agriculturally significant pests (e.g. insects) and infectious agents (e.g. viruses), and the impact of these practices on the environment.
5. Describe the environmental implications of hybridization, monoculture, interspecies gene transfer, and other genetic manipulation.
6. Describe the genetic and environmental implications of new species introductions to an area.
7. Describe the human genome and identify common chromosome and gene disorders.
8. Describe the sources of irradiation (e.g. UV x-rays) in the environment and describe their genetic significance.
9. Describe sources of mutagenic, carcinogenic, and teratogenic chemicals in the environment and identify their known effects.
10. Describe genetic research relating to the production and action of antibacterial and antiviral agents.
11. Describe the epidemiological and environmental implications of the use of antibiotics and other disease limiting methodologies.
12. Describe the evolutionary and environmental significance of genetic diversity and identify ways in which human activity threatens genetic diversity.
13. Describe ways in which genetic diversity may be created and maintained.
14. Describe the human and environmental implications of the control and distribution of genetic resources (e.g. gene/organism patents).
15. Describe the origin, goals, successes, and the social and environmental implications of the human genome project.
16. Research and write a scholarly paper on a topic of environmental genetic significance, and present a report on the research.

P. Course Content

The major topics in the course include the following:

1. Environmental implications of genetic practices/research in food production

- the green revolution
- hybridization
- monoculture
- genetic engineering
- genetic implications of pest control
- genetic mechanisms of pest control
- hazards of new species introductions

2. Medical Genetics and the Environment

- genetics of disease organisms
  - bacteria
  - viruses
  - other organisms
- implications of antibiotic use
- genetics of drug production
- mutation and mutagenesis
- carcinogenesis

3. Genetics, Industry and the Environment

- importance of genetic diversity
- genes as resources
- forest practises
- environmental/genetic implications of atomic energy/research

4. Environmental implications of genetic engineering

- eugenics
- interspecies gene transfer
- gene modification
- evolutionary consideration

Q. Method of Instruction:

The course will include 2 hours/week of direct lectures and 2 hours of seminar in which instructor and students will discuss key topics, view slide or film presentatins and work on projects. Readings will be assigned to supplement the lectures.

R. Course Evaluation

Type of Evaluation	Points
Class Tests (2)	30
Essay/Poster Project	20
Comprehensive Examinations - midterm	25
- final	25
TOTAL	100

GRADES: A+ 92-100 A 87-91 A- 82-86 B+ 77-81 B 72-76
B- 67-71 C+ 62-66 C 57-61 C- 53-56 P 50-52
F -049

Notes:

1. Class Tests:

   There will be two class tests based on the course objectives and other material covered in class and in the reading assignments.

2. Essay/Project:

   One essay/project presentation will be assigned in consultation with the student. The results of the student research will be presented to the class as a poster project.

3. Comprehensive Examinations:

   A midterm and a final examination will be worth 25 marks each.