Douglas College

EFFECTIVE: SEPTEMBER 2007
CURRICULUM GUIDELINES

A. Division: **Education** Effective Date: **September 2007**

B. Department / Program Area: **Science and Technology**
Biology

Revision [ ] New Course [X]

If Revision, Section(s) Revised:
Date of Previous Revision:
Date of Current Revision:

C: BIOL 3500 **D: Plants and Society** **E: 5**

Subject & Course No.	Descriptive Title	Semester Credits

F: Calendar Description:

This course will examine the relationship between plants and people. Topics include plant ecosystem interactions, plant evolution, classification and the significance of different structural, physiological and biochemical attributes of plants. The course will explore the importance of plants to society, from the origins of agriculture to plant biotechnology and ethnobotany.

G: Allocation of Contact Hours to Type of Instruction / Learning Settings

Primary Methods of Instructional Delivery and/or Learning Settings:

Lecture/Tutorial/Laboratory/Field trip

Number of Contact Hours: (per week / semester for each descriptor)

Lecture/Tutorial **4 hours/week**
Laboratory/field trip **3 hours/week**

Number of Weeks per Semester:

15 weeks

H: Course Prerequisites:

BIOL 1310 or BIOL 1210 with a grade of C- or permission of the instructor

I: Course Corequisites:

none

J: Course for which this Course is a Prerequisite

none

K: Maximum Class Size:

27

L: PLEASE INDICATE:

[ ] Non-Credit
[ ] College Credit Non-Transfer
[X] College Credit Transfer:

SEE BC TRANSFER GUIDE FOR TRANSFER DETAILS (www.bctransferguide.ca)

M: Course Objectives / Learning Outcomes

1. To gain an appreciation of the ecosystem services provided by plants.
2. To understand the principles of general plant classification and appreciate the underlying unity within this diversity.
3. To appreciate the roles that plants play in ecosystems, and understand how plants have adapted to their environments.
4. To understand plant structure and anatomy and its relationship to plant physiology, genetics and reproduction.
5. To investigate the origins of agriculture, including major crop plants and to understand the biological basis of their modification and selection by plant breeders.
6. To understand the issues and potential impact of biotechnology on agricultural ecosystems.
7. To be able to analyze and evaluate the potential impacts of environmental change and biodiversity loss on plants and people.
8. To consider the various uses of plants in medicine, poisons, beverages and as herbs and spices.
9. To gain an appreciation for the way different cultures have viewed and interacted with plants, including our own technological society.

N: Course Content:

1. Plants and our communities, including:
   - 1.1. ecological niche
   - 1.2. food chains and food webs
   - 1.3. energy flow and ecological pyramids
   - 1.4. plant adaptations to the environment
   - 1.5. plant roles in maintaining the environment

2. Plant systematics and evolution, including:
   - 2.1. seedless and seed plants
   - 2.2. phylogenetic system to group plants
   - 2.3. taxonomic hierarchy
   - 2.4. mechanisms of plant evolution

3. The plant cell, plant structure and anatomy, including:
   - 3.1. types of and unique features of plant cells
   - 3.2. plant tissues, including meristems, dermal, ground and vascular
   - 3.3. plant organs, including stems, roots and leaves and reproductive structures
   - 3.4. plant growth and development
   - 3.5. role of plant hormones in growth and development

4. Plant physiology, including:
   - 4.1. transport systems in vascular plants, including transpiration cohesion theory of water movement
   - 4.2. role of stomata
   - 4.3. translocation of sugars through pressure flow
   - 4.4. nutritional adaptations and nutrient uptake

5. Plant photosynthetic systems, including:
   - 5.1. C3 pathway; photorespiration and inefficiency of C3 pathway
   - 5.2. C4 and CAM photosynthetic systems
   - 5.3. respiration and fermentation

6. Reproduction and genetics
   - 6.1. mitosis and vegetative reproduction
   - 6.2. meiosis and sexual reproduction
   - 6.3. process of double fertilization

7. Plant Biotechnology
   - 7.1. crop breeding versus genetic engineering
   - 7.2. genetic engineering and transgenic plants
   - 7.3. the green revolution
   - 7.4. GM crops and new forms of crops
   - 7.5. Environmental concerns

8. Origins of Agriculture
   - 8.1. foraging societies and their diets
   - 8.2. early sites of agriculture
   - 8.3. characteristics of domesticated plants
   - 8.4. origins of particular crops
   - 8.5. sustainable agriculture

9. Medicines and Poisons from plants
   - 9.1. history of plants in medicine
   - 9.2. major classes of plant-derived compounds used in medicines
   - 9.3. medicinal plants and specific uses
   - 9.4. psychoactive drugs and poisons from plants
   - 9.5. allelopathy
   - 9.6. plants that cause mechanical injury
   - 9.7. insecticides from plants
   - 9.8. plants and allergies

10. Stimulating and Alcoholic beverages from plants
    - 10.1. physiological effects of caffeine
    - 10.2. coffee and tea processing
    - 10.3. fermentation and alcohol
    - 10.4. distillation
    - 10.5. physiology of alcohol use

11. Herbs and Spices
    - 11.1. herbs and spices in history
    - 11.2. chemistry and ecology of tastes and smells
    - 11.3. derivation of some spices
    - 11.4. herb families

12. Ethnobotany
    - 12.1. use of plants by indigenous peoples

DOUGLAS COLLEGE SIGNATURE ELEMENTS:

Core Competencies:

a. Oral, written and interpersonal communication:
Students will write essays on exams and assignments, and will work in teams for some lab exercises

b. Computational and Information Technology:
Students will learn basic computing skills and perform calculations in the lab and in class through practical applications of the theory.

c. Critical and Creative Thinking:
Students will critically examine scientific papers and apply their knowledge in discussion sessions

d. Teamwork:
Students will be required to work in teams for some lab activities, and possibly for term projects.

Academic Signature:

a. Applied Skills (field, laboratory practicum)
Students will apply their theoretical knowledge on field trips and in the lab.

b. Ethical behaviour and social responsibility
Students will discuss the ethics of, for example, decision-making with respect to genetic engineering and the protection of plant genetic resources, and learn the importance of ethical behaviour in the application of scientific knowledge.

c. Intercultural, International and Global Perspective
Students will analyze and evaluate cultural attitudes to the uses of plants.

O: Methods of Instruction

Lecture
Practical laboratory work is integrated with the lecture material
Group discussions
Field trips/observations and/or video observation
Self-study via print or online materials
Reading assignments
Group projects

P: Textbooks and Materials to be Purchased by Students

Will be decided by course instructors. Potential resources include:

Levetin and McMahon. (2006). Plants and Society 4th edition.
McGraw Hill Higher Education.
or

Chrispeels and Sadava. (2003) . Plants, Genes, and Crop Biotechnology 2nd edition
Jones and Bartlett Publishers, Sudbury, Massachusetts, USA

Other materials still under consideration by the department

Q: Means of Assessment

Class tests and term assignments	20%
Laboratory exercises	20%
Midterm examination	25%
Final examination	35%
Total	100%

GRADES: **A+ 95 – 100** **A 90 – 94** **A- 85 - 89** **B+ 80 – 84** **B 75 – 79**

B- 70 – 74 **C+ 65 – 69** **C 60 – 64** **C- 55 – 59** **P 50 – 54**

F 0 - 49

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

There is no provision for PLAR, other than that normally done by examining transcripts and comparing course outlines of biology courses taken within the last five years to the Biology 3500 course content.

Course Designer(s): Adrienne Peacock

Education Council / Curriculum Committee Representative

Dean / Director: Des Wilson

Registrar