

ENVIRONMENTAL BIOLOGY

BIO 211-3

COURSE NAME

CODE NUMBER

TOTAL CREDIT HOURS: 48

PREREQUISITE(S): SCI115

I. PHILOSOPHY/GOALS:

This is a study of the environment from the biological point of view. It will include a look at the process of environmental assessment as well as identification and relationships of flora and fauna to their aquatic or forest habitats.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course, the student will:

1. Discuss environmental assessment both Provincial and Federal.
2. Identify and relate to habitat, uses, and ecological inter-relationships a number of flora including some lichens, mosses, club mosses, horsetails, ferns and aquatic plants.
3. Identify species and discuss ecological values and management of a number of fauna including some aquatic invertebrates, fish, waterfowl, birds and mammals.
4. Compare tracks and signs of mammals studied.
5. Give a talk on bio-energetics.

III. TOPICS TO BE COVERED:

1. Environmental impacts.
2. Ground and aquatic flora.
3. Common fauna of Ontario.

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IV. LEARNING ACTIVITIES:

1. Given a hypothetical development, construct an environmental impact matrix using a numerical rating system and justify the rating.
2. List differences in a numerical matrix and the Federal screening process.
3. Explain the major features of the EARP Federal process and the EIA Ontario process.
4. Name at least two advantages of the Ontario class action exemption process.
5. Draw and label the life cycle of clubmoss.
6. Name division and genus, and identify five species of clubmoss, stating their major ecological importance.
7. Explain symbiotic relationship in lichens.
8. Describe importance of lichens referring to factors such as atmospheric qualities, site indicators, competition with other species, and possible uses.
9. Define crustose, fruticose and foliose lichens, and identify three major species of lichens.
10. Draw and label a moss life cycle.
11. Identify three species of horsetail and name at least one practical use.
12. Name division and class for moss and liverworts and identify 10 moss species.
13. Name at least three differences between sphagnum moss and true moss, state their ecological importances and uses.
14. Demonstrate ability to use a key for clubmoss, moss, ferns, aquatic plants, aquatic invertebrates and fish by either constructing a usable key or by successful keying of species.

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IV. LEARNING ACTIVITIES: (cont'd)

15. Identify 14 species of fern and describe typical sites.
16. Draw and label three species of fern to show the difference between once, twice and thrice cut.
17. List at least five past or present uses for ferns
18. Identify 21 species of aquatic plants.
19. List two distinguishing characteristics of the following families: Rush, grass and sedge.
20. State at least four ecological benefits of aquatic plants.
21. State four ecological adaptations of aquatic plants to suit their environment.
22. Define the following terms related to aquatic habitat:

pond	lentic
lotic	epilimnion
fall turnover	spring turnover
littoral	limnetic
profundal	oliotrophic
eutrophic	dystrophic
hypolimnion	
23. Describe two techniques of measuring lake enrichment.
24. Describe four methods of aquatic plant density control.
25. Given a list of wildlife and aquatic plant species, match the lists for a food or habitat relationship.
26. Explain the most common method of purifying water.
27. List types of streams where benthic, pelagic, and surface organisms are usually found. Invertebrates as well as mosses, club mosses, lichens, ferns and aquatic plants will be collected on a field trip.

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IV. LEARNING ACTIVITIES: (cont'd)

28. Name at least two invertebrates typical of each of the following:

bedrock streambed	rubble or gravel bottom
sandy streambed	muddy or silt bottom

29. Explain reproduction of the blackfly and mosquito.

30. State ecological and economic effects of blackflies and mosquitoes.

31. Name and explain five different ways of controlling biting insects.

32. Give phylum, class, and order of 21 species of aquatic invertebrates.

33. Identify 21 species of aquatic invertebrates.

34. Identify and give habit detail on 24 species of fish.

35. Given a list of fish, match to the following terms:

omnivorous	phytoplankton feeder
herbivorous	carnivorous
parasitic	scavenger

36. List harmful effects on humans of fish contaminants such as mercury, PCB's, mirex and DDT.

37. On a field trip, students will perform water quality tests such as dissolved oxygen.

38. Compare and contrast on a chart, the indicated fish species under the following headings:

Identification Features	Habitat
Coldwater Species	Panfish

39. List five major distinguishing features between puddle and diving ducks.

40. Identify 24 species of water fowl.

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V. EVALUATION METHODS:

TEST #1	Lichen, Clubmoss, Moss, Fern	19%
TEST #2	Aquatic Plants, Aquatic Invertebrates	19%
TEST #3	Ducks, Fish	19%
TEST #4	Birds, Mammals	19%
FIELD TRIP REPORT		6%
PLANT COLLECTION		8%
TALK		5%
IMPACT MATRIX		5%
ECOLOGICAL RELATIONSHIPS BONUS		

GRADE A+ = 90% A = 80% B = 70% C = 60%

If average mark for the four tests is 60%+, there will be no rewrites. If average mark is 55-60%, student will rewrite test with the lowest mark. If average for the four tests is less than 55%, student must write a rewrite for the whole course.

To be eligible for a rewrite, average mark must be at least 50%.

VI. REQUIRED STUDENT RESOURCES:

Lab Manual - College Bookstore, as well as selected references.

Hinds, Bob. Ducks at a Distance, Can. Govt. Publishing Centre, Hull, PQ

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VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY
BOOK SECTION:

Banfield A.W.F. Mammals of Canada National Mus. of Nat. Sciences Tor.
1974 QL721.B215

Godfrey E. Birds of Canada National Museum of Natural Sciences 1986
QL685.G63

Halfpenny O. A Field Guide to Mammal Tracking in North America.
Johnson Books Col. 1986 QL768.H34

Hotchkiss N. Common Marsh Underwater & Floating-leaved Plant. Dover
Pub. NY NY 1972 QK115.H6

Magee, D.E. 1981. Freshwater Wetlands Univ. of Mass. press.
QK117.M24

Murie, O.J. 1954. A Field Guide to Animal Tracks. Houghton Mifflin
Co., Boston. 374pp. QL768.M87

Needham, J.G. 1962. Freshwater Biology. Holden-Day Inc., California
108pp. QH96.N38

Parenteau, N. 1988. Public Participation in Environmental
Decision-Making. Federal Environmental Assessment Review Off. 71pp.
Vertical File

Pennak, R.W. 1953. Fresh-Water Invertebrates of the United States.
Ronald Press Co., N.Y. QL141.P45

Scott, W.B., Crossman, E.J. 1973. Freshwater Fishes of Canada.
Information Canada. 966pp. QL626.S34

VIII. SPECIAL NOTES:

Hard hats must be worn on field trips.

Students with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.