

M: Course Objectives / Learning Outcomes

Upon completion of this course, the student will be able to demonstrate a comprehensive understanding of the following:

1. Major differences between the composition of natural ecosystems in and urban ecosystems.
2. The variety of unique urban habitats created by urban development, the unique composition of urban flora and fauna, and how the urban environment effects their life histories.
3. The impact of urbanization on biodiversity.
4. Changes in surface and groundwater flows due to urbanization, and the changes to river and lake ecosystems which result.
5. The types of water pollutants found in freshwater and marine environments of urban areas, and their effects.
6. Stream and wetland care, stream habitat and water quality survey, sampling stream fauna and stream enhancement.
7. Stream planning and development with reference to official community plans, zoning bylaws, design approvals, environmental design standards and construction management.
8. Greenways planning with natural systems, practical benefits of community greenways, planning for community greenways, greenways implementation and greenways management.
9. Caring for wildlife habitat at home with reference to components of wildlife habitat, wildlife shelters, theme gardens – hummingbirds, butterflies, songbirds and co-existing with wildlife-windows, conflicts.
10. Land use planning and how it can be used to reduce the impact of cities on natural ecosystems.
11. The concept of sustainability and the major components of sustainable communities in terms of protecting and restoring local natural ecosystems.

N: Course Content:

The major topics in the course include the following:

1. Basic characteristics of urban ecosystems:
 - habitat loss
 - change in local climate - albedo effect, heat island, wind
 - impact on water cycle
 - disturbance to soil structure
 - changes in species interactions
 - ecosystems of Greater Vancouver - North Shore Systems, Coastal/Intertidal Systems/Fraser River Systems, Fraser Lowland Systems
 - the effects of introduced species on natural ecosystems
2. Unique urban habitats and their properties
 - forest and shrub communities
 - freshwater landscapes
 - open spaces
 - barren and paved landscapes
 - corridors
 - garden and public landscapes
3. Urban Biodiversity
 - levels of biodiversity
 - native versus introduced species
 - threats to native ecosystems and species
 - indicator species most tolerant and species least tolerant to urban conditions
 - rare and endangered species in urban areas
 - urban areas as reservoirs of genetic diversity
4. Urban hydrology
 - infiltration, runoff and groundwater recharge
 - impact of impervious surface
 - storm drains and storm water management
 - detention and retention ponds as habitats

5. Water quality
 - point and nonpoint sources of pollution
 - inorganic chemicals and minerals
 - sources and impacts of organic oxygen demanding nutrients
 - petroleum, synthetic organics and urban runoff
 - sewage treatment plants, waterfowl and pathogens
 - sediment loading

6. Streamkeepers guide to stream and wetland care
 - stream habitat survey
 - water quality survey
 - stream invertebrate survey
 - juvenile fish trapping and identification
 - streamside planting, fencing and channel improvement
 - community awareness

7. Stream Stewardship: A Guide for Planning and Development
 - Official community plans
 - Zoning bylaws
 - Design approvals
 - Environmental design standards
 - Construction management

8. Community Greenways: Linking communities to country and people to nature
 - Greenways planning and natural systems
 - Practical benefits of community greenways
 - Planning for community greenways
 - Greenways implementation
 - Greenways management

9. Naturescape guide to caring for wildlife habitat at home
 - components of wildlife habitat
 - wildlife shelters
 - theme gardens – hummingbirds, butterflies, songbirds
 - designing gardens for wildlife
 - co-existing with wildlife – windows, conflicts

10. Land use planning
 - categories of land use and conflicts
 - housing options and environmental benefits - intensification, building design
 - transportation - nodal development, town centres, mass transit, bicycle paths
 - green space - parks, sanctuaries, easements, restrictive covenants, edge effects
 - case studies e.g. East Clayton project, Surrey

11. Sustainable communities, protection and restoration of urban ecosystems
 - three legged stool model - environment, economy, social equality
 - sustainability indicators
 - bioregionalism
 - case studies e.g. Greater Vancouver Regional District Liveable Region Strategy, Georgia Basin Ecosystem Initiative

O: Methods of Instruction

This course involves four hours per week of classroom instruction and three hours per week of field trips. Classroom work will include lectures and tutorials, and is integrated with textbook, scientific journal readings and case studies. The field trips are designed to complement the theory content of the course.

P: Textbooks and Materials to be Purchased by Students

Link, Russell. 1999. Landscaping for Wildlife in the Pacific Northwest. University of Washington Press, Seattle. 320 pp.

Lowell, Adams. 1994. Urban Wildlife Habitats: A Landscape Perspective. University of Minnesota Press, Minneapolis. 186 pp.

Schaefer, Valentin, Hillary Rudd and Jamie Vala. 202. Urban Biodiversity: Exploring Natural Habitat and its Value in Cities. Douglas College, New Westminster. 149 pp.

Stream Stewardship, Stream Keepers, Community Stewardship, Naturescape and Greenways of the Stewardship Series, BC Ministry of Water, Land and Air Protection

Q: Means of Assessment

<u>Type of evaluation</u>	<u>Points</u>
1. Midterm examination	25%
2. Final examination	25%
3. Field trip reports	30%
4. Term project	20%

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				

- Notes:
1. Field trip reports will consist of 5 reports worth 5 marks each involving analysis and 5 worth 1 mark each that are descriptions of site visits.
 2. The final exam will be comprehensive and cover the entire course.
 3. The term project will include an oral presentation and a paper.
 4. For Habitat Restoration Program students, 15 marks of the 30 for field trips will be assigned to a habitat restoration project. Three of the BIO 2302 field trips will become optional for HRP students.
 5. HRP students will be required to design a community based habitat restoration project in consultation with a community group, government department or other client for 15 marks.
 6. HRP students will be required to conduct their major 20 mark project on a wetland topic applied to a local situation.

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

There is no provision for PLAR, other than normally done by examining transcripts and comparing course outlines of Biology courses taken within the last five years to the Biology 2302 course outline.

 Course Designer(s)

 Education Council / Curriculum Committee Representative

 Dean / Director

 Registrar