Landscape Ecology and Planning
EVDP 626 H(4-4)

Fall 2015

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Introduction

This course examines key concepts in ecology, landscape ecology and environmental science relevant to planning at landscape scales. Principles of urban ecology, regional landscape ecology, watershed management and parks and protected area design are coupled with knowledge of landscape processes, ecosystem services, ecological infrastructure, and wildlife habitat to assess planning interventions in the built and natural environments. Skills are developed in geographic information systems (GIS) for monitoring the current state of landscapes and potential challenges to landscape function; and, for proposing solutions to these challenges that are based on empirical evidence. Field visits within the Calgary region, guest speakers from government and industry, and GIS skill-building exercises form part of the instruction.

Objectives

1. To develop an **empirical evidence-based** orientation when undertaking planning and design decisions, and to assess the quality of evidence that may be used in professional work.

2. To acquire knowledge of the **key concepts in urban ecology, landscape ecology and ecosystem science** relevant to planning and designing at landscape scales.

3. To introduce the skills necessary to measure in both quantitative and qualitative terms **the ecosystem services provided by landscapes**, and to estimate the potential challenges to landscape function (e.g. land use change and climate change)

4. To use **spatial analytical techniques** to prepare empirical evidence upon which to base planning and design decisions.

5. To develop **confidence to dialogue in the ideas of landscape planning** and design and in the complexities associated with operating at this broad spatial extent.

Teaching Approach

The course combines instructor-centred and student-centred classroom time with hands-on computer lab and field experiences. Assessment focuses on the effective application and communication of knowledge rather than on recording evidence of its acquisition. Four course assignments collectively provide opportunities to develop effective oral and written communication skills within a planning context, produce and interpret quantitative spatial analyses relevant to planning, and synthesize learning from across the course in an authentic final project.

Topics

1. Natural landscapes of the Calgary region (e.g. prairie; foothills; montane; and sub-alpine).

2. Ecosystem services (e.g. what are they; how are they measured; why they are valued)

3. Measuring the amount and quality of ecological infrastructure and estimating the ecosystem services they provide (e.g. patch; matrix; mosaic; corridor; edge; core area; habitat loss; habitat fragmentation; habitat connectivity; disturbance; succession)

4. Ecological integrity of landscapes (e.g. biodiversity; plant and animal communities; ecosystem resilience; how this supports ecosystem services)

5. Elements of urban ecology (e.g. linear corridors; plantings; plant communities; pollinators; urban forest; aquatic habitat; wetlands; light pollution; traffic; domestic animals; insect pests; mammal and avian pests; air pollution; air quality; water quality; soil contamination; soil ecology; urban heat; urban agriculture; mammal and bird habitat; green networks; urban parks; river and stream valleys; sewage; water storage and retention; hardscape; roofing; water conservation; agricultural chemicals; groundwater; stormwater and run-off; sewage; wind and airflow; microclimates)

6. Climate change adaptation in cities and regions (e.g. the key role of planners; adaptation versus mitigation; priorities for adaptation; adaptations for urban infrastructure; adaptations for building codes; insurance implications; disaster planning; feeding cities under climate change; supplying cities with water under climate change).

Course structure

The primary contact time will be on **Tuesdays 9 to 12:45**. We will have additional contact time on Thursdays (beginning at 9:00) that we will use for three 6-7 hour field trips, and to provide one section of GIS labs. A complete schedule for the term will be shared with students on the first day of class.

<u>Tuesday</u>

Lectures (7)
Guest speakers (4)
Seminars (3)
Student presentations
GIS labs (2hr labs; for lab section 1 and 2)

<u>Thursday</u>

Field trips (3 trips; 9:00 to 4:00, approx.)
GIS labs (2hr labs; for lab section 2 only)
GIS and spatial analysis support (TA; drop-in)
Conferences with Paul (15 minute slots; sign-up)

Field Trips

Full day field trips are scheduled for three Thursdays. The final course schedule advising of the timing of these trips will be distributed at the beginning of the semester.

The three trips will be themed as follows: (1) Cultural landscapes and ecosystem services in the grassland ecoregion; (2) Hydrology, landforms and ecosystem services in the foothills ecoregions; (3) Watersheds, biodiversity and ecological integrity in the montane and sub-alpine ecoregions;

Students are encouraged to bring a camera and a journal to document these trips, and optionally a device equipped with a GPS receiver. This evidence will form an important part of the ecosystem services portfolio assignment (see below)

There is a supplementary course fee of $70.00 that offsets the cost of passenger coach rental.

GIS Labs

There are three GIS labs each 2 hours in length. Activities completed in these labs are intended primarily to build skill at using GIS for basic spatial analyses useful for ecological planning purposes. Products from this work will be included in the ecosystem services portfolio assignment. Skills developed will be useful for the final project.

Evaluation

The course evaluation will be based on four assessments. There will be no final examination. Complete details for these assignments as well as assessment criteria will be provided in class when the assignment is first introduced.

Ecosystem services portfolio (30%)
Students will submit a portfolio presenting the diversity of ecosystem services in the Calgary area drawing upon products created on the field trips and in the GIS labs. Entries in the portfolio will include photographic and written evidence from the three field trips, as well as products generated in the GIS lab activities assessing the quantity and quality of ecological infrastructure. Portfolio entries should be accompanied by interpretative text. Full details of this assignment will be provided in class. **(Due: October 19th, 4:30pm to EVDS main office).**

Urban ecology micro-talks (15%)
Assigned a specific topic in urban ecology to research, students will give 3 minute micro-talks distilling key ecological ideas and how it concerns planning. Emphasis in this assignment is on the clear and concise oral communication of information. Full details for this assignment will be provided in class. **(Due Nov 10th, electronically at the start of class).**

Seminar persuasive essay (15%)
Students will be assigned to a group of 6 with whom they will meet for three seminars. Readings will be assigned for each seminar, and all students should come prepared to discuss them. Two group members will be assigned to lead each seminar, and will be asked to develop questions in advance to provoke discussion. Each student will also be required to write a 500 word persuasive essay based on any one of the seminar discussions. Full details for this assignment will be provided in class. **(Seminar persuasive essay due Oct 30, 4:30pm to EVDS main office).**

Final project: Landscape risk assessment under climate change (40%)
Working in groups of two, students will design a landscape transect through part of Calgary or its surrounding region in order to investigate physical and ecological infrastructure along this route. The goal is to assess risks presented by climate change to this infrastructure and the services it provides, and to propose means to adapt to these conditions. An oral presentation and short report will describe these features, evaluate risks, propose adaptations and incorporate quantitative evidence derived from spatial analyses. Completing this project will require students to visit field sites independently and apply GIS skills developed in the course. Emphasis in this assignment is on synthesizing learning from the course and applying it a new context. Full details for this assignment will be provided in class.
(Presentations due Dec 1, electronically at the start of class; Report due Dec 8, 4:30pm to EVDS main office)

Readings

Recommended course text

*This is a high quality textbook and also an excellent reference that is likely to be of use to you in your professional career as a planner or landscape architect. It is **not** a required text, but will be helpful reference for the urban ecology microtalks and the final assignment. It should be available for purchase at the university book store. A few copies are also available at the library.*

Forman, R.T.T. 2014. *Urban ecology: science of cities*. Cambridge University Press, Cambridge.

Additional required readings:

These will be assigned for each of the three seminars, and links to the relevant library materials provided on D2L.

Notes: Final grades will be reported as letter grades, with the final grade calculated according to the 4-point range. All assignments will be evaluated by percentage grades, with their letter grade equivalents as shown

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding - evaluated by instructor
A	4.00	3.85-4.00	90-94	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89	Very good performance
B+	3.30	3.15-3.49	80-84	Good performance
B	3.00	2.85-3.14	75-79	Satisfactory performance
B-	2.70	2.50-2.84	70-75	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69	All final grades below B- are indicative of failure atthe graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64	
C-	1.70	1.50-1.84	55-59	
D+	1.30	1.15-1.49	50-54	
D	1.00	0.50-1.14	45-49	
F	0.00	0-0.49	0-44	

A student who receives a "C^{+}" or lower in any one course will be required to withdraw regardless of their grade point average (GPA) unless the program recommends otherwise. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript.

Written work, term assignments and other course related work may only be submitted by e-mail if prior permission to do so has been obtained from the course instructor. Submissions must come from an official University of Calgary (ucalgary) email account.

Academic Accommodations. Students who require an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to their Instructor or the designated contact person in EVDS, Jennifer Taillefer (jtaillef@ucalgary.ca). Students who require an accommodation unrelated to their coursework or the requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Vice-Provost (Student Experience). For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/

Plagiarism - Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Most commonly plagiarism exists when:(a) the work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test),(b) parts of the work are taken from another source without reference to the original author,(c) the whole work (e.g., an essay) is copied from another source, and/or,(d) a student submits or presents work in one course which has also been submitted in another course(although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved. While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual honesty requires that such references be explicitly and clearly noted. Plagiarism is an extremely serious academic offence. It is recognized that clause (d) does not prevent a graduate student incorporating work previously done by him or her in a thesis. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.

Information regarding the Freedom of Information and Protection of Privacy Act (http://www.ucalgary.ca/secretariat/privacy) and how this impacts the receipt and delivery of course material. Emergency Evacuation/Assembly Points (http://www.ucalgary.ca/emergencyplan/assemblypoints) Safewalk information (http://www.ucalgary.ca/security/safewalk)

Contact Info for: Student Union (http://www.su.ucalgary.ca/page/affordability-accessibility/contact); Graduate Student representative(http://www.ucalgary.ca/gsa/) and Student Ombudsman's Office (http://www.su.ucalgary.ca/page/quality-education/academic-services/student-rights).