



Course Title: Ecological Restoration

Winter 2022

Course Number:	LAND 670	Credits:	3
Instructor:	Mathis Natvik	Email:	mathis.natvik@ucalgary.ca
Class Dates:	March 14-18, 2021 (Mon-Fri)		
Class Times:	09:00-16:00		
Location:	PF 2140		

Course Description

The conservation and restoration of natural ecosystems has become common practice in many Canadian cities. As such, there is an ever-increasing demand for Landscape Architects and Professional Planners to have expertise in the field of ecological restoration.

In this course, students will first be introduced to the major ecosystems of Canada, the history of the field, and the core principles and theories of ecological restoration (day 1). Most of the course (days 2-4) will focus on the planning and implementation of ecological restoration projects and will include the following subtopics: site analysis, creation of site-specific restoration plans, sourcing of plant materials, site preparation techniques, control of invasive species, managing earthwork/construction, installation of plant material, prescribed fire, and long-term management of projects. A special emphasis will be placed on the ecosystems of southern Alberta such as grasslands, wetlands, forests, streams, and riparian ecosystems. The course will be delivered via online lectures, discussions, group work sessions, and a virtual field trip to a proposed ecological restoration site in Calgary (day 2).

Students will be evaluated based on their group presentation (presented on day 5) and a written report (due by March 25, 2022, one week after the end SAPL block week 2022). The assignments will give the students an opportunity to apply their knowledge to a specific ecological restoration project in Calgary.

Recommended Textbook

1. *Project Planning and Management for Ecological Restoration*. John Reiger, John Stanley, and Ray Traynor, 2014. (optional for completing the course)

Additional Readings (for further interest)

2. *Ecological Restoration and Environmental Change: Renewing Damaged Ecosystems*. Stuart K. Allison, 2012.
3. *Human Dimensions of Ecological Restoration: Integrating Science, Nature and Culture*. Dave Egan, Evan E. Hjerpe, and Jesse Abrams, 2011.

4. *Ecological Restoration: Principles, Values, and Structure of an Emerging Profession*. Andre F. Clewall and James Aronson, 2007.
5. *Ecological Restoration*. Susan M. Galatowitsch, 2012.
6. *The Tallgrass Prairie Center Guide to Prairie Restoration in the Upper Midwest*. Daryl Smith, Dave Williams, Greg Houseal, and Kirk Henderson, 2010.

Online Resources:

7. ***Ecological Restoration*** (Online Journal). University of Wisconsin--Madison. Arboretum. Society for Ecological Restoration.
8. *Restoration Ecology: The New Frontier*. James Aronson and Jelte van Andel. Hoboken, 2005.
9. *Pioneers of Ecological Restoration: The People and Legacy of the University of Wisconsin Arboretum*. Franklin E Court: University of Wisconsin Press 2012.
10. *Bombs Away: Militarization, Conservation, and Ecological Restoration*. Havlick, David G. Chicago: University of Chicago Press 2018.

Course Learning Outcomes

At the end of this course, students will be able to:

- A. Identify the major ecosystems of southern Alberta.
- B. Assess factors that shape major ecosystems (soil, microclimate, indicator species)
- C. Describe and apply the major components of an ecological restoration project including:
 - Site evaluation
 - Identify appropriate target ecosystems for a project
 - Write basic site preparation guidelines
 - Plan for acquisition of required plant material
 - Plan construction/project installation for ecological restoration projects
 - Long-term maintenance and monitoring requirements

Course Schedule & Due Dates

Day 1: March 14, 2021

Introduction to ecological restoration & ecosystems of Alberta

- What is ecological restoration?
- History of the field
- Factors that shape ecosystems
- Ecosystems of Alberta

History of ecological restoration in Canada

- Ecological restoration: case studies in Canada
- Land Reclamation, Green Infrastructure, and other related fields

Site analysis & planning ecological restoration projects

- Planning ecological restoration projects
- Site Analysis & Ecological Land Classification
- Reference ecosystem

Ecological restoration process

- Ecological Restoration process for degraded ecosystems
- Ecological restoration process from ground zero

Day 2: March 15, 2021

Introduction of Course Assignments

- Students can work individually or in groups of up to 3 students
- Each group will be assigned a project site (based on field trip locations).
- Students will create a restoration plan for their site.
- Groups will present their restoration plan on last day of Block Week.
- Groups will submit a written restoration plan 1 week after Block Week.

Field Trip

- We will take a field trip to sites in Calgary:
- Local natural areas (grassland, wetland, forest)
- Potential ecological restoration site (to be used as case study for your assignment)
- [Group Work Session #1](#)

Day 3: March 16, 2021

Planting materials

- Creating planting lists
- Seed collection and seed production
- Container, bare-root, and vegetation production
- Contract growing arrangements

Herbaceous plant installation

- Pre-planting site preparation
- Herbaceous plant installation

Woody Plant Installation

- Installing bare-root trees, Direct seeding of trees, cuttings
- Protection of seedlings from herbivores
- Irrigation and weeding methods

Group Work Session #2

Day 4: March 17, 2021

Wildlife Structures and Special Habitats

- Nesting structures for birds
- Course woody debris for amphibians and reptiles
- Hibernaculum design (snakes)
- Maximizing season nectar supply (pollinator habitat)

Long-term Management

- Thinning
- Invasive species management
- Herbivore over-population
- Species re-introductions (plants & animals)

Group Work Session #3

Day 5: March 18, 2021

Prescribed Burns

- Role of fire in ecosystems
- Planning for fire with your site design
- Prescribed burns in grasslands and savannas
- Prescribed burns in forests and woodlands

Work Session #4

Final Presentations (Starting at 1:00 PM after lunch)

- Groups will present their restoration plans to the class

Wrap-up

- Ecological restoration in Planning and Landscape Architecture firms
- Integrating ecological restoration with design
- Creating budgets and cost estimates

Final Written Assignment: Due Friday, March 25, 2022

Assessment and Evaluation Information

50% Oral presentation on Friday, March 18

50% Written ecological restoration plan

100% Total

Grading Scale

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	90-94.99	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89.99	Very good performance
B+	3.30	3.15-3.49	80-84.99	Good performance
B	3.00	2.85-3.14	75-79.99	Satisfactory performance
B-	2.70	2.50-2.84	70-74.99	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69.99	All final grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64.99	
C-	1.70	1.50-1.84	55-59.99	
D+	1.30	1.15-1.49	50-54.99	
D	1.00	0.50-1.14	45-49.99	
F	0.00	0-0.49	0-44.99	

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.

Media and Recording in Learning Environments

Part 1

University Calendar: <https://www.ucalgary.ca/pubs/calendar/current/e-6.html>

Recording of lectures (other than audio recordings that are pre-arranged as part of an authorized accommodation) is not permitted.

Students may not record any portion of a lecture, class discussion or course-related learning activity without the prior and explicit written permission of the course instructor or authorization from Student Accessibility Services. For any other use, whether by duplication, transcription, publication, sale or transfer of recordings, written approval must be obtained from the instructor for the specific use proposed. Any use other than that described above constitutes academic misconduct and may result in suspension or expulsion.

Part 2

The instructor may use media recordings to capture the delivery of a lecture.

The instructor will notify all students and guests in the class that the event is being recorded. If a student or guest wants to take steps to protect privacy, and does not want to be recorded, the instructor will provide the individual (s) with an alternative means of participating and asking questions (e.g., passing written notes with questions). Students cannot be penalized for choosing not to be recorded in situations where participation is part of the course. Students must be offered other ways of earning participation credit that do not involve recording.

Any video-recording would be intended to only capture the instructor and the front of the classroom. Students/other participants would not necessarily be visible on video recordings.

University of Calgary Policies and Supports

ACADEMIC ACCOMMODATION

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>.

ACADEMIC MISCONDUCT

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, (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. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.

For information on academic misconduct and its consequences, please see the University of Calgary Calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>

COPYRIGHT LEGISLATION:

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary.

UNIVERSITY STUDENT APPEALS OFFICE: If a student has a concern about the course, academic matter, or a grade that they have been assigned, they must first communicate this concern with the instructor. If the concern cannot be resolved with the instructor, the student can proceed with an academic appeal, which normally begins with the Faculty. <https://ucalgary.ca/student-appeals/>

More student support and resources (e.g. safety and wellness) can be found here: <https://www.ucalgary.ca/registrar/registration/course-outlines>