UNIVERSITY OF CALGARY
SCHOOL OF ARCHITECTURE, PLANNING AND LANDSCAPE

Course Title:	**Ecological Restoration**
Course Number:	LAND 672.3 L01
Professor:	Mathis Natvik mathis.natvik@ucalgary.ca
	(825) 561-8232 Office: PF 3196
Lecture Days:	March 13-17, 2023 (Mon-Fri)
Lecture Times:	09:00-12:00 Mountain Time
Class Location:	**TBA** - PF 2165 or PF3160?

Online Delivery (if applicable)

If classes are required to go online, students will be required to join via zoom using a computer equipped with a web cam, microphone, and reliable internet connection. If unable to participate live due to unforeseen circumstances, inform the instructor in advance to work out an alternative participation activity (e.g., watch the recordings, submit a brief reflection, and actively contribute to the follow-up online discussion). The following zoom invite and passcode will be used if lectures are held online:

https://ucalgary.zoom.us/j/3671473933
Meeting ID: 367 147 3933
Passcode (Case Sensitive): **LAND670**

Course Description

The conservation and restoration of natural ecosystems has become common practice in many areas of Canada. 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 field trip to various ecosystems in Calgary (day 2).

Students will be evaluated based on their group presentation (presented on day 5) and a final copy based on feedback (due by Sun, Mar 19, 2023). The assignments will give the students an opportunity to apply their knowledge to a specific ecological restoration project in Calgary.

Technology and Equipment Needed

You will need access to a computer equipped with Power Point or similar software.

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

Teaching Approach

The course incorporates a variety of teaching and learning approaches and includes lectures, guest lectures, project-based learning, and field trips (if possible!). Students will be given the opportunity to apply critical and creative thinking to the topics in the course.

Means of Evaluation

The course evaluation will be based on 1 assignment to be completed by the end of the week. There will be no final examination. Students must achieve a passing grade on their assignment to complete the course successfully.

Assignment weight:

70%	Oral presentation	(delivered on Friday, March 17, 2023)
30%	Final copy	(submitted to D2L dropbox by end of Sunday, March 19, 2023)
100%	Total	

Late Assignments

Unless agreed to by the instructor on compassionate grounds, illness, or for reasons of academic accommodation (see note 2 below), assigned work that is handed in late will be penalized 10% of the total available grade per calendar day late (this includes weekends and holidays). Assignments more than two calendar days late will not be accepted and no credit will be given for them. Assignments must be handed in or presented during scheduled class hours.

Grading Scale

Grade	GPV	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. The School of Architecture, Planning and Landscape will not permit the Flexible Grade Option (CG Grade) for any course offered by the School. (https://www.ucalgary.ca/pubs/calendar/current/salp-3-3.html).

Course Schedule

Day 1: March 13, 2023

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 ecosystems

Ecological restoration process

- Ecological Restoration process for degraded ecosystems

Ecological restoration process from ground zero

Introduction of Course Assignment

- Students can work individually or in groups of up to 3 students
- Each group will choose a project site.
- Students will create a restoration plan for their site.
- Groups will present their restoration plan on last day of Block Week.

Day 2: March 14, 2023

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 15, 2023

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 16, 2023

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)

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

Group Work Session #3

Day 5: March 17, 2023

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 Copy: Due Sunday, March 19, 2023

Guidelines for Zoom Sessions

Zoom is a video conferencing program that will allow us to meet at specific times for a "live" video conference, so that we can have the opportunity to meet each other virtually and discuss relevant course topics as a learning community.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

The use of video conferencing programs relies on participants to act ethically, honestly and with integrity; and in accordance with the principles of fairness, good faith, and respect (as per the Code of Conduct). When entering Zoom or other video conferencing sessions (such as MS Teams), you play a role in helping create an effective, safe and respectful learning environment. Please be mindful of how your behaviour in these sessions may affect others. Participants are required to use names officially associated with their UCID (legal or preferred names listed in the Student Centre) when engaging in these activities. Instructors/moderators can remove those whose names do not appear on class rosters. Non-compliance may be investigated under relevant University of Calgary conduct policies (e.g, Student Non-Academic Misconduct Policy). If participants have difficulties complying with this requirement, they should email the instructor of the class explaining why, so the instructor may consider whether to grant an exception, and on what terms. For more information on how to get the most out of your zoom sessions visit: https://elearn.ucalgary.ca/guidelines-for-zoom/

If you are unable to attend a Zoom session, please contact your instructor in advance to arrange an alternative activity for the missed session (e.g., to review the recorded session). Please be prepared, as best as you are able, to join class in a quiet space that will allow you to be fully present and engaged in Zoom sessions. Students will be advised by their instructor when they are expected to turn on their webcam (for group work, presentations, etc.).

The instructor may record online Zoom class sessions for the purposes of supporting student learning in this class – such as making the recording available for review of the session or for students who miss a session. Students will be advised before the instructor initiates a recording of a Zoom session. These recordings will be used to support student learning only and will not be shared or used for any other purpose.

University of Calgary Policies and Supports

COVID-19 PROCEDURE FOR SICK STUDENTS: https://www.ucalgary.ca/risk/covid-19-procedure-for-sick-students

UNIVERSITY OF CALGARY COVID-19 UPDATES: https://www.ucalgary.ca/risk/emergency-management/covid-19-response

ACADEMIC ACCOMMODATION
It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: https://www.ucalgary.ca/legal-services/university-policies-procedures/student-accommodation-policy

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure
Students needing 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 (contact information on first page above).
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/

ACADEMIC MISCONDUCT
Academic Misconduct refers to student behavior which compromises proper assessment of a student's academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

For information on the Student Academic Misconduct Policy and Procedure please visit:
https://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf
https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf
Additional information is available on the Academic Integrity Website at
https://ucalgary.ca/student-services/student-success/learning/academic-integrity

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 (https://www.ucalgary.ca/pubs/calendar/current/k.html).

INSTRUCTOR INTELLECTUAL PROPERTY
Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These

materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

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.

SEXUAL VIOLENCE POLICY
The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf

UNIVERSITY STUDENT APPEALS OFFICE: If a student has a concern about a grade that they have received, they should refer to Section I of the Undergraduate Calendar (https://www.ucalgary.ca/pubs/calendar/current/i-3.html) which describes how to have a grade reappraised. In addition, the student should refer to the SAPL's Procedure for reappraisal of grades

OTHER IMPORTANT INFORMATION
Please visit the Registrar's website at: https://www.ucalgary.ca/registrar/registration/course-outlines for additional important information on the following:

- Wellness and Mental Health Resources
- Student Success
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information
- Emergency Evacuation/Assembly Points
- Safewalk