

**BI 290**  
**Revegetation Management**

**3 Credits**

Instructor: Jennifer McGuinness  
780 853 8643

Original Developer: Dr. Lee Arthur

Current Developer: Jennifer McGuinness

Reviewer: Robin Lagroix-McLean

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2602 - 59 Avenue, Lloydminster, Alberta, Canada T9V 3N7. Ph: 780 871 5700  
5707 College Drive, Vermilion, Alberta, Canada T9X 1K5. Ph: 780 853 8400  
Toll-free in Canada: 1 800 661 6490



## BI 290 Version: 20



# Revegetation Management

## Calendar Description

This course provides an intensive practical study of the determinants of revegetation success. Emphasis is placed on study of the factors affecting germination, emergence, establishment and longevity of plant stands. The course includes a review of practical and specialized revegetation methods and strategies.

## Rationale

This is a required course for students enrolled in the Environmental Conservation and Reclamation major of the Environmental Sciences program. An increased environmental awareness in society has led to increased demand for successful and well-planned revegetation efforts when ecosystems are disturbed. Approaches to revegetation vary with land use objectives, environmental factors, and site characteristics. A multitude of factors determine revegetation success including effective land use planning and site assessment, site preparation, and management of factors affecting germination, emergence, and establishment of vegetation. A study of approaches and field techniques used to achieve successful revegetation is integral to developing practical field skills of future environmental technicians and managers.

## Prerequisites

BI 270, BO 120, and SO 210

## Co-Requisites

None

## Course Learning Outcomes

Upon successful completion of this course, students will be able to

1. apply sound ecological principles when revegetating rangelands and employing soil/water/plant conservation strategies.
2. utilize pre-disturbance planning to identify end land use goals and conduct appropriate site assessment techniques prior to revegetating a disturbed site.

3. compare effective site preparation and vegetation establishment techniques used in revegetation.
4. recommend appropriate techniques and strategies to ensure successful vegetation germination, emergence, and establishment when revegetating a disturbed site.
5. assess revegetation success and describe standards by which revegetation efforts are deemed acceptable.
6. analyze and evaluate revegetation success using the Alberta Reclamation Criteria for Wellsites and Associated Facilities.
7. describe the major end land uses for revegetation in western Canada and apply appropriate revegetation techniques for each land use.
8. describe special techniques employed in the reclamation industry to revegetate disturbed sites.
9. identify and comply with environmental regulations pertinent to revegetation activities.
10. operate workplace equipment safely.

## Essential Employability Skills

Essential employability skills are critical for workplace success and lifelong learning. Lakeland College prepares its graduates for the workplace and lifelong learning by integrating and promoting essential employability skills development in its curricula. Each credit course offered at Lakeland College emphasizes one or more of the following five essential employability skills:

- A. **Communication Skills** that enable individuals to listen, interpret, express, and convey knowledge and ideas so that they are received and understood.
- B. **Teamwork Skills** that enable individuals to respect the thoughts and opinions of others as they work together to plan activities, meet deadlines, complete projects, and contribute to an organization's goals.
- C. **Critical Thinking Skills** that enable individuals to conceptualize and analyze issues from various perspectives while rationally evaluating the strengths and limitations of each perspective and deciding what action to take.
- D. **Adaptability Skills** that enable individuals to respond quickly, willingly, and positively to new conditions and changing times.
- E. **Positive Attitude and Behavioural Skills** that enable individuals to be confident about themselves and to deal with people, problems, and situations with honesty, integrity, and personal ethics.

Please refer to the Knowledge/Skills Matrix of this course outline to review the essential employability skills emphasized in this course.

## Resource Materials

### *Required Textbooks:*

Aasen, A., and M. Bjorge. 2009. Alberta forage manual. 2nd ed. Alberta Agriculture and Rural Development, Edmonton, AB.

- Smreciu, A., H. Sinton, D. Walker, and J. Bietz. 2003. Establishing native plant communities. Alberta Agriculture, Food and Rural Development, Edmonton, AB.
- Alberta Environment. 2010. 2010 Reclamation criteria for wellsites and associated facilities for cultivated lands. June 2011 Update. Alberta Environment, Edmonton AB. 79 pp.
- Gramineae Services Ltd. 2013. Recovery strategies for industrial development in native prairie for the dry mixed grass natural subregion of Alberta. 1st approximation. Alberta Environment and Sustainable Resource Development, Edmonton, AB. (available on-line).

***Highly Recommended Textbooks:***

- Gerling, H.S., M.G. Willoughby, A. Schoepf, K. E. Tannas, and C.A. Tannas. 1996. A guide to using native plants on disturbed lands. Alberta Agriculture, Food and Rural Development and Alberta Environmental Protection. Edmonton, AB.

***Reference Textbooks:***

- Alberta Land Conservation and Reclamation Council Report No. RRTAC 89-4 (p. 436). 1989. Manual of plant species suitability for reclamation in Alberta. 2<sup>nd</sup> ed. Hardy BBT Limited, Edmonton, AB.
- Heady, H.F., and R.D. Child. 1994. Range ecology and management. Westview Press, Colorado.
- Holechek, J.L., R.D. Pieper, and C.H. Herbel. 2011. Range management principles and practices 6th ed. Prentice Hall, New Jersey.
- Plant identification and weed guides for Alberta, Saskatchewan and western Canada.

## **Conduct of Course**

Total course hours are 42 hours of lecture and 42 hours of lab. The lecture component is a formalized lecture situation where the instructor discusses pertinent topics and students normally take notes. Students are encouraged to ask questions to clarify subject areas. Lecture content will be supported by required readings and assignments. The assigned readings are an integral component of the course and help students apply principles from the lectures and labs. Quizzes on lectures, labs and required readings are provided to help students focus on the main ideas being covered. The lab component focuses on field tours and exercises that practically apply the theory discussed in lectures. Range plant spot identification skills are an important asset when performing lab exercises. The two midterm exams and the final exam reflect content from both the lecture and laboratory sections. The midterms focus on course content prior to these exams and the final exam covers course content from the beginning of the course.

Course information will be available on D2L. However, the provided notes are NOT a substitute for attending lectures. There will be additional testable material covered in the lectures and labs that is not in the provided notes.

Instructor and student interaction is an important component of learning. The best way to communicate with the instructor is face to face by appointment. A scheduled appointment ensures there is time to address concerns fully and completely. Email, voicemail and discussion board enquiries are welcome, and the instructor will respond as promptly as is feasible, ideally within two business days.

## Evaluation Procedures

Midterm 1	15%
Midterm 2	15%
Comprehensive Final Exam	20%
Labs: Field Data Reports	10%
Labs: DSA Reports	10%
Literature Review/Opinion Paper	5%
Revegetation Plan Assignments (2-3 @ 5-7.5% each)	15%
Quizzes (D2L/Lecture/Lab)	10%
Total	100%

To obtain credit for this course:

- All labs must be attended.
- All lab reports, assignments and projects must be completed and handed in to avoid an incomplete (IN) grade for the course.
- Assignments and lab reports are due at the start of the class or lab section as announced. The penalty for late submission is -20% of the earned mark anytime within the first 24 hours and -20% for each subsequent day late.
- A minimum grade point of D (50%) is required.
- All reports, assignments and exams are graded on a percentage (%) basis. Then a total course percentage is calculated using the above weighting values. Finally, the total course percentage is converted to a letter grade basis using the Grading scheme:

## Knowledge/Skills Matrix

### Students apply and demonstrate their knowledge and skills to use

#### A. Communication Skills

##### A1. by listening, reading, interpreting information, and communicating effectively

Evaluation(s)/Goal(s): Midterm/Goals 1-6; Final/Goals 1-9; Lab Reports/Goals 5, 6, 9, 10; Assignments/Goals 1-10
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<b>A2. by using written, spoken, and/or visual formats and media to communicate and meet needs of each particular audience</b>	<b>Evaluation(s)/Goal(s):</b> Lab Reports/Goals 5, 6, 9, 10; Assignments/Goals 1-10
<b>A3. by using libraries, Internet, technical publications, journals and other sources to find pertinent information</b>	<b>Evaluation(s)/Goal(s):</b> Assignments/Goals 1-10
<b>B. Teamwork Skills</b>	
<b>B1. by using interpersonal skills to create an atmosphere that maximizes the strengths of group members to accomplish tasks</b>	<b>Evaluation(s)/Goal(s):</b> Lab Reports/Goals 5, 6, 9, 10
<b>B2. by using interpersonal skills to resolve conflict, relate to others, and assist others</b>	<b>Evaluation(s)/Goal(s):</b> Lab Reports/Goals 5, 6, 9, 10
<b>B3. by contributing and listening to others as group determines realistic objectives, prioritizes tasks, and identifies resources and timelines</b>	<b>Evaluation(s)/Goal(s):</b> Lab Reports/Goals 5, 6, 9, 10
<b>B4. by treating other members of the group open-mindedly and fairly</b>	<b>Evaluation(s)/Goal(s):</b> Lab Reports/Goals 5, 6, 9, 10
<b>B5. by developing tactics/strategies to accomplish tasks</b>	<b>Evaluation(s)/Goal(s):</b> Lab Reports/Goals 5, 6, 9, 10
<b>C. Critical Thinking Skills</b>	
<b>C1. by seeing critical thinking as a lifelong process of self-assessment</b>	<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 1-6; Final/Goals 1-9; Lab Reports/Goals 5, 6, 9, 10 ; Assignments/Goals 1-10
<b>C2. by examining problems closely</b>	<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 1-6; Final/Goals 1-9; Lab Reports/Goals 5, 6, 9, 10; Assignments/Goals 1-10
<b>C3. by examining beliefs, assumptions, and opinions, and weigh them against the facts</b>	<b>Evaluation(s)/Goal(s):</b> Midterm/Goal 4; Final/Goals 1, 4, 5, 6; Assignments/Goals 1, 4, 5, 6
<b>C4. by seeking out the truth</b>	<b>Evaluation(s)/Goal(s):</b> N/A
<b>C5. by finding solutions; make decisions</b>	<b>Evaluation(s)/Goal(s):</b> Lab Reports/Goals 5, 6, 9, 10; Assignments/Goals 1-10
<b>C6. by incorporating new ideas that may not necessarily agree with previous thought on the topic</b>	<b>Evaluation(s)/Goal(s):</b> Lab Reports/Goal 5; Assignments/Goals 1, 4, 5, 6
<b>C7. by seeing connections between topics and use knowledge from other disciplines to enhance reading and learning experiences</b>	<b>Evaluation(s)/Goal(s):</b> Midterm/Goals 1-6; Final/Goals 1-9; Lab Reports/Goals 5, 6, 9, 10; Assignments/Goals 1-10

**D. Adaptability Skills**

<b>D1. by working independently or as part of team</b>	
	Evaluation(s)/Goal(s): Midterm/Goals 1-6; Final/Goals 1-9; Lab Reports/Goals 5, 6, 9, 10; Assignments/Goals 1-10
<b>D2. by carrying out multiple tasks or projects</b>	
	Evaluation(s)/Goal(s): Lab Reports/Goals 5, 6, 9, 10
<b>D3. by being innovative and resourceful: identify and suggest alternative ways to get the job done</b>	
	Evaluation(s)/Goal(s): Lab Reports/Goals 5, 6, 9, 10
<b>D4. by being open and respond constructively to change and uncertainty</b>	
	Evaluation(s)/Goal(s): Lab Reports/Goals 5, 6, 9, 10

**E. Positive Attitude and Behavioural Skills**

<b>E1. by dealing with people, problems, and situations with honesty, integrity, and personal ethics</b>	
	Evaluation(s)/Goal(s): Lab Reports/Goals 5, 6, 9, 10
<b>E2. by showing interest, initiative, and effort</b>	
	Evaluation(s)/Goal(s): Midterm/Goals 1-6; Final/Goals 1-9; Lab Reports/Goals 5, 6, 9, 10; Assignments/Goals 1-10
<b>E3. by affirming the need for positive solutions and encourage positive interaction and feedback</b>	
	Evaluation(s)/Goal(s): Lab Reports/Goals 5, 6, 9, 10
<b>E4. by balancing personal and family activities with job-related activities</b>	
	Evaluation(s)/Goal(s): Midterm/Goals 1-6; Final/Goals 1-9; Lab Reports/Goals 5, 6, 9, 10 ; Assignments/Goals 1-10

**Grade Equivalents and Course Pass Requirements**

*A minimum grade of D (50%) (1.00) is required to pass this course.*

Letter	F	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
Percent Range	0-49	50-52	53-56	57-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
Points	0.00	1.00	1.30	1.70	2.00	2.30	2.70	3.00	3.30	3.70	4.00	4.00

**Students must maintain a cumulative grade of C (GPA - Grade Point Average of 2.00) in order to qualify to graduate.**

**Attendance**

Classroom and laboratory attendance is considered vital to the learning process and as significant to the students' evaluation as examinations and reports.

- a. Students having a combination of excused and/or unexcused absence of 20 percent or higher for the scheduled course hours will be required to withdraw and will automatically receive a "RW" (required withdrawal) for the course, regardless of any other evaluation results. (RW is a failing grade.)

- b. An excused absence is one that is verified with your Instructor. Verification should be prior to the absence or the next class day following the absence. Verification of the absence may take the form of a note from your doctor/College nurse regarding illness, or a note from another Instructor regarding a field trip or other activity, or authorization by your Instructor. An unexcused absence is anything NOT verified by the instructor prior to the absence or the next class day following the absence.

NOTE: Any exceptions to the above attendance policy (e.g. timetable conflicts, work-related issues) must be approved in writing by the Department Chair prior to the beginning of the course.

It is the students' responsibility to know their own absentee record.

Normal hours are 8:30 a.m. to 6:30 p.m., with potential for evening courses, exams or extended field trips. Students are expected to be available for classes during these times.

## **Course Units/Topics**

### ***Lecture Contents:***

- Unit 1: Assessment tools used in revegetation
- Unit 2: Revegetation and reclamation planning
- Unit 3: Revegetation site preparation
- Unit 4: Vegetation establishment
- Unit 5: Ensuring establishment success
- Unit 6: End land use: annual crop production
- Unit 7: End land use: tame forages for pasture, hay or seed production
- Unit 8: End land use: native grassland communities
- Unit 9: Monitoring and assessment of revegetation projects
- Unit 10: Specialized revegetation techniques

### ***Laboratory Content:***

- The labs in this course emphasize field tours and exercises. The field tours and exercises allow students to observe revegetation techniques and practice and implement the theory presented in lectures. Students must come prepared for autumn weather conditions that can be variable (within a lab period) and inclement. Sturdy hiking and/or winter boots, warm clothes, rain gear, food and water should be brought on all excursions.



Changes in scheduling of field tours may occur due to inclement weather, changes to tour host's personal schedules, changes to site access arrangements and restrictions due to timing or safety concerns, etc. The actual lab tours/exercises performed are not restricted to but may include the following (NOTE: labs are not indicated in chronological order):

- Revegetation Field Tour
- Revegetation of Disturbed Sites on Public Lands
- Detailed Site Assessment for Reclamation Certificate
- Specialized Revegetation Equipment
- Range Conservation, Restoration or Improvement Projects
- Vegetation Management Issues
- Pre-Disturbance Site Assessment
- Seeding Rate Calculations



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5707 College Drive, Vermilion, Alberta, Canada T9X 1K5. Ph: 780 853 8400  
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