

ESC424
Ecosite Classification
3 Credits

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ESC424 Version: 9



Ecosite Classification

Calendar Description

This course is a detailed examination of sampling techniques used to assess vegetation and soils with emphasis on methods to meet government reclamation criteria. Students consider methods to conduct pre- and post-disturbance inventories and detailed site assessments on disturbed and undisturbed sites. Significant time will be spent in the field applying reclamation criteria and utilizing reclamation principles and inventory techniques to insure and verify effective reclamation and revegetation of disturbed sites.

Rationale

This is a senior level directed elective course for students in the Reclamation and Remediation stream of the Bachelor of Applied Science Degree in Environmental Management.

Students in this program stream require extensive knowledge of inventory techniques used in the environmental consulting industry to service the needs of the oil/gas/mining/forestry and other industries. A variety of standardized range and soil inventory techniques exist and are used to assess vegetation and soils in pre-disturbance and post-disturbance situations and in sites being assessed by environmental consultants. While government regulations may dictate specific methods and approaches to sampling, natural variability in site project size/scope can lead to the use of many resource inventory techniques. Therefore, environmental degree graduates require a solid understanding of standardized approaches to sampling vegetation and soils, both from a research and applied industry perspective. This training will help students appreciate the basis for government mandated sampling strategies/methods and give them standardized options to apply in unique situations, sites or projects.

Prerequisites

Entrance requirements for Reclamation and Remediation stream of the Bachelor of Applied Science Degree in Environmental Management program.

Co-Requisites

None

Course Learning Outcomes

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

1. evaluate and classify western Canadian native grassland, forest and wetland sites according to ecological site descriptions used in Alberta.
2. select and apply the appropriate soil and/or vegetation measurement techniques to evaluate reclamation success in a variety of situations.
3. perform a Detailed Site Assessment (DSA) using the Alberta 2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands, Criteria for Native Grasslands and Criteria for Forested Lands.
4. interpret the information compiled for a DSA, analyze the results and communicate them effectively.
5. effectively evaluate reclamation success on larger disturbances where reclamation criteria do not exist.
6. interpret the information compiled in a reclamation assessment where criteria do not exist, and analyze and communicate the results.
7. integrate ecological site descriptions into pre-disturbance planning and reclamation of natural ecosystems.
8. interpret, analyze and describe pre-disturbance site assessments for a proposed industrial disturbance using appropriate techniques.
9. develop various reclamation reports including DSA's and pre-disturbance site assessments for given ecosystems and disturbances and present these as written reports and verbal summaries.
10. compare different approaches of scientific researchers and environmental consultants in industrial situations when sampling vegetation and soils.

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.

Resource Materials

Required Textbooks:

Bureau of Land Management. 1999. Sampling Vegetation Attributes. Bureau of Land Management, Denver, CO. BLM Technical Reference 1734-4.

This book can be downloaded at:

<https://www.blm.gov/learn/blm-library/agency-publications/technical-references>

Alberta Environment. 2010. 2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands. Alberta Environment, Edmonton, Alberta. 117 pp.

Alberta Environment. 2010. 2010 Reclamation Criteria for Wellsites and Associated Facilities for Native Grasslands. Alberta Environment, Edmonton, Alberta. 125 pp.

Alberta Environment. 2010. 2010 Reclamation Criteria for Wellsites and Associated Facilities for Forested Lands. Alberta Environment, Edmonton, Alberta. 99 pp.

Burkinshaw, A., M. Willoughby, K. France, H. Loonen, and R. McNeil. 2009. Range Plant Communities and Range Health Assessment Guidelines for the Central Parkland Subregion of Alberta. Alberta Sustainable Resource Development, Edmonton, Alberta.

Willoughby, M., C. Stone, C. Hincz, D. Moisey, G. Ehlert, and D. Lawrence. 2006. Guide to Range Plant Community Types and Carrying Capacity for the Dry and Central Mixedwood Subregions in Alberta. Alberta Sustainable Resource Development, Edmonton, Alberta.

In addition, a variety of journal articles and other resource material will be given to the students in class. Students will be responsible for reading these materials.

Strongly Recommended Textbook:

Beckingham, J.D., and J.H. Archibald. Field Guide to Ecosites of Northern Alberta. UBC Press, University of British Columbia, Vancouver, British Columbia, 1996.

Reference Textbooks:

Adams, B., R. Ehlert, and D. Moisey. 2003. Rangeland Plant Communities and Range Health Assessment Guidelines for the Foothills Fescue Natural Subregion of Alberta. Alberta Sustainable Resource Development, Edmonton, Alberta.

Alberta Agriculture. Weeds of the Prairies. 2000. Adgex 640-4. Alberta Agriculture Publications Office: Edmonton.

Alberta Land Conservation and Reclamation Council. 1989. Manual of plant species suitability for reclamation in Alberta 2nd ed. Alberta Land Conservation and Reclamation Council Report No. RRTAC 89-4, Hardy BBT Limited, Edmonton, AB. p. 436.

Gerling, H.S., Willoughby, M.G., Schoepf, A., Tannas K.E., and Tannas, C.A. 1996. A guide to using native plants on disturbed lands. Alberta Agriculture, Food and Rural Development and Alberta Environmental Protection. ISBN: 0-7732-6125-7. 247 pages.

Various Plant Identification Guides for Alberta and Western Canada.

Elzinga, C.L., D.W. Salzer, & J.W. Willoughby. 1998. Measuring and monitoring plant populations. Bureau of Land Management, Denver, CO. BLM Technical Reference 1730-1.

This book can be downloaded at:

<https://www.blm.gov/learn/blm-library/agency-publications/technical-references>.

Adams, B., L. Poulin-Klein, D. Moisey, and R. McNeil. 2004. Rangeland Plant Communities and Range Health Assessment Guidelines for the Mixedgrass Natural Subregion of Alberta. Alberta Sustainable Resource Development, Edmonton, Alberta.

Adams, B., L. Poulin-Klein, D. Moisey, and R. McNeil. 2005. Rangeland Plant Communities and Range Health Assessment Guidelines for the Dry Mixedgrass Natural Subregion of Alberta. Alberta Sustainable Resource Development, Edmonton, Alberta.

Conduct of Course

Total course hours are 28 hours of lecture and 42 hours of lecture/lab. The instructor will discuss the allocation of time as it relates to your timetable and expected hours of homework.

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. Lectures will incorporate required readings, student research, case studies and so forth. Independent learning of some topics is required by students. Lectures support lab content by providing additional detail for lab exercises.

The lab component focuses on field tours and exercises that practically apply the theory discussed in lectures.

The course exams reflect course content from both the lecture and the laboratory components. The midterm exams focus on course content covered prior to these exams and the final exam covers course content from the beginning of the course.

Students are assigned readings in preparation for lecture. The main ideas are reviewed and discussed in class. Students may be required to summarize and present information from readings and library research. The assigned readings are an integral part of the course and help students apply principles from the lectures. Preparation and in-class participation are essential to the learning process. Quizzes on required readings, lectures and labs are provided to help students clarify the main ideas being covered.

Students will complete five to seven written reclamation reports as lab assignments. The topics of the assignments will vary depending on the labs that are conducted in any given year. Reports will be completed either individually or as a group reports, depending on the specific report. Report format will be provided to students in advance of the field exercise for the specific lab. Lab assignments will be graded as detailed in the Evaluation Procedures section.

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

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|---|-----|
| Midterm 1 | 15% |
| Midterm 2 | 15% |
| Comprehensive Final Exam | 20% |
| Labs: Field Data Submission and reports | 40% |
| Quizzes | 10% |

To obtain credit for this course:

- 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 requested. The penalty for late submission is -20% of the earned mark for submission anytime within the first 24 hours, and -20% for each subsequent day late.
- All labs must be attended.
- Lab assignments include a mixture of questions and detailed reports
- A minimum grade point of D (50%) is required to pass the course.
- 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

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|---|
| A1. by listening, reading, interpreting information, and communicating effectively |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| A2. by using written, spoken, and/or visual formats and media to communicate and meet needs of each particular audience |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| A3. by using libraries, Internet, technical publications, journals and other sources to find pertinent information |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |

B. Teamwork Skills

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| B1. by using interpersonal skills to create an atmosphere that maximizes the strengths of group members to accomplish tasks |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| B2. by using interpersonal skills to resolve conflict, relate to others, and assist others |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| B3. by contributing and listening to others as group determines realistic objectives, prioritizes tasks, and identifies resources and timelines |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| B4. by treating other members of the group open-mindedly and fairly |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |

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| B5. by developing tactics/strategies to accomplish tasks |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |

C. Critical Thinking Skills

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| C1. by seeing critical thinking as a lifelong process of self-assessment |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| C2. by examining problems closely |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| C3. by examining beliefs, assumptions, and opinions, and weigh them against the facts |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| C4. by seeking out the truth |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| C5. by finding solutions; make decisions |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| C6. by incorporating new ideas that may not necessarily agree with previous thought on the topic |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| C7. by seeing connections between topics and use knowledge from other disciplines to enhance reading and learning experiences |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |

D. Adaptability Skills

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|---|
| D1. by working independently or as part of team |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| D2. by carrying out multiple tasks or projects |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| D3. by being innovative and resourceful: identify and suggest alternative ways to get the job done |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| D4. by being open and respond constructively to change and uncertainty |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |

E. Positive Attitude and Behavioural Skills

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|---|
| E1. by dealing with people, problems, and situations with honesty, integrity, and personal ethics |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| E2. by showing interest, initiative, and effort |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| E3. by affirming the need for positive solutions and encourage positive interaction and feedback |
| Evaluation(s)/Goal(s): Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |
| E4. by balancing personal and family activities with job-related activities |
| Evaluation(s)/Goal(s): Exam 1/Goals 1, 2, 3; Exam 2/Goals 4, 5, 6, 7, 8, 9, 10; Lab Assignments/Goals 1, 2, 3, 6, 8, 9, 10 |

Grade Equivalents and Course Pass Requirements

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

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|---------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 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, therefore absenteeism is recorded.

- a. Students having a combination of excused and/or unexcused absence of 20 percent or higher for the scheduled course hours can be required to withdraw and would then 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 following an in-person meeting. Be sure to contact your instructor and ask what they will require from you as verification for each absence. 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:

The following is a list of the major topics that will be covered in the class. The order of delivery may vary due to student field trips and timing of these field trips, field site accessibility and weather. Lectures will support lab exercises, projects and student work and therefore may vary from the order given below. In addition, some of the lecture content that relates to field activities may be given as handouts or presented in the laboratory time period.

Unit 1: 2010 Alberta Reclamation Criteria for Wellsites and Associated Facilities - field component

- A) Cultivated Lands
- B) Native Grasslands
- C) Forested Lands

Unit 2: Ecological Site Assessment Techniques, Analysis and Interpretation

- A) Pre-disturbance plant community site assessments
- B) Ecological site description and classification

Unit 3: Reclamation Data Analysis, Assessment and Interpretation

- A) Ecological site description and classification of the 2010 Alberta Reclamation Criteria for Wellsites and Associated Facilities
 - i) Cultivated Lands
 - ii) Native Grasslands

iii) Forested Lands

iv) Peatlands

B) Saskatchewan Detailed Site Assessments

Unit 4: Assessing revegetation on disturbances without criteria (large disturbances)

Dependent on time availability:

Unit 5: Research vs. monitoring – differences in assessment

Laboratory Contents:

The labs in this course emphasize field tours and hands on application of expected course outcomes. The labs allow students to practice vegetation sampling techniques and implement the theory presented in the lectures. Students must come prepared for autumn weather conditions that can be variable within a lab period. Lab order and topics may vary because of inclement weather, guest availability or other contingencies.

Potential lab topics include:

1. Detailed Site Assessments - cultivated land, native grassland and/or forested land
2. Pre-disturbance site assessments
3. Assessment of plant establishment and species composition on reseeded land
4. Plant species composition and utilization on grazed land
5. Ecosystem classification - native grassland, forested land and/or wetlands
6. Weed and invasive plant assessments
7. Case studies

Although every attempt will be made not to do so, field trips may be held outside of the regular scheduled time based on field site location and industry liaison schedules.



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