

BI 210
Forest Ecology

3 Credits

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BI 210 Version: 18



Forest Ecology

Calendar Description

This course is an introduction to forest ecology and ecological forest management. The impacts of industry and other land-use on forests are investigated at a landscape scale. Topics include dendrology, ecological disturbance, forest biodiversity, forest management techniques, approaches to forest restoration, and reclamation criteria for forested areas. Field trips and labs are used to develop field skills in tree and shrub identification, forest insect and disease identification, timber cruising, forest harvesting, stand assessment, and ecosystem classification.

Rationale

This is a required course for the Conservation and Restoration Ecology, the Environmental Conservation and Reclamation and the Wildlife and Fisheries Conservation students.

An understanding of forests, their ecology and management is essential in the applied environmental science areas of conservation, reclamation, parks and wildlife habitat management.

Knowledge of forest legislation and forest management (silviculture, harvesting, regeneration) facilitate environmentally sound management and multiple uses of forest resources.

This course provides an overview and understanding of forests and forest practices, with a focus on Alberta and Western Canada.

Prerequisites

BI 110 and BO 120

Co-Requisites

None

Course Learning Outcomes

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

1. describe the major components of the Alberta Forests Act, Timber Management Regulation and the Forest Management Agreement.
2. characterize land use regulations that are unique to forested areas.
3. recognize and describe the merchantable forest tree species of Alberta and Saskatchewan.
4. perform forest measurements, process cruise data, and determine wood volume and yield values.
5. interpret Forest Inventory Maps.
6. engage in sustainable forest management planning activities.
7. explain and describe how wood is harvested, transported and processed for lumber and paper products.
8. describe ecosystem management approaches for dealing with multiple land-use and maintaining forest biodiversity.
9. explain and describe reforestation techniques, policies, and methods of evaluation.
10. explain the abiotic determinants of stand establishment and growth.
11. explain and describe major insect and disease conditions affecting forests of Canada.
12. describe wildfire processes in forest ecosystems.

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:

None

Reference Textbooks:

Alberta Environment. 2010 Reclamation Criteria for Wellsites and Associated Facilities for Forested lands. Alberta Environment, Edmonton, Alberta. 99 p.

Beckingham, J.D. and J.H. Archibald. 1996. Field guide to ecosites of Northern Alberta. Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta. 336 p.

Kimmins, J.P. 2004. Forest ecology. Pearson Education, Inc., Upper Saddle River, NJ. 611 p.

Schneider, R.R. 2002. Alternative futures: Alberta's Boreal Forest at the crossroads.

The Federation of Alberta Naturalists, Edmonton, AB. 152 p.

Required Materials:

Equipment required for laboratory sessions are provided.

You are required to dress appropriately for weather conditions on outdoor labs, and to conduct yourself professionally on all field trips.

Conduct of Course

The course consists of approximately 42 hours of lecture and 28 hours of laboratory.

The lecture is a formalized classroom situation where the instructor discusses pertinent topics and students normally take notes. Student-questions are encouraged to clarify subject areas.

The lab component is comprised of field trips, forest measurement exercises, guest lectures/tours, and attendance of a scientific meeting, all of which provide practical application of theory discussed in lectures. Laboratory reports are required for all tours, meetings and measurement labs. Attendance at and participation in all laboratories and field trips is mandatory. Field trips and field tours may extend into the evening and may include overnight activities.

Evaluation Procedures

Lecture exams may contain discussion-type, short answer, matching, true-false-justify, and multiple-choice questions. The lab exam tests forest plant identification skills and there are short answer or practical questions concerning field trip experiences and techniques. The final grade for the course is weighted according to the following schedule:

Lecture exam I	25%
Lecture exam II	25%
Lab exam	20%
Lab reports, quizzes and assignments	<u>30%</u>
Total	100%

To obtain credit for this course all lab reports and assignments must be completed and handed in, all labs must be attended, and a minimum grade of 1.0 in the combined lecture/lab and project portions of the course must be achieved.

Late lab reports and assignments are not graded and a zero mark is assigned. Any in-class assignment or quiz that is missed due to tardiness or unexcused absenteeism will result in a zero. Any student who misses any lab activity for any reason is expected to make up that activity with a project assigned by the instructor.

All reports, assignments and exams are graded on a percentage (%) basis and a total course percentage is calculated using the above weighting values. Finally, the total course percentage is converted to a letter grade using the following 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): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12
A2. by using written, spoken, and/or visual formats and media to communicate and meet needs of each particular audience
Evaluation(s)/Goal(s): Assignments: Goals 4, 11
A3. by using libraries, Internet, technical publications, journals and other sources to find pertinent information
Evaluation(s)/Goal(s): Assignments: Goals 4, 11

B. Teamwork Skills

B1. by using interpersonal skills to create an atmosphere that maximizes the strengths of group members to accomplish tasks
Evaluation(s)/Goal(s): Assignments: Goals 4
B2. by using interpersonal skills to resolve conflict, relate to others, and assist others
Evaluation(s)/Goal(s): NA
B3. by contributing and listening to others as group determines realistic objectives, prioritizes tasks, and identifies resources and timelines
Evaluation(s)/Goal(s): Assignments: Goals 4
B4. by treating other members of the group open-mindedly and fairly
Evaluation(s)/Goal(s): NA

B5. by developing tactics/strategies to accomplish tasks
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12

C. Critical Thinking Skills

C1. by seeing critical thinking as a lifelong process of self-assessment
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12
C2. by examining problems closely
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12
C3. by examining beliefs, assumptions, and opinions, and weigh them against the facts
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 6, 8; Lecture Exam 2: Goals 6, 8; Lab Exercises: Goals 6, 8
C4. by seeking out the truth
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12
C5. by finding solutions; make decisions
Evaluation(s)/Goal(s): NA
C6. by incorporating new ideas that may not necessarily agree with previous thought on the topic
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 3-12
C7. by seeing connections between topics and use knowledge from other disciplines to enhance reading and learning experiences
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12

D. Adaptability Skills

D1. by working independently or as part of team
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12
D2. by carrying out multiple tasks or projects
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12
D3. by being innovative and resourceful: identify and suggest alternative ways to get the job done
Evaluation(s)/Goal(s): NA
D4. by being open and respond constructively to change and uncertainty
Evaluation(s)/Goal(s): Assignments: Goals 3-12

E. Positive Attitude and Behavioural Skills

E1. by dealing with people, problems, and situations with honesty, integrity, and personal ethics
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12
E2. by showing interest, initiative, and effort
Evaluation(s)/Goal(s): Lecture Exam 1: Goals 1-12; Lecture Exam 2: Goals 1-12; Lab Exercises: Goals 1-12
E3. by affirming the need for positive solutions and encourage positive interaction and feedback
Evaluation(s)/Goal(s): NA
E4. by balancing personal and family activities with job-related activities
Evaluation(s)/Goal(s): NA

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, 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 of 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 Units:

1. Introduction to the Forest Ecosystem and Canadian Forest Resource

2. Forest Regions of Canada
3. Forest Values in Canada
4. The Forest Act, Guidelines, Criteria, and Operating Ground Rules
5. Cumulative Impacts in Alberta Forests
6. Silviculture
 - a. mechanical harvest and equipment
 - b. harvest systems
 - c. site preparation
 - d. stand regeneration
 - e. stand tending
7. Ecological Forest Management
8. Urban and Old Growth Forests

Possible Laboratory Units: (all lab activities are subject to availability, field conditions and current issues.)

1. Autecology and ID of Western Canadian Trees and Shrubs
2. Forest Measurement and Biodiversity Monitoring
3. Ecological Stand Assessment (Whitney Lakes)
4. Ecosite Classification
5. Important Forest Insects and Diseases of Alberta
6. Reclamation Criteria and Standards in Alberta Forests
7. Environmental Field Reports
8. Alberta Pacific Pulp Mill and Woodlands Tour
9. Fire Ecology: Northern Forest Research Centre (Edmonton)
10. Scientific Conference: subject to availability and time constraints.
11. Forest Pests and Pathogens



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