DEPARTMENT OF RENEWABLE RESOURCES
UNIVERSITY OF ALBERTA
RENR 322 : Forest Ecosystems

FALL 2020 - Syllabus

Instructor: Ellen Macdonald, Professor
Email Address: ellen.macdonald@ualberta.ca
Office Hours: email me questions and I'll reply or we can schedule a virtual meeting

Teaching Assistants: for questions or to schedule a virtual meeting, just email your TA

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Classes[1] MWF 11h00 to 11h50; asynchronous or synchronous+virtual
Labs[2] T or F 14h00 to 16h50 (virtual)
Credits 3 credits

[1]We will meet synchronously in only some scheduled lecture periods. Most weeks there will be one synchronous interaction per week – with 1/3 of the class participating at a time. Details can be found below and on eClass.

Course Description: Analysis of the structure and function of forest ecosystems from a stand to a landscape perspective. Topics include physical forest structure and heterogeneity, community composition, energy flow, productivity, nutrient cycling, succession, ecosystem classification, impacts of natural and anthropogenic disturbance.

Course Pre-Requisites: BIOL 208 or by permission of instructor. Students are responsible for ensuring they have the necessary pre-requisite(s) and may be dropped before or after the course drop date if they have not met this requirement. Students must obtain written verification of permission to waive the pre-requisite using the form available from: questions.ales@ualberta.ca

Course Format: This course will be taught using a blend of synchronous and asynchronous delivery. (See detailed schedule below). There will be a few synchronous, virtual lectures, for the entire class; these will be recorded for later viewing. Most content will be delivered asynchronously; everything (including pre-recorded lectures, videos, assigned readings, or other out-of-class activities, etc.) will made available on e-class. Students are expected to keep up with content each week as that is necessary to prepare for the synchronous session the following week. In most weeks the Instructor will meet virtually with ~ 1/3 of the class at a time (Mon, Wed. or Fri.). During these time periods we will apply the knowledge gained through the asynchronous content. These synchronous sessions will be focused on active learning designed to help students synthesize and apply knowledge. Students should be prepared for these sessions by completing all the assigned asynchronous content. Attendance is expected and participation marks will be given for activities completed during the synchronous sessions. These synchronous sessions will not be recorded.

The laboratory portion of the course will be delivered on-line. Materials, (e.g., handouts, pre-recorded lectures, instructional videos, etc.) will be made available on eClass. During the scheduled lab periods we will have synchronous, virtual meetings during which the Teaching Assistants will guide students through specific activities, answer questions, troubleshoot problems.

Technology requirements: Because the course will be taught on-line, students will need to have access to a computer with a microphone, webcam, and speakers or headphone, and will need reliable internet access. Your webcam, microphone, and computer activity may be monitored using remote proctoring software during exams. For recommendations on technology for remote learning see: https://www.ualberta.ca/information-services-and-technology/services/software-hardware-vendors/technology-requirements.html

Professionalism and Classroom Rules of Engagement: We expect students, teaching assistants, and the instructor to treat one another with respect. This includes in any in-person interactions, virtual interactions, or written communication. Disrespectful behavior will not be tolerated. ***Netiquette:*** During synchronous sessions delivered to the whole class, please mute your microphone. You can pose questions or communicate with the Instructor using the Chat box or the "raise hand" option in Zoom; as appropriate I will invite you to unmute so you can comment or ask a question. You may have your video turned on, or off, whichever you prefer. We will have breakout sessions during which you will need to unmute your microphone so you can discuss or work together on activities with other students. I encourage you to also use your video during these sessions, but it is not required.

Course Website: is on eclass: https://eclass.srv.ualberta.ca
All notices, information, and resources for the lecture and laboratory portions of the course will all be posted on eClass. All grades will be tracked using the eClass gradebook. Copyrighted material contained in posted slides is reproduced under ss. 29-29.4 of the Canadian Copyright Act. These documents are available for your individual use; further distribution may infringe copyright.

Marking and Grading

Component	Weight Towards Final grade
Midterm Exam, Fri. Oct. 16, 11:00 – 11:50 (MT)	20
Laboratory assignments (see below for details)	35
Participation[1]	15
Final Exam (2 hours), Mon. Dec. 21, 2:00 pm[2]	30
Course total	100

[1]Participation grade will be based on activities completed during the synchronous lecture periods.
[2]Students must verify this date on BearTracks when the Final Exam Schedule is posted.

Grading:
Students' grades on each component of the course will be weighted and then combined to calculate a final % grade. This % grade will be converted to a letter grade, which reflects the student's level of achievement with respect to the course learning outcomes as described above. Grade distribution will not be based on a curve but will reflect a student's relative performance in the class. An overall course mark of 50% or more guarantees a passing grade of at least D while an overall course mark of 90% or more guarantees a grade of at least A. Grades are unofficial until approved by the Department. Over the past five years the minimum % grade to obtain a given letter grade has varied as follows:

Grade	minimum %
A+	88-90
A	83-85
A-	79-82
B+	76-78
B	72-74
B-	67-70
C+	64-66
C	62-64
C-	60-62
D+	56-59
D	50
F	< 50

Both exams will encompass all the material presented in lecture and lab components of the course up to that point in time; for the final exam greater emphasis will be placed on material presented since the midterm. Exams will include a mix of short-answer and long-answer questions and may require students to interpret diagrams or graphs. Exams are designed to provide students the opportunity to demonstrate that they have achieved the learning outcomes for the course. Clarity of writing, factual accuracy and the ability to utilize ideas and examples presented and discussed in class will be judged when marking exam questions. Exams will be marked by the Instructor with closely supervised assistance from the GTAs. The laboratory assignments will be marked by the Teaching Assistants using grading guidelines provided by the Instructor. ***Copies of midterm and final examinations from previous years are available on eclass.***

Due dates for Exams and Assignments: Due dates and times for assignments are as described in the detailed course schedule below and will also be posted on eClass. Late assignments will be penalized 10% for every 24 hours (or part thereof) that it is late (e.g. a "perfect" paper received 5 days late would receive a grade of 50%). Assignments are considered handed in when they are uploaded to eclass.

A student who cannot write an in-term exam or who cannot complete an assignment by the due date/time because of an incapacitating illness, severe domestic affliction, or other compelling reasons can apply for a deferral. Applications for deferral must be made in writing to the instructor, with supporting documentation, within 48 hours of the time of the exam/assignment due date. If deferral is approved the student will be given the opportunity to take the exam on a later date, or will be granted an extension for submission of the assignment or, at the discretion of the instructor, the weight for the exam or assignment may be transferred to the final exam. The exact timing of these is at the instructor's discretion.

Instructors can neither give permission to a student to miss the final exam nor grant a request for a deferred final exam. Students are encouraged to check exam schedules prior to making travel or event plans. The decision to grant a deferred final exam can only be granted by the Faculty of ALES (email questions.ales@ualberta.ca to obtain an exam deferral form). Acceptable reasons for an excused absence may include illness or bereavement; weddings, travel arrangements or vacation are not acceptable reasons. The University policy on deferred exams can be found in Section 23.3.2 of the University Calendar. It includes specific instructions on how to obtain a deferral.

Course Objectives: My objective is to provide students with the basic knowledge, skills and opportunity to develop their understanding of ecological principles as they apply to forest ecosystems. A review of general principles will be accompanied by specific illustrative examples along with exploration of how those principles can be applied to make predictions of ecological consequences under different scenarios. An underlying theme in the course will be the application of ecological knowledge to management of forests for a diversity of values.

Recommended References: *On reserve in Cameron library*

Barnes, B.V., D.R. Zak, S.R. Denton, S.H. Spurr. 1998. Forest Ecology. John Wiley & Sons.
Kimmins, J.P. 2004. Forest Ecology: A foundation for sustainable management. (3rd Edition) Macmillan, New York.
Perry, D.A., R. Oren, S.C. Hart. 2008. Forest Ecosystems. Johns Hopkins University Press.

Course goals: Through the course students will -

- Develop a solid understanding of key ecological principles as they apply to forest ecosystems
- Learn to recognize and appreciate interactions and processes underlying forest structure and function
- Gain experience in applying ecological knowledge to manage forests for a diversity of values
- Learn how to obtain information from a variety of sources and critically evaluate it

Course learning outcomes: By the end of the course students will be able to:

- Describe different components of forest structure; explain and give examples of how these are related to ecological function
- Compare forests with different structure and determine how this will affect biodiversity and ecological function
- Classify forests using biological and environmental information
- Explain and give examples of the ecological processes underlying changes in forest structure and composition over time
- Make predictions about how forest structure, composition and ecological function will change in the future
- Describe the main pathways and compartments for flow of energy, nutrients and water in forests; compare these among different types of forest and in response to different types of disturbance
- Create hypotheses about the impacts of different management interventions and natural disturbances on forest structure and function
- Apply ecological understanding of forest structure and function to forest management
- Articulate informed opinions about ecological issues facing natural resource professionals

Learning outcomes for the lab component. By the end of the course students will be able to:

- Complete simple analyses of field data on forest structure, interpret and draw inferences from the data
- Develop scientific hypotheses and prepare a professionally-written report, following a prescribed format, that presents the results of data collection and analyses designed to test those hypotheses

- Utilize a guide to ecosite classification of forests
- Measure dendrochronological samples, organize and analyze the resulting data, use these data to make inferences about the pattern and process of forest stand dynamics
- Use modeling approaches to predict the impact of different disturbances and interventions on forest carbon cycling.

Schedule: Lecture topics and Lab exercises might change throughout the term. In case of discrepancy between what is listed here and what is said in class or posted on eclass – ***the information posted on eclass will be viewed as correct.***

Lecture Schedule:

Dates	**Synchronous Activity / Topic**	**New Topic (Asynchronous content)**
Sept 2, 4	Course overview, approach, expectations; Introduction to forest ecology and applications to forest management (whole class, both days)	Application of ecological knowledge to forest management (course context)
Sept. 9		Forest stand structure
Sept. 11	Traditional Ecological Knowledge (B. Parlee guest lecture – whole class)	
Sept. 14, 16, 18	Applying knowledge of forest stand structure*	Forest landscape structure
Sept. 21, 23, 25	Applying knowledge on forest landscape structure*	Landscape forest distribution
Sept. 28, 30, Oct. 2	Applying knowledge on landscape forest distribution*	Forest disturbance & dynamics
Oct. 5, 7, 9	Applying knowledge on forest disturbance and dynamics*	Ecosite classification
Oct. 12	**Thanksgiving**	
Oct. 14		Natural-disturbance-based management
Oct. 16	**Midterm**	
Oct. 19, 21, 23	Applying knowledge on NDB management*	Biotic interactions in forests
Oct. 26, 28, 30	Applying knowledge on biotic interactions*	Energy and carbon dynamics
Nov. 2, 4, 6	Applying knowledge on energy and carbon dynamics*	Forest hydrology
Nov. 9-13	**READING WEEK**	
Nov 16, 18, 20	Applying knowledge on forest hydrology*	Forest nutrient cycles
Nov. 23, 25, 27	Applying knowledge on forest nutrient cycles*	Ecological Management of forests
Nov. 30, Dec. 2, 4	Applying ecological knowledge to forest management*	
Dec. 7	Open session - review	

* Virtual meeting, from 11-11:50 (MT) for: Group 1 on Mon., Group 2 on Wed., Group 3 on Friday.

Lab Schedule:

Date	Topic
Sept 8, 11	Forest structure – preparatory work (asynchronous)
Sept 15, 18	Forest structure – introduction
Sept 22, 25	Forest structure – results
Sept 29, Oct. 2	Forest structure – discussion
Oct 6, 9	Ecosite classification
Oct 13, 16	**No lab (Midterm this week)**
Oct 20, 23	Ecosite classification
Oct 27, 30	Dendrochronology
Nov. 3, 6	Dendrochronology
Nov 10, 13	**READING WEEK**
Nov 17, 20	Carbon budget model
Nov 24, 27	Carbon budget model
Dec. 1, 4	Carbon budget model

Lab component: due dates and values (all assignments are to be uploaded via eclass)
Forest structure:

- Introduction (for peer review): Sept. 22/25
- Peer review (of Introduction): Sept. 29/Oct. 2 (2 %)
- Mini-Results (group): Sept. 29/Oct. 2 (4 %)
- Final report: Oct. 27/30 (12 %)

Ecosite classification worksheet – Oct. 20, 23 (5%)
Dendrochronology: Participation: Oct. 27/30; Worksheet: Nov. 3/6th; Report: Tues. Nov. 17 (5%)
Carbon assignment:

- Results sharing in small groups: Dec. 1 /4 (2%)
- Report: Dec. 7 (5 %)

Relevance of course goals and learning outcomes to professional certification:

Canadian Forestry Accreditation Board (CFAB): The course Goals, Content and Learning Outcomes are designed to fulfil some of the requirements prescribed for the following CFAB standards: Standard 1 (Tree and Stand Dynamics), Standard 2 (Forest to Landscape), Standard 5 (Leadership Skills), Standard 6 (Information Acquisition and Analysis), Standard 7 (Professionalism and Ethics). http://www.cfab.ca/English/standards.html

Professional Agrologist: RenR 322 is recognized by the Alberta Institute of Agrologists as a "senior agrology course" thus fulfilling part of their requirements for professional designation. http://aia.in1touch.org/document/2554/UofA_ApprovedCourseNovember2014.pdf The course goals, content and learning outcomes are relevant to several of the AIA areas of practice http://aia.in1touch.org/site/practice-areas

Professional Biologist: RenR 322 (formerly For 322) is recognized as a "biology" course by the Alberta Society of Professional Biologists https://www.aspb.ab.ca/faq-for-applicants#aca7 ; the goals and learning outcomes of the course are relevant to several of their 'practice areas', although they have not developed specific academic requirements for these.

Academic integrity: The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (see below) and avoid any actions which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All students at the University of Alberta are subject to the Code of Student Behaviour, as outlined at: *University Governance > Code of Student Behaviour* . Please familiarize yourself with it and ensure that you do not participate in any inappropriate behavior as defined by the Code. Key components of the code include the following statements.

- No Student shall submit the words, ideas, images or data of another person as the Student's own in any academic writing, essay, thesis, project, assignment, presentation or poster in a course or program of study.
- No Student shall represent another's substantial editorial or compositional assistance on an assignment as the Student's own work.
- No Student shall in the course of an examination or other similar activity, obtain or attempt to obtain information from another Student or other unauthorized source, give or attempt to give information to another Student, or use, attempt to use or possess for the purposes of use any unauthorized material.
- No Student shall represent or attempt to represent him or herself as another or have or attempt to have himself or herself represented by another in the taking of an examination, preparation of a paper or other similar activity.
- No Student shall submit in any course or program of study, without the written approval of the course Instructor, all or a substantial portion of any academic writing, essay, thesis, research report, project, assignment, presentation or poster for which credit has previously been obtained by the Student or which has been or is being submitted by the Student in another course or program of study in the University or elsewhere.
- No Student shall submit in any course or program of study any academic writing, essay, thesis, report, project, assignment, presentation or poster containing a statement of fact known by the Student to be false or a reference to a source the Student knows to contain fabricated claims (unless acknowledged by the Student), or a fabricated reference to a source.

Students should speak with the course instructor about any questions or concerns about the code. Students should be particularly aware of the code as it pertains to internet and library research and use of assignments from prior years.

Also of particular relevance to students in this class is section 30.3.3 Inappropriate Behaviour in Professional Programs:
http://www.governance.ualberta.ca/en/CodesofConductandResidenceCommunityStandards/CodeofStudentBehaviour/303OffencesUndertheCode/3033InappropriateBehaviourinPr.aspx
The Code of Student Behaviour requires students in pre-professional programs to follow the Codes of Practice for those profession(s) the student plans to or is required to enter. This often is a higher standard than that described in the Code of Student Behaviour and there are significant consequences for students for violating the profession's code of conduct. The profession may impose strict membership requirements in that professional body, which could be denied for a student who is found to have violated the University of Alberta Code of Student Behaviour.

Policy about course outlines can be found in Course Requirements, Evaluation Procedures and Grading of the University Calendar. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

Disclaimer: Any typographical errors in this Course Outline are subject to change and will be announced in class.