

**DEPARTMENT OF RENEWABLE RESOURCES
UNIVERSITY OF ALBERTA
RENR 447/RENR 747 – Forest Health
2017 Syllabus**

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Office hours: By appointment only. To schedule an appointment, send email or call.

Term	Winter		
Classes	MWF	11:00-11:50	GSB 553
Lab	R	2:00-4:50	AF 1-13
Credits	3 credits		

Lab Instructor: Jennifer Klutsch
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Office hours: By appointment only. To schedule an appointment, send email.

Course Description

The overall objective of this course is to introduce students to major forest insects and diseases and their impacts on forests. The course is largely insects and fungal diseases occurring in western Canada, but also looks at forest health issues of national importance. Students will learn the biology and ecology of forest insects and diseases while also evaluating forest management strategies including prevention and control. Basic entomology (classification, structure and function), biology and damage of main forest pest insects, and approaches to insect pest management will also be covered. The major classes of tree diseases (the big 4) will be covered, with emphasis on principles of plant pathology, disease cycles, disease symptoms/signs, ecological services, and disease management.

This course consists of two sections: In section 1, forest pathology will be covered, which will include lectures, lab practical, discussions, and written discussion summaries. In section 2, forest entomology will be covered, which will include lectures, lab practical, discussions, and written discussion summaries. Students will also prepare a term paper. Final exam will be comprehensive (both pathology and entomology).

Course Pre-Requisites and Co-Requisites

This course is suggested for students in either the Faculty of ALES or the Faculty of Science with an interest in Ecology, Conservation Biology, Forestry or Sustainable Ecosystem Management. Prerequisites: Third or fourth year standing and BIOL 208. The course is open to all types of graduate students. Students are responsible for ensuring they have the necessary pre-requisites and co-requisites. Students may be dropped before or after the course drop date if pre-requisites and co-requisites are not met. If the instructor agrees to waive a pre-requisite or co-requisite, students must fill out a form in the office of Student Services and get a signature from the instructor.

Course Format

The course will consist of in-class lectures, discussions, and lab practical.

Student Learning Outcomes and Competencies

Upon successful completion of this course students will be able to do the following:

- Understand classification, biology, natural history, and diversity of insects and diseases affecting forest ecosystems;
- Ability to identify insects and diseases common to forests and recognize their damage,
- Develop knowledge of the biology and ecology of major forest insects and diseases,
- Ability to link spatial and temporal characteristics of multiple biotic agents in decline of forests in Canada,
- Practice at critically evaluating journal articles in the field of forest health,
- Capable of addressing management practices for prevention and control.

References and Readings

Instructor recommends: "A Field Guide to Forest Insects and Diseases of the Prairie Provinces" by Hiratsuka, Langor, and Crane. This book is not a required text but is a useful field guide for identification of forest insects and diseases and is a great resource to supplement lectures. The following book is of the same type as the field guide above but more complete and may be useful for forest entomology: Ives, W. G. H. & H. R. Wong. 1988. "Tree and Shrub Insects of the Prairie Provinces" Canadian Forest Service, Northwest Region (<https://tidcf.nrcan.gc.ca/en/>).

Useful link for terminology and disease examples: <http://www.forestpathology.org/>

Required Text and Instructional Material

All lecture notes will be available on the course Moodle website on eClass (<https://eclass.srv.ualberta.ca>). The links for the discussion papers will be posted on e-Class. Example questions for final exam will be also posted before the final exam on e-Class.

Marking and Grading

Activity	Percentage
Participation & Attendance	10
Group Discussions	10
Discussion Summaries	20
Lab Practical Reports	15
Term Paper	15
Final Exam	30

Due Dates

It is the student's responsibility to ensure that the assignment is completed efficiently, accurately, and on time. The assignments are to be submitted at their respective due dates mentioned below. There is a penalty for all late assignments of 10% for every 24 hours (or part thereof) that it is late (e.g., a paper received 10 days late would receive a zero). Extensions will only be made with prior notice – please talk to the instructor if there are problems.

Participation & attendance (10% of the course)

Presence & participation at each lecture (including discussion) and lab practical is not mandatory to pass the course; however 10% of the final mark is allowed for course attendance and participation. Presence in each course and participation will be assessed. Goal is not to have every student participate in the same way or at the same rate, however if only a few students participate by volunteering answers, asking questions, or contributing to discussions, class sessions become to some extent a lost opportunity to assess and promote learning. Students should consider this class as an environment in which all participants have an equal opportunity to learn and in which the class explores issues and ideas in depth, from a variety of viewpoints. It is important to understand that high participation marks are not awarded simply for talking a lot, but instead for making high quality comments/responses throughout the term. I will assign each student in one of the following three participation & attendance categories: **(0): Not attended, (1) attended, but not contributed, (2) attended and contributed.** Students will be informed at the end of each month throughout the semester.

Group discussions of the primary literature (10% of the course)

There will be 11 discussion sessions throughout the semester (6 in pathology and 5 in entomology). These discussions are essential for placing certain ideas into a broader context and will help clarify difficult concepts. Discussion papers are chosen by the instructor and links to these articles are posted on e-Class. A group of 3-4 students (depending on the size of class) are assigned to lead a discussion paper and names of students corresponding to each paper will be posted on e-Class. Students are free to change their groups after discussing among themselves, but should notify the instructor as soon as possible. Each group will be responsible for preparing questions or issues prior to the meeting in order to stimulate discussion. A summary of the paper along with questions and issues to be discussed should be submitted electronically to the instructor at least one day in advance of the discussion (maximum 2 pages). Each group should make suggestions as to group behaviour, such as not to digress from topic, keep the discussion on track, and encourage all members to participate. Please note that students in each group will be evaluated independently based on their contributions during the discussion

sessions. **Notes should be treated as reference and reading from notes are not allowed.** A student who is supposed to lead a discussion is absent without valid reason will receive a mark of "0" on the discussion.

Discussion summaries (20% of the course)

All students are expected to write 4 discussion summaries (discussions other than what you present). Each student should review the content of the discussion topic, identify the major themes, and links to other relevant material covered in the course to that point (including lectures and discussions). Discussion papers will allow students to show what they learn and improve their writing skills. Furthermore, it allows them to pursue a particular topic at more depth. These summaries should be a maximum of one page each (single-spaced). Writing style as well as content will be assessed. All TWO pathology discussion summaries (Discussions 1-5) should be submitted to the instructor electronically before or on March 3 and all TWO entomology discussion summaries (Discussions 6-11) before or on April 12. Each summary will be worth 5 % of your final grade. Please note that there is no reason to wait until the last moment to do these summaries. The paper must be typed with font size no smaller than Times-Roman 12 and page margins > 2.0 cm.

Laboratory reports (15% of the course)

Students are required to submit seven lab reports (4 pathology, 3 entomology) on major forest diseases and insects. Lab Practical 2-5 and 8-10 will primarily focus on major forest diseases and insects respectively. In each report, details should be provided on how you can identify the pest and their associated damage. Each report should not be longer than one page. Lab reports will be written in a scientific manner and submitted electronically to the lab instructor. All pathology reports should be submitted to the lab instructor electronically before or on March 3 and all entomology reports should be submitted before or on March 31.

Term paper (15% of the course)

Each student will submit a term paper. The primary purpose of this paper is to facilitate student learning on major causes of tree damage occurring in Canadian forests. It will also allow students to pursue a topic of personal choice at some depth. Students are expected to select five major insect species and five major fungal diseases affecting forest trees. A list of major insect and disease pests is provided and students will select these 10 organisms from this list. Choose the 10 species that will most benefit you as you search the literature. The length of the paper should be a maximum of 20 pages, including images, figures, and references (2 page per organism, single-spaced). The paper must be typed or printed in single-spaced text with font size no smaller than Times-Roman 12 and page margins > 2.0 cm. A student who cannot complete a term assignment due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for extension of time to complete an assignment. All students must provide **the list of organisms for the term paper by January 20, rough draft by February 10, and final submission by April 12.** Electronic submissions are encouraged. Acceptable term papers must take advantage of primary literature sources, including but not restricted to websites. This material should be cited in the body of your text and formally referenced at the end of your document following the conventions adopted by the Canadian Journal of Forest Research: (<http://www.nrcresearchpress.com/page/cjfr/authors#9d>).

For insects, the following headings should be provided in the term paper: (a) basic life cycle of the species (or group of species), (b) its geographical distribution and host(s), (c) major symptoms & signs associated with the damage, (d) damage it causes, (e) under what conditions (biotic, abiotic, anthropogenic) it may cause damage, and (f) possible recommendations on control/management methods.

For diseases, the following headings should be provided in the term paper: (a) basic disease cycle of the organisms (or group of organisms), (b) its geographical distribution and host(s), (c) major symptoms & signs associated with the disease, (d) a causal agent (or a group of agents), (e) damage it causes, (f) under what conditions (biotic, abiotic, anthropogenic) it may cause damage, and (g) possible recommendations on control/management methods.

The rough draft helps you to put together all your ideas on a research paper and then flesh them out. It should not be longer than 1-2 pages. I summarized the following instructions on how to write a rough draft.

- Decide which organism you want to investigate and then do some brief research on the topic of organisms that is long enough and in depth enough so as to become familiar with their biology and ecology. Consider which references you will cite in your final draft to support your topic. As you do research on your organism,

some ideas might pop up in your mind; note them down on a piece of paper immediately. This process is also known as brainstorming,

- Identify relevant information related to your organisms. You do not need to be concerned with the overall flow of the paper just yet. The length of each piece of information should be a single paragraph or group of paragraphs in the final submission. Although you should consider writing complete sentences in the rough draft, you can use fragmented sentences (i.e., bullet format),
- Organize your ideas (grouping together) based on their relevance when you are preparing your final paper,
- When you list the similar ideas in a group, the structure of your paper will begin to emerge. At this juncture you will find that you might want to add more detail or delete what you think is superfluous or repetitive,
- Final step is to draw up an outline of your paper. This outline will help you to direct your research that you may be required to do before you actually get down to writing your essay.

Paper Evaluation Criteria

Title page: Include your name and student number in the title page (5 pts)

Style, grammar and presentation (25 pts)

- Is the author writing with clarity, economy and precision?
- Is proper grammar used?
- Are references properly cited?

Body (70 pts). For each organism, please include the followings headings in the body:

- a. basic life cycle (or disease cycle),
- b. geographical distribution and host(s),
- c. major symptoms & signs associated with the damage,
- d. causal agent (or a group of agents) (only for disease),
- e. damage it causes,
- f. under what conditions (biotic, abiotic, anthropogenic) it may cause damage,
- g. possible recommendations on control/management methods.

Final examination (30% of the course)

Everything discussed in class (lectures, lab practical, and discussions) since the start of the course until April 12th will be subject to evaluation. **The final exam will take place at 9:00 am on April 21 (Friday)**. The examination will consist of short (30%) and long (70%) answer questions. Students will receive sample questions prior to exam. A student who cannot write the final examination due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for a deferred final examination. Instructor can neither give permission to a student to miss the final exam nor grant a request for a deferred final exam (Please see '[Missed final examination](#)' section for details).

Final grades

Letter grades will be determined strictly from final percentage marks according to the following contract.

% Range	Letter Grade	% Range	Letter Grade
>=95%	A+	75 – 78.4	C+
90 – 94.9	A	66 – 74.9	C
88.5 – 89.9	A-	62.5 – 65.9	C-
86 – 88.4	B+	58 – 62.4	D+
81 – 85.9	B	50 – 57.9	D
78.5 – 80.9	B-	<50	F

Questions about marking. For reconsideration of marks (except for errors in counts or calculations, which should be dealt with immediately before leaving the classroom on the day that papers are returned), students must submit the paper for re-grading within 4 days of its return, together with a written statement explaining why the mark should be adjusted. The mark may be adjusted upward or downward as a result of re-grading. The instructor will provide a written response.

Academic Integrity

The UofA 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](#) and avoid any behaviour 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.” (GFC 2003)

Code of Student Behaviour

“All students at the University of Alberta are subject to the Code of Student Behaviour, as outlined at:

<http://www.governance.ualberta.ca/en/CodesofConductandResidenceCommunityStandards/CodeofStudentBehaviour.aspx>.

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.

- 30.3.2(1) 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.
- 30.3.2(2) c. No Student shall represent another’s substantial editorial or compositional assistance on an assignment as the Student’s own work.”

Plagiarism & Cheating

Plagiarism, cheating, misrepresentation of facts and participation in an offence are viewed as serious academic offences by the University and by the General Faculty Council Campus Law Review Committee (GFC CLRC). Sanctions for such offences range from a reprimand to suspension or expulsion from the University. GFC CLRC believes that students should be told, at the beginning of each term, how the University defines plagiarism and cheating, what constitutes misrepresentation of facts and participation in an offence and what the sanctions are.

The "Don't Cheatsheet" is available on the University Governance website at: <http://www.governance.ualberta.ca/> From the drop down menu click on Student Appeals and navigate to the Don't Cheatsheet. Writing help is available through the: Student Success Centre: <http://www.studentsuccess.ualberta.ca/Centre> for Writers: <http://c4w.ualberta.ca/>

Assignment must be completed and written by you and you alone. To be a plagiarist you need not copy all of the words of another author; rearrangement, dropping out words, or altering punctuation still count as plagiarism. 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, use of previous class notes, reclamation plans of former students and interviews or discussions with others.

Professionalism and classroom rules of engagement

Missed final examination: A student who cannot write the final examination due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for a deferred final examination. Instructors can neither give permission to a student to miss the final exam nor grant a request for a deferred final exam. Acceptable reasons for an excused absence may include illness or bereavement, and unacceptable reasons include weddings, travel arrangements or being on vacation. Such an application must be made to the student’s Faculty (e.g. ALES students go to 231 GSB to obtain an exam deferral) office within 48 hrs of the missed examination and must be supported by a Statutory Declaration or other appropriate documentation (Calendar section 23.5.6). Deferral of term work or exams is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of facts to gain a deferral is a serious breach of the Code of Student Behaviour. 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.

Disruptive behaviour in class: Talking and other disruptive behaviour during lecture presentations will not be tolerated. The rule in RENR447/747 is that disruptive students are given one warning and, upon a second offense, will be asked to leave the classroom. Disruptive behaviour prevents other students from making the most of their classroom opportunities. Please be courteous to your fellow students. We will expect you to contribute to class discussions from time to time.

Cell/Smart phones policy: Phones are to be turned off during lectures, lab practical, discussions & exams.

Student responsibilities: Wireless-capable devices are not permitted for exams. Individual work is expected on written papers. The collaboration with your peers on discussion and term papers is not

discouraged, but your individual responses in your own words must be individually typed and turned in. Submitting other people's work is considered plagiarism and is strictly prohibited.

Students with Disabilities: Students who require accommodation in this course due to a disability are advised to discuss their needs with Specialized Support and Disability Services (2-800 SUB).

Academic Support Centre: Students who require additional help in developing strategies for better time management, study skills or examination skills should contact the Student Success Centre at <http://www.studentsuccess.ualberta.ca/>. Students who need help with writing can contact Centre for Writers at <http://www.c4w.arts.ualberta.ca/>.

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

Assignment	Due Date	Value
4 discussion summaries	Two pathology discussion summaries should be submitted by March 3. Two entomology discussion summaries should be submitted by April 12	20% (4 x 5%)
Term paper	Topic submission due January 20; rough draft due February 10; final submission due April 12	15%
Group discussions (1-11)	Between Jan 20 and April 7	10% (2 x 5%)
Laboratory reports (1-7)	All four pathology lab reports should be submitted by March 3. All three entomology lab reports should be submitted by March 31.	15% (7 x 2.15%)
Lecture participation & attendance	Throughout course	10%
Final Exam	April 21 (Friday): 9:00 -11:50 am	30%

Tentative Schedule

Date	Lecture #	Topic	Activity
Jan 9	1	Introduction	Go over syllabus & introduction to forest health
PATHOLOGY			
Jan 11	2	Introduction to plant pathogens	Lecture <i>Posting links for discussion papers</i>
Jan 12	3 LAB 1	Introduction to plant pathogens & classification of pathogen specimens	Lecture LAB
Jan 13	4	Fungi	Invited lecture by J Cale
Jan 16	5	Cont. - Fungi	Invited lecture by J Cale
Jan 18	6	Stem decays	Lecture
Jan 19	LAB 2	Fungi	LAB PRACTICAL 1 <i>Lab report # 1</i>
Jan 20	7	DISC 1	DISCUSSION <i>Declaration list of organisms for term paper. Winter registration deadline.</i>
Jan 23	8	Cont. - Stem decays	Lecture
Jan 25	9	Root diseases	Lecture
Jan 26	LAB 3	Stem decays	LAB PRACTICAL 2 <i>Lab report # 2</i>
Jan 27	10	DISC 2	DISCUSSION
Jan 30	11	Cont. - Root diseases	Lecture
Feb 1	12	Rusts	Invited lecture by J Cale
Feb 2	LAB 4	LABS 4 AND 5 ARE COMBINED. NO LABS	
Feb 3	13	DISC 3	DISCUSSION
Feb 6	14	Cont. - Rusts	Lecture by J Klutsch
Feb 8	15	Whitepine blister rust	Invited lecture by Tod Ramsfield
Feb 9	16 LABS 4 & 5	Lec: Mistletoes Lab: Root diseases; rusts, wilts, cankers, foliar diseases & mistletoes	Invited Lecture by J Klutsch & LAB PRACTICALS 3 & 4 <i>Lab reports # 3 & 4</i>
Feb 10	17	DISC 4	DISCUSSION <i>Rough draft due for term paper</i>
Feb 13	18	Wilts, cankers, foliar diseases & mistletoes	Lecture
ENTOMOLOGY			
Feb 15	19	Insect classification and diversity	Lecture
Feb 16	20 LAB 6	Cont. - Insect classification and diversity, Introduction to insect morphology & major insect orders	LAB
Feb 17	21	DISC 5	DISCUSSION
Feb 20-24	No Lecture	Family Day Holiday/Winter Term Reading Week	
Feb 27	22	External structure	Lecture
Mar 1	23	Internal structure and function	Lecture
Mar 2	LAB 7	Prepare specimens for collection	LAB
Mar 3	24	DISC 6	DISCUSSION <i>Last day of submitting all discussion summaries and lab reports for Pathology</i>
Mar 6	25	Cont. - Internal structure and function	Lecture
Mar 8	26	Lepidoptera & budworms	Lecture
Mar 9	LAB 8	Lepidoptera & budworms	LAB PRACTICAL 5 <i>Lab report #5</i>
Mar 10	27	DISC 7	DISCUSSION
Mar 13	28	Sawflies	Lecture
Mar 15	29	Bark beetles and woodborers	Lecture
Mar 16	LABS 9 & 10	Sawflies and Beetles & Woodboring beetles	LAB PRACTICALS 6 & 7 <i>Lab reports #6 & 7</i>
Mar 17	30	DISC 8	DISCUSSION
Mar 20	31	Major insect pest problems in AB	Invited lecture by Caroline Whitehouse from AAF
Mar 22	32	Provincial Policy on Forest Health	Invited Lecture Mike Undershultz from AAF
Mar 23	LABS 9 AND 10 WERE COMBINED. NO LABS		
Mar 24	33	DISC 9	DISCUSSION
Mar 27	34	Seeds & Cone Insects	Lecture
Mar 29	35	Population dynamics	Lecture
Mar 30	36 LAB 11	Remote Sensing & GIS	Invited lecture by Ron Hall
Mar 31	37	DISC 10	DISCUSSION <i>Last day for withdrawal from Winter Term courses Last day of submitting lab reports for Entomology</i>
Apr 3	38	Tree defenses	Lecture
Apr 5	39	Integrated pest management	Lecture <i>Last day for withdrawal from Winter Term courses</i>
Apr 6	40 LAB 12	Cont. - Integrated pest management	Lecture
Apr 7	41	DISC 11	DISCUSSION
Apr 10	Review	Lecture notes	Exam prep
Apr 12	Review	Lecture notes	Exam prep. <i>Last day of Winter Term classes. Final term paper due. Last day of submitting discussion summaries</i>
April 21	Final Exam	9:00-11:50 AM	Final Exam