FOREST ECOSYSTEMS & MANAGEMENT
ERS 234
Course Outline: September 2018

"Sadly, its much easier to create a desert than a forest" – James Lovelock

COURSE DESCRIPTION

This course examines the fundamental concepts of forest ecology and the role of forests in terrestrial ecosystems. The course will be divided into three sections, and will integrate case studies to introduce the student to current research problems in the study of forest ecology.

Section 1: People & Forests evaluates the impact of humans and a growing population on forest ecosystems. The dependence of humans on forest resources and the development of forestry and forestry practices will be discussed.

Section 2: Forest Ecosystems (ecological Interactions) will discuss the concept of ecosystems and its

emergent properties, the transfer, storage and allocation of energy and nutrients (carbon, nitrogen, phosphorus etc.) and the effects of humans on these forest cycles. Interactions include the effects of solar radiation, temperature, water, wind, fire and soil on forest ecosystem productivity and diversity.

Section 3: Forest Management focuses on conventional and sustainable forest management practices, forest plantations, forest fragmentation, biodiversity and climate change.

Section 4: Forests & Society (social forestry) builds on Section 1, but with a focus on sustainable approaches to forest management. This course is available on D2L (Learn).

COURSE GOAL

To introduce the fundamental concepts of forest biology and ecology, and forest management; and to introduce the major factors that lead to the interaction between people, society and forests and the development of policies for forest conservation.
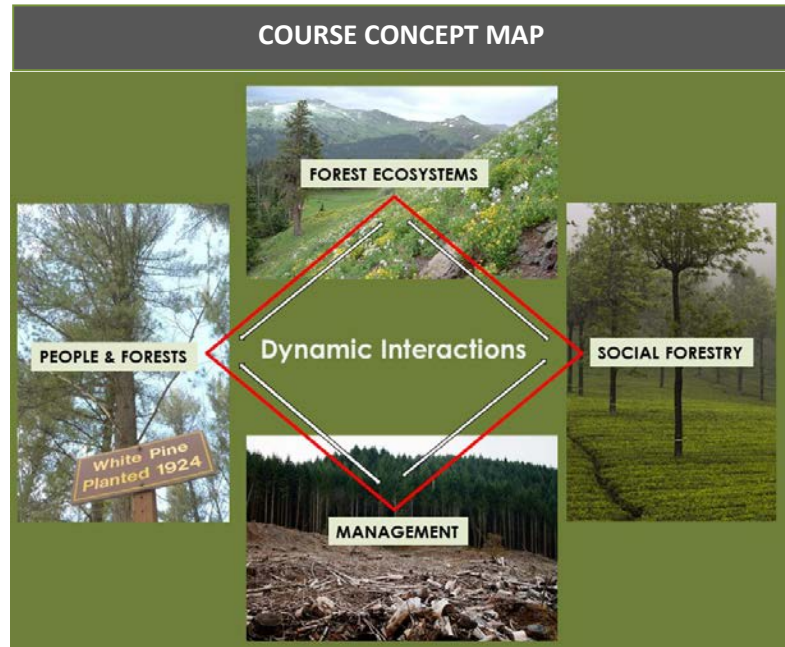
INTENDED LEARNING OUTCOMES

1. *Section 1: People and Forests*
   - Understand the fundamental issues to forest degradation that led to policy development in Canada and the USA to protect forest ecosystems

2. *Section 2: Forest Ecosystems*
   - Identify different forest biomes of the world and recognize different forest landscapes and watershed management approaches
   - Understand forest ecophysiology
   - Describe forest soils and their importance in forest ecosystem ecology

3. *Section 3: Forest Management*
   - Wildlife, fire, measuring & monitoring, silvicultural practice
   - Understand wildlife and forest ecosystem interactions
   - Understand the positive and negative roles of fire in forest ecosystems
   - Explain how to measure and monitor forest resources
   - Describe different forest management (silvicultural) techniques

4. *Section 4: Forests & Society (Social Forestry)*
   - Describe what is social forestry and current issues in social forestry

TECHNIQUES LEARNED

- Applied problem solving skills
- Critical thinking skills
- Writing skills
- Synthesizing new knowledge skills
- Communication skills
- Organizational skills

COURSE MEETING TIMES & LOCATION

Lecture Times	Location
Thursday	AL
11:30 am – 2:30 pm	Room 105

INSTRUCTIONAL TEAM

	PROFESSOR	TEACHING ASSISTANT
NAME	Prof. Dr. M. Oelbermann	Samuel Kroetch
CONTACT INFORMATION	Office: EV-2, room 2008 E-mail: moelbermann@uwaterloo.ca Phone: 519-888-4567 Ext. 37552	Via Learn
OFFICE HOURS	TBD	Please check with TA

MATERIALS
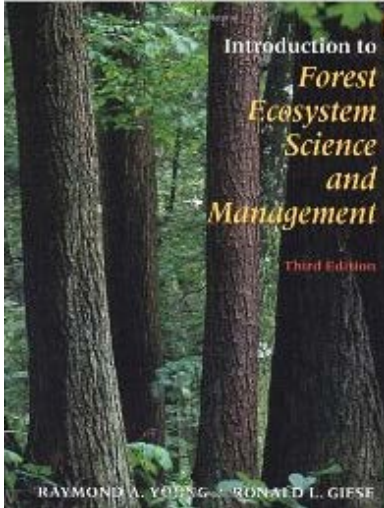
This textbook is available in the UW Bookstore:
Strongly Recommended
Raymond A. Young and Ronald L. Giese. Introduction to Forest Ecosystem Science and Management, 3rd Edition. (Copy on reserve at Dana Porter with a 3 hr loan).

Additional *(but not required for the course)* readings to supplement the textbook will be available on Learn. These readings will be relevant to the material discussed in class; help with the assignment and provide further insight for interested students.

COURSE ASSESSMENT

LEARNING OUTCOME	ASSESSMENT METHODS (FORMATIVE & SUMMATIVE)	% OF OVERALL GRADE	TEACHING & LEARNING METHODS
1. PEOPLE & FORESTS 2. FOREST ECOSSYTEMS	• **Class discussions** • **Midterm** ▪ Lectures 1 to 4 ▪ Held in class	0 30	• Interactive lectures • Case studies • Video presentation • Textbook readings • Course website • PowerPoint slides
3. FOREST MANAGEMENT 4. FORESTS & SOCIETY	• **Class discussions** • **Assignment** • Group effort • **Final Exam** • Lectures 1 to 11 • Not cumulative	0 30 40	• Interactive lectures • Case studies • Video presentation • Textbook readings • Course website • PowerPoint slides

SUMMARIZED SCHEDULE OF COURSE ACTIVITIES

Module #	Day of Lecture	Lecture #	Topic	Reading Material
PEOPLE & FORESTS	Sept 13, 2018	1	- Introduction - Forest ecosystem sustainability	Introduction Chapter 1
FOREST ECOSSYTEMS (ECOLOGICAL ITERACTIONS)	Sept 20,2018	2	- Forest biomes of the world - **DVD: Seasonal Forests**	Chapter 2
	Sept 27 2018	3	- Landscape ecology & watershed management	Chapter 7 Chapter 16
	Oct 4 2018	4	- Forest ecophysiology	Chapter 4
	Oct 8, 2018	--	**- Reading Break (no class this week)**	--
	Oct 18 2018	5	- Forest soils	Chapter 5
	Oct 25 2018	**-**	**Midterm (start at 8:30 am in class)** **Covers lecture 1, 2, 3 & 4**	
	Nov 01, 2018	6	- Forest ecosystem ecology - **DVD: Climbing Redwood Giants**	Chapter 6
FOREST MANAGEMENT	**Nov 8, 2018**	7	- Forest wildlife management **- Assignment due (submit via Learn)**	Chapter 14
	Nov 15, 2018	8	- Forest fires	Chapter 18
	Nov 22, 2018	9	- Forest Mensuration - Silvicultural Systems	Chapter 11 Chapter 13 Chapter 19
FORESTS & SOCIETY	Nov 29, 2018	10	- Social forestry - Final Exam: question & answers	Chapter 23

DETAILED SCHEDULE OF COURSE ACTIVITIES

MODULE I: PEOPLE & FORESTS

LECTURE 1
Introduction
- Introduction to ERS 234: Forest Ecosystems and Management
- Course outline
- Course expectations

Sustainability of Forest Ecosystems (Introduction & Chapter 1)
- Introduction to forest ecosystem science and management
- Forest policy development in the USA
- Forest policy development in Canada

MODULE II: FOREST ECOSYSTEMS (ECOLOGICAL INTERACTIONS)

LECTURE 2
Forest Biomes of the World (Chapter 2)
- Factors affecting vegetation distribution
- Forest biomes
- Canadian forest ecozones
- Global change and forests

LECTURE 3
Landscape Ecology and Watershed Management (Chapter 7 & 16)
- Introduction
- Landscape patterns and their generation
- Influence of landscape patterns on forest ecosystems
- The watershed concept
- The hydrological cycle
- Global distribution of terrestrial water
- Integrated watershed management

LECTURE 4
Forest Ecophysiology (Chapter 4)
- Tree structure and function
- Environmental stresses
- Global issues in forest ecophysiology

LECTURE 5
Forest Soils (Chapter 5)
- Concept of forest soil & properties of forest soils
- Nutrient distribution and cycling in forest ecosystems
- Forest soils and tree nutrition
- Soil survey and classification
- Forest soils and environmental quality

LECTURE 6
Forest Ecosystem Ecology (Chapter 6)
- Concepts in systems ecology
- Forest tree species distribution
- The carbon cycle and forest growth
- The nutrient cycle
- Forest succession
- Effects of timber harvesting on forest ecosystems

MODULE III: FOREST MANAGEMENT

LECTURE 7
Forest Wildlife Management (Chapter 14)
- Ecological interactions

- Wildlife as components of forest ecosystems
- Wildlife effects on forests
- Effects of forest management on wildlife
- Wildlife considerations in ecosystem management

LECTURE 8
Forest Fires (Chapter 18)
- Natural fire regimes
- Human influence on forest fire
- Fire behavior
- Fire prevention, control & prescribed burning
- Environmental Impacts of Forest Fires

LECTURE 9
Measuring and Monitoring Forest Resources (Chapter 11)
- Measurement of primary forest products
- Survey and mapping
- Measuring forest resources

Silviculture and Ecosystem Management (Chapters 13 & 19)
- Evolution of silvicultural practices
- Natural patterns of disturbance
- Growth and development of forest stands
- Treatments to improve existing stands
- Regeneration of forest stands
- Silvicultural systems
- Silvicultural practices and ecosystem integrity
- Ecological Forest Management (EFM)
- Timber harvesting techniques (Chapter 19)

MODULE IV: FORESTS & SOCIETY (SOCIAL FORESTR)

LECTURE 10
Social Forestry (Chapter 23)
- Global experience in social forestry
- Issues and challenges in social forestry
- Final exam: questions and answers

DESCRIPTION OF DVDs

Seasonal Forests (BBC's Planet Earth)
Trees are earth's largest organisms and are also one of the planet's oldest inhabitants. Seasonal forests (unlike tropical rain-forest) the largest land habitats. A third of all trees grow in the endless taiga of the Arctic north. Northern America has forests that include California's sequoia's, the earth's largest trees.

There and elsewhere, their vast production of photosynthesis and shade presides over a seasonal cycle of life and involves countless plant and animal species. *Written by [KGF Vissers.](#)*

Climbing Redwood Giants (National Geographic)

They are giants—stretching more than 300 feet above the ground, with hidden gardens and mysterious predators thriving within their canopy. National Geographic reveals the unexplored environment of redwoods using high-tech aerial laser surveys and breathtaking imagery. Obsessive redwood climber Steve Sillett of Humboldt State University investigates their monster crowns, tallying biological material and discovering new record-breaking trees, while escaping falling branches and crashing trees in the process. Down below, National Geographic Explorer-in-Residence Mike Fay charts the redwood range. It is an epic yearlong exploration to size up the past and future of this primeval tree threatened in 21st century California.

STUDENT CONDUCT AND APPROPRIATE BEHAVIOUR
Pages 6 to 8 in this Course Syllabus

I encourage students to study together, however each student is expected to individually fulfill the requirements of the midterm and the final exam. The assignment is a group effort Please refer to the **Assignment Outline** on Learn for further details. It is the responsibility of each student to be aware of what constitutes responsible behaviour in class, what constitutes plagiarism, and your rights and responsibilities with respect to these issues.

STUDENT & FACULTY RESOURCES

The Faculty of Environment has an entire webpage https://uwaterloo.ca/environment/undergraduate-teaching-resources) dedicated to Student Resources including issues surrounding the following topics. Further detailed topics are outlined below:
- Teaching Resources
- Important Dates
- The Course Outline
- Student Privacy
- Academic Integrity
- Group Work
- Scheduling and Administration of Tests and Exams
- International Exchange Students
- Accommodation and Accessibility

ACCOMMODATION & ACCESSIBILITY

Please note that if you are registered with AccessAbility Services https://uwaterloo.ca/accessability-services/about, please write your midterm and final exam in accessibility if this is one of the requirements you requested. The instructor has to send a certain number of midterms and final exams to AccessAbility Services several days before the midterm/final exam is written. If you write in the class-room you must let the instructor know about a week ahead of time to ensure that sufficient number of midterms/exams are available.

AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

MENTAL HEALTH

The University of Waterloo, the Faculty of Environment and our Departments/Schools consider students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and / or emotional. **Please note that help is available**. Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services http://www.uwaterloo.ca/counselling-services is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and

much more. if you think you are experiencing mental health issues, please see this website for guidance and support: https://uwaterloo.ca/environment/get-mental-health-support-when-you-need-it Also see last page of syllabus.

INTELLECTUAL PROPERTY:
Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:
- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights. Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

RELIGIOUS OBSERVANCES: Students need to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

GRIEVANCE: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. See Policy 70 - Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please contact your Undergraduate Advisor for details.

APPEALS: A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 – (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals)
www.adm.uwaterloo.ca/infosec/Policies/policy72.htm

COMMUNICATIONS WITH INSTRUCTOR AND TEACHING ASSISTANTS: All communication with students must be through either the student's University of Waterloo email account or via Learn. If a student emails the instructor or TA from a personal account they will be requested to resend the email using their personal University of Waterloo email account.

TURNITIN: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, and are subject to the USA PATRIOT ACT, 2001; therefore, students must be given an alternative (e.g., scaffolded assignment or annotated bibliography) if they are concerned about their privacy and/or security. Students will be due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin® in this course.

RECORDING LECTURES:
Use of recording devices during lectures is only allowed with explicit permission of the instructor of the course. If allowed, video recordings may only include images of the instructor and not fellow classmates. Posting of videos or links to the video to any website, including but not limited to social media sites such as: facebook, twitter, etc., is strictly prohibited.

CO-OP INTERVIEWS AND CLASS ATTENDANCE: Co-op students are encouraged to try and choose interview time slots that result in the least amount of disruption to class schedules. When this is challenging, or not possible, a student may miss a portion of a class meeting for an interview. Instructors are asked for leniency in these situations; but, a co-op interview does not relieve the student of any requirements associated with that class meeting.

When a co-op interview conflicts with an in-class evaluation mechanism (e.g., test, quiz, presentation, critique), class attendance takes precedence and the onus is on the student to reschedule the interview. CECA provides an interview conflict procedure to manage these situations. Students will be required to provide copies of their interview schedules (they may be printed from WaterlooWorks) should there be a need to verify class absence due to co-op interviews.

Life Lines

Improving your quality of life, one step at a time

Issue #1

Talking About Mental Health

The burden of mental illness and addiction is 1.5 times that of all cancers, and more than seven times the cost of all infectious diseases.[1] No matter what our age, cultural background or income bracket, at least one in five of us will experience a mental illness in our lifetime. If mental illness is so prevalent, then why do so many people suffer in silence? It's time to start talking.

According to the World Health Organization, health is "a state of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity." Yet so many people simply define good health as being physically well. Our mental health is equally important but often does not get the attention it should — and that's costing us all. Mental health problems cost Canada at least $50 billion a year, not including the costs to the criminal justice system or the child welfare system.[2]

What is mental illness?

Our psychological health has a profound effect on how we feel, perceive, think, communicate, and understand the world around us. When we are mentally unwell, we experience alterations in thinking, mood or behaviour, and that causes distress and impairs how we function in life. There are many types of mental illness, but the most common include:

- Anxiety disorders
- Mood disorders
- Eating disorders
- Schizophrenia
- Personality disorders
- Substance use disorders (commonly called addictions)

Warning Signs of Mental Illness

Each mental illness has its own characteristic symptoms, however, there are some general warning signs that might alert you that someone may need professional help. Some of these include:

- marked personality change
- extreme mood swings
- excessive anxieties
- prolonged depression
- inability to cope with minor problems and daily activities
- loss of interest in hobbies and social activities
- strange or grandiose ideas, delusions, or hallucinations
- problems thinking clearly
- significant changes in eating or sleeping patterns
- thinking or talking about suicide
- abuse of alcohol or drugs
- excessive anger, hostility, or violent behaviour

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Health | Santé