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Faculty of Science Course Syllabus
Department of Biology

Agroforestry (BIOL 3634)
Summer 2016

Instructor: Rajesh Rajaselvam Email: Rajesh.Rajaselvam@Dal.Ca Office: LSC 3082

Lectures: Mon-Sat: 09:35 – 16:55 hrs (LSC/C244)

Labs: April 27th, May 3rd and May 4th, 2016: 09:35- 16:00 hrs

(LSC/ Lab 2097)

Field study: April 26th, April 29-30th, May 02nd, 2016

(Point Pleasant Park, Halifax, LaHave Forests, near Lunenburg, and Glenmore farm, Middle Musquodoboit respectively)

Course Description

Agroforestry is a land-use system in which trees or shrubs are grown in association with agricultural crops and/or livestock. As practiced in the tropics, agroforestry generates numerous ecological, environmental and economic benefits.

This hands-on, field-intensive course provides a foundation for understanding this traditional practice and its applications in North America..

Course Prerequisites

Introduction to Ecology (BIOL 2060.03) from Dalhousie's Biology Dept or BIOL 3001 or AGRI 1000 from Dalhousie's Faculty of Agriculture or an equivalent class or permission of instructor. An additional class on the biology, ecology, diversity or physiology of plants is recommended.

Course Textbook

'Agroforestry' custom made (from various resources in North America and around the world). Students get these materials at no cost.

Learning Objectives

- To understand the need of agroforestry and the biophysical processes involved
- To study the role of agroforestry systems in soil fertility and nutrient cycling
- To examine tree-crops-soil interactions (for light, water and nutrients)
- To relate agroforestry in conservation strategies
- To get field experience in agroforestry and evaluate a few multipurpose tree species.

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Course Assessment

Assignment, Exam, or Presentation	Marks %	Date
Oral Presentation	10	May 06
Brief Report *(Tree-plant interaction)*	10	May 10
Special Report *(An AF system/MPTS)*	10	May 10
Field Report *(LaHave Forest)*	25	May 10
Quiz	10	May 05
Written Exam	35	May 09
Total	***100***	

Field visit 1: Half a day field observation and data collection at Point Pleasant Park on "Tree-Plant Interactions"
a. Abiotic factors (light intensity, Soil temperature, soil moisture content, pH, Soil nutrients)
b. Biotic factors (shoot/root growth patterns, diversity)
(A two page brief report, based on the questions given should be submitted on the last day of the class)
**Soil and data analysis will be done at the university lab*

Field visit 2: 2-day field research at "Lahave forests" near Lunenburg (including an overnight stay) to study:
a. Modern Agroforestry practices towards sustainability (Forest farming, Wind-break, Api-silviculture)
b. Different Multipurpose Tree Species and their contribution to soil fertility
c. Haskap berries in agroforestry systems
After collecting and analyzing the data, a five page field report should be submitted for evaluation. Format: Abstract, Introduction, Research objective, Method/materials, Results, Conclusions and Discussions
(A notebook will be necessary for use in the field and field station to include notes on procedures, hypotheses, and findings. This will be an invaluable resource in writing field reports)
**Soil and data analysis will be done at the university lab*

Field visit 3: A day trip to "Glenmore Farms" in Truro to experience some hands on activities in Multi-Purpose Tree research followed by a lecture by an expert forest farm practices.
(No written report is expected, the practical knowledge is necessary for the quiz)

Monograph on a Multipurpose Tree Species

A two page monograph (description, distribution, uses and special purpose in agroforestry) on a Multipurpose Tree Species (MPTS) should be submitted at the end of the course.

Computer use and communications

Computer use will be necessary for this field oriented class including oral presentations and field reports. We will also rely on email/messages for communication among students and between students and teaching staff (instructor and teaching assistant) via BBL. Field reports and presentations will require the use of Excel (spreadsheets/graphs), Word, Power-point and a statistical software.

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Oral Presentation

Students are expected to do a 10 minute power point presentation on a selected Multipurpose Tree Species before submitting their 1-2 page report.

**Evaluation rubric*	MARKS				
Evaluate the presentation by checking the grade the student achieved in the following categories:					
The presentation was well organized.	5	4	3	2	1
The topic was covered in a clear and understandable fashion.	5	4	3	2	1
The presentation was very well timed.	5	4	3	2	1
Presentation resources were incorporated and used effectively.	5	4	3	2	1
The student/group responded effectively to questions posed by the audience.	5	4	3	2	1
Main points were effectively summarized at the end of the presentation.	5	4	3	2	1
Overall grade: Total (out of 30) is reduced to out of 10					

Grading Scale

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (<50)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies

All Lectures, field visits and Lab analysis are mandatory
Meeting deadlines is mandatory. No late submission without valid reason is accepted for marking.
Brightspace (course web-tool) will be used for regular updates and announcements.

Course Content

Tentative schedule

Day	**Activity**
Day 1 (April 25, 2016) ***Monday***	Morning session 1. Introduction to Agroforestry 2. Practical Applications of Agroforestry Afternoon session 3. Soil conservation and Agroforestry
Day 2 (April 26, 2016) ***Tuesday***	Morning session 4. Agroforestry services

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	5. Successful Agroforestry approaches in Canada Afternoon session; Field Trip to Point Pleasant Park Tree-Plant Interaction/Data collection ** This field session ends at 6:00pm*
Day 3 (April 27, 2016) ***Wednesday***	Morning session 6. Multipurpose Tree Species in Agroforestry Afternoon session Soil analysis I at the Dalhousie laboratory (using test kit) *Point pleasant park soil samples will be analysed using test kit *Statistical analysis
Day 4 (April 28, 2016) ***Thursday***	Morning session 7. Agroforestry and the future *Brief Introduction on Field report and presentation* Afternoon session *Introduction to field work at Lahave forests and preparations*
Day 5 (April 29, 2016) ***Friday*** (Lahave Forests)	At 8:30 am: Departure from Dalhousie 10:30 am: Field-work/research 12:30 pm- 1:00 pm Lunch/Snack 1:00 pm- 4:00 pm Fieldwork/research 6:00 pm- 7:00 pm Dinner
Day 6 (April 30, 2015) ***Saturday*** (Lahave Forests)	8:00 am- 8:30 am Breakfast 8:30 am- 11:30 am Fieldwork/research 12:05 pm: Departure from Lahave Forests (can go to Lunenburg and have lunch) 4:30 pm: Back to Dalhousie, Halifax
Day 7 (May 02, 2016) ***Monday*** (Glenmore farm, Middle Musquodoboit)	At 9:30 am: Departure from Dalhousie 10:30 am- 12:00 noon Seminar 12:00 pm- 12:30 pm Lunch 12:30 pm- 3:00pm Field work At 3:30 pm: Departure from Glenmore farm
Day 8 (May 03, 2016) ***Tuesday***	Morning session : PPT/Oral presentation introduction, Field Report Introduction Afternoon session Soil analysis II at the Dalhousie laboratory (using test kit) *LaHave forest farm soil samples will be analysed using test-kit *Statistical analysis
Day 9 (May 04, 2016) ***Wednesday***	Field reports and Statistical Analysis (9:35 am- 11:35 pm) PPT preparation (12:05 pm to 2:35 pm)
Day 10 (May 05, 2016) ***Thursday***	*Quiz (9:35 am- 11:35 pm) PPT preparation (12:05 pm to 2:35 pm)
Day 11 (May 06, 2016) ***Friday***	Students' Oral Presentations (9:35 am- 15:35 pm)
Day12 (May 07 & 08, 2016) ***Saturday***	Study leave for exam and off days for written report preparation

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	(for students to prepare all three reports/ on 07th, they will be allowed to come to the class room and discuss with their peers to complete the reports/teaching staff will be there for help)
Day 13 (May 09, 2016) ***Monday***	Morning: Study leave Afternoon: Written Exam: 2 hrs and 30 min (1:05 pm- 3:35 pm)
Day 14 (May 10, 2016) ***Thursday***	Deadline to submit; (9:35 am to 11:35 am) a. Brief report on "Tree-plant interaction" (Point pleasant park) b. Field report (LaHave forest) c. Special report on Multi-Purpose Tree Species

Moring session and after-noon sessions conducted during 0935-1225 and 1305-1655 hrs respectively

Items needed for field and research experiments

1. pH meter
2. Photo meter (to measure the light intensity)
3. Soil tools (augur or shovel) and nutrient testing kits
4. Tape measure
5. Hand-lenses
6. Paper/Polythene bags (small and medium sizes)
7. Marker pens
8. Tags or labels
9. Field notebook
10. Ropes
11. Outdoor thermometer
12. Binoculars
13. Field guide (any flora of NS identification book)
14. Digital camera

Items 1 - 11 Provided at the field station

Items 12- 14 Students can bring their own Items; Four different guides with colour pictures will be uploaded on the course website

During field research: Items needed/recommended for students

1. Clipboard & notebook paper
2. Pens & pencils
3. Daypack or shoulder bag to carry your things
4. Sneakers/ hiking boots
5. Windproof jacket/rain jacket and pants
6. Sunscreen
7. Insect repellent
8. Sunglass
9. Hat and gloves

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At the field station: Required personal items

1. Sleeping bag/blankets
2. Water bottle
3. Alarm clock
4. Flashlight with extra batteries
5. Appropriate clothing
6. Boots/Rain-boots
7. Personal toiletries (tooth brush, tooth paste, soap, shampoo and a bath towel)
8. Prescription drugs
9. Basic snack food
10. Cash (for emergency purchases)
11. Portable audio device (optional)
12. Laptop (optional, your responsibility)

ACCOMMODATION POLICY FOR STUDENTS

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic under the Nova Scotia Human Rights Act. Students with disabilities are encouraged to register as quickly as possible at the Student Accessibility Services if they wish to receive academic accommodations. To do so please phone 494-2836, e-mail access@dal.ca, drop in at the Mark A. Hill Accessibility Centre, or visit their website www.studentaccessibility.dal.ca.

ACADEMIC INTEGRITY

Academic integrity, with its embodied values, is seen as a foundation of Dalhousie University. Our Academic Integrity website (http://academicintegrity.dal.ca) is an exceptional resource that provides students and faculty access to current university policies. It highlights issues of concern to discourage violations of acceptable conduct, and provides many links to help students succeed honestly.

It is the responsibility of ALL students to be familiar with behaviours and practices associated with academic integrity – ***IGNORANCE IS NO EXCUSE FOR PLAGIARISM, CHEATING OR ANY OTHER ACADEMIC OFFENCE***.

At Dalhousie University, plagiarism is defined as "the submission or presentation of the work of another as if it were one's own." (Dalhousie Undergraduate Academic Calendar)

Instructors are REQUIRED to forward any suspected cases of plagiarism to the Academic Integrity Officer for their Faculty. If you are accused of plagiarism you will be informed of the allegation by the Faculty of Science Academic Integrity Officer, and a date will be set for a meeting. You may contact Dalhousie Student Advocacy Services to assist you in preparing a defense. Until the case is resolved, your final

letter grade will be an "INC". If it is determined that you have committed an offence you will be penalized. Penalties are determined on a case by case basis. For more details see the Academic Integrity Website and Academic Regulations (http://academicintegrity.dal.ca).

"***Plagiarism is considered a serious academic offence that may lead to the assignment of a failing grade, suspension or expulsion from the University***." (Dalhousie Undergraduate Academic Calendar)

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STUDENT CODE OF CONDUCT

Dalhousie University has a student code of conduct, and it is expected that students will adhere to the code during their participation in lectures and other activities associated with this course.

In general:

"The University treats students as adults free to organize their own personal lives, behaviour and associations subject only to the law, and to University regulations that are necessary to protect

- the integrity and proper functioning of the academic and non – academic programs and activities of the University or its faculties, schools or departments;
- the peaceful and safe enjoyment of University facilities by other members of the University and the public;
- the freedom of members of the University to participate reasonably in the programs of the University and in activities on the University's premises;
- the property of the University or its members."

The full text of the code can be found here:
http://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Questions?

Visit the course website/ 'Brightspace' or email Rajesh.

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