

**ENVS\*3230 Agroforestry Systems**

### Fall 2018

Section(s): C01

School of Environmental Sciences Credit Weight: 0.50

Version 1.00 - September 04, 2018

# Course Details

## Calendar Description

The planned and systematic integration of trees into the agricultural landscape can potentially result in sustainable environmental, ecological, economic and social benefits. The key aspects of deriving these benefits, associated science and management considerations, application potentials at the landscape level and adoption challenges will be discussed. Common temperate and tropical agroforestry systems (e.g. intercropping of trees and crops) will be discussed. Emphasis will be given to successful research and development case studies.

#### Pre-Requisite(s): Equate(s):

* 1. **Course Description**

5.00 credits, (1 of BIOL\*1040, BIOL\*1050, BIOL\*1070) ENVB\*3230

The planned and systematic integration of trees into the agricultural landscape can potentially result in sustainable environmental, ecological, economic and social benefits. The key aspects of deriving these benefits, associated science and management considerations, application potentials at the landscape level and adoption challenges will be discussed. Common temperate and tropical agroforestry systems (e.g. intercropping of trees and crops) will be discussed. Emphasis will be given to successful research and development case studies.

## Timetable

LEC Wed, Fri 11:30AM - 12:20PM ROZH, Room 105 LAB Fri 03:30PM - 05:20PM ROZH, Room 105

## Final Exam

This course does not have a final exam but the students are expected to submit a final term paper. All term papers should be submitted by December 7, 2018 via email to the Teaching Assistant (TBD) and the Instructor (nthevath@uoguelph.ca). There will be a 2% reduction per day for late submissions.

# Instructional Support

## 2.1 Instructor(s)

#### Naresh Thevathasan B.Sc (Agric.), Ph.D (Envi. Sc.), P.Ag., D.Sc. (hon.)

**Email: Telephone: Office:**

nthevath@uoguelph.ca

+1-519-824-4120 x52565

ALEX (AXEL) 121

I am excited to meet you all during the course. I have taught this course since 2007 and have received great appreciation from past students for the course content and for the materials covered. Agroforestry land-use is the only land-use that embraces all three dimensions of the production system – the environment, economics and society. It also shows more resilience to climate change and is now considered as the future of global agricultural land-use practiced by more than 90% of the global farming communities. Given the climate change and associated climate extremes, agroforestry land-use systems are considered more resilience to climate extremes and hence should be adopted in many climate-prone areas of the world, especially in sub-Saharan Africa.

As we travel together through this course, you will also be exposed to Results-Based Management (RBM) techniques, a tool used to assess results and progress in international food security developmental projects and adopted by many international donors including the Global Affairs Canada, Government of Canada.

At the end of the course, you will be trained and educated to act as an independent consultant and write an independent proposal to solve or bring remedial measures for a land-use problem in any part of the world.

I really enjoy teaching this course as I bring experiences that I have gained over the last 20 years implementing agroforestry-based food security projects in Nepal, India, Egypt, Ghana, Rwanda, DR Congo, Sri Lanka and Chile.

## 2.2 Teaching Assistant(s)

#### Teaching Assistant: Email:

**Telephone: Office:**

Brent Coleman colemanb@uoguelph.ca

+1-519-824-4120 x53488 ALEX (AXEL) 121B

# Learning Resources

## Required Resource(s)

#### Required Texts (Textbook)

Online Course Manual will be available on Courselink in order to enhance and assist understanding of the lecture materials. But, attending lectures is the key to understand the

concepts and do well in examinations.

## Recommended Resource(s)

#### Recommended Texts (Textbook)

North American Agroforestry: An Integrated Science and Practice (2000). Editors: H.E. (Gene) Garrett, W.J. (Bill) Rietveld and R.F. (Dick) Fisher

Temperate Agroforestry Systems (1997). Editors: Andrew M. Gordon and Steven M. Newman An Introduction to Agroforestry (2000). Author: P.K. Ramachandra Nair

Note: The above text books are recommended for additional reading only. However, students are NOT expected / required to purchase them.

## Additional Resource(s)

#### Field Trips (Other)

There will be two field tours / visits to the agroforestry research site in Guelph and riparian research site in Washington Creek. These field tours will be organized to showcase long-term ecological research and research findings associated with integration of trees or perennials into agricultural landscapes. The dates are shown above; during lab time period. There will be no additional cost to the students.

# Learning Outcomes

## Course Learning Outcomes

By the end of this course, you should be able to:

* + 1. To familiarize students with approaches to agroforestry systems including theory, principles and scientific research.
		2. To offer students an opportunity to develop solutions to present-day agricultural problems through agroforestry (AF) land-use systems and to improve their independent and creative thinking ability.
		3. To explore potentials application of AF land-use systems in developed and developing countries to bring about food and income security, climate change mitigation strategies with supportive data / case studies and livelihood development.
		4. To bring enhanced awareness to the importance of social dynamics associated with agroforestry and climate change mitigation projects
		5. To educate and provide hands-on experience with preparing and presenting high quality written reports.
		6. To provide an exposure to agroforestry project management skills including Results-based Management (RBM) techniques.
		7. Literacy: A term paper will be required of each student or from a group, and journal articles will be discussed in class.
		8. Sense of historical development. This course will explore the history of agroforestry and its impacts on human societies in the developing world. Emphasis will also be given to historical agroforestry development in the temperate region, especially in Canada.
		9. Understanding forms of inquiry. The lecture portion of this course has been structured to

follow the sequence of events in the process of scientific inquiry: (1) identification of driving issues related to land-use problems; (2) recognition of potential solutions through agroforestry systems (3) managing the system for environmental, ecological, economic and social benefits.

* + 1. Depth and breadth of understanding: Current issues and research on temperate and tropical agroforestry will be explored through journal articles, which will require an increasing depth of understanding.

## Extra

In addition, assignments, recommended materials and course manual will direct students to more information on specific topics that will not be covered entirely in lectures.

# Teaching and Learning Activities

## Lecture

#### Topic(s):

Lecture Content

Introduction to Agroforestry – Agroforestry concept and principles, global agroforestry systems, agroforestry for food security and rural livelihoods (emphasis on developing countries), agroforestry for North America (emphasis on environment, economic and social aspects)

Agroforestry systems – Farm forestry, windbreaks and shelterbelts, riparian buffer zone management, tree-based intercropping, silvopastoral systems, agroforestry systems for non- timber forest products, tropical systems (multi-storey tree systems, home gardens, tea, coffee, cocoa, black pepper production systems etc.). Ecological processes associated with each.

Agroforestry and the Environment – Impact of agroforestry systems on air, soil and water resources. Demonstrated case studies. System design and performance indicators.

Agroforestry systems management considerations – Numerous management strategies will be discussed to achieve overall system productivity and sustainability.

Socioeconomic considerations – Impact of agroforestry on social and economic indices Agroforestry designs for Canadian landscape and important considerations - Use of trees on farms, whole farm planning, markets for farm tree products, species selection and site assessment, site preparation, establishment techniques, tending of trees, health of trees and appropriate government incentives related to agroforestry (Ontario farm plan, Green Cover Canada etc.)

Results-based Management (RBM) techniques in relation to agroforestry project management

#### Fri, Sep 7

**Topic(s):**

**Wed, Sep 12 Topic(s):**

**Fri, Sep 14 Topic(s):**

**Wed, Sep 19 Topic(s):**

**Fri, Sep 21 Topic(s):**

Agroforestry the future of global land-use Introduction to Agroforestry

continue…

Tropical agroforestry systems Agroforestry classifications

#### Wed, Sep 26 Topic(s):

**Fri, Sep 28 Topic(s):**

**Wed, Oct 3 Topic(s):**

**Fri, Oct 5 Topic(s):**

**Wed, Oct 10 Topic(s):**

**Fri, Oct 12 Topic(s):**

**Wed, Oct 17 Topic(s):**

**Fri, Oct 19 Topic(s):**

**Wed, Oct 24 Topic(s):**

**Fri, Oct 26 Topic(s):**

**Wed, Oct 31 Topic(s):**

**Fri, Nov 2 Topic(s):**

Tree-based intercropping systems and scientific basis continue…

continue…

Riparian buffer systems continue…

Windbreak systems continue… Silvopastoral systems

Forest farming systems

Impact of agroforestry systems on soil, air and water – applications

continue…

Problem solving techniques in relation to agroforestry land-use

world conservation strategies, driving forces of environmental problems, solvex model within the social context

#### Wed, Nov 7

**Topic(s):**

**Fri, Nov 9 Topic(s):**

**Wed, Nov 14 Topic(s):**

**Fri, Nov 16 Topic(s):**

**Wed, Nov 21 Topic(s):**

**Fri, Nov 23 Topic(s):**

**Wed, Nov 28 Topic(s):**

continue...

Introduction to Results-based management

Introduction to Logic model, performance measurement framework and risk registry

Case study discussions – Ghana Case study discussions – India

Final assignment – term paper discussion

Term paper preparation time / Open for reviews and or

discussion

## Lab

#### Fri, Sep 14 Topic(s):

**Fri, Sep 21 Topic(s):**

**Fri, Sep 28 Topic(s):**

**Fri, Oct 5**

Soil C analysis – organic, inorganic and total C

Video presentation on Agroforestry for rural livelihoods and agroforestry Systems in the world

Bus tour – GTI, agroforestry plots

#### Topic(s):

**Fri, Oct 12 Topic(s):**

**Fri, Oct 19 Topic(s):**

**Fri, Oct 26 Topic(s):**

**Fri, Nov 2 Topic(s):**

**Fri, Nov 9 Topic(s):**

**Fri, Nov 16 Topic(s):**

**Fri, Nov 23 Topic(s):**

**Fri, Nov 30**

No Lab (Early Thanksgiving)

Bus tour – Washington Creek research site Mid-term # 1

Agroforestry and climate change

Video presentation – Agroforestry to enhance resource-poor livelihoods

Guest lecture – Dr. Waseem Ashiq – Agroforestry and community forestry practices in Pakistan

Mid-term # 2

Agroforestry practices in Iran – Dr. Amir Bazrgar

#### Topic(s):

Term paper preparation time / Open for reviews and or discussion

# Assessments

## Assessment Details

**Midterm 1 (30%) Date:** Fri, Oct 19

**Midterm 2 (30%) Date:** Fri, Nov 16

**Final Paper (40%) Due:** Fri, Dec 7

All term papers should be submitted by December 7, 2018 via email to the Teaching Assistant (TBD) and the Instructor (nthevath@uoguelph.ca). There will be a 2% reduction per day for late submissions.

### 6.2 Student's assessment

Lectures, field tours, laboratory exercises, two mid-term examinations and major term paper are for knowledge and skill development. In addition, assessment of student’s understanding on agroforestry systems in terms of: a) innovative ideas presented in examinations and in the term paper having a local, regional and global perspective, b) application of these ideas, c) logical thinking / process flow, would be used to evaluate attitudinal development.

# Course Statements

## Group Work

The students will be paired, either based on alphabetical order or their individual preferences. The group work will only be for the Final Term Paper. Specific guidelines will be provided in order to avoid any confusion or disagreement within the group. The instructor will request groups to present their term paper topics in advance and will provide specific inputs and directions to the groups to enhance the quality of their respective work and at the same time to ensure effective collaboration between the individuals in a group. The individual who will be responsible for submitting the final term paper, within a group, will be decided during the discussion sessions.

## Grading Policies:

Undergraduate Grading Procedures -

As outlined in: [https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-](http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-) grds-proc.shtml

# University Statements

## Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e- mail is the official route of communication between the University and its students.

## When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The regulations and procedures for [Academic Consideration](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml) are detailed in the Undergraduate Calendar.

## Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-

semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for [Dropping Courses](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml) are available in the Undergraduate Calendar.

## Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

## Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day.

More information: [www.uoguelph.ca/sas](http://www.uoguelph.ca/sas)

## Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it.

Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The [Academic Misconduct Policy](https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml) is detailed in the Undergraduate Calendar.

## Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## Resources

The [Academic Calendars](https://www.uoguelph.ca/registrar/calendars/) are the source of information about the University of Guelph’s

procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.