

## **BIOLOGY 2050, Tree Development and Function**

### **COURSE OUTLINE Fall 2018**

**Lectures:** Dr. Mathew Leitch, BB1005f, 343-8659 [mleitch@lakeheadu.ca](mailto:mleitch@lakeheadu.ca)

**Teaching Assistant:** TBA

**Lecture Schedule:** M,W,F 10:30-11:30am BB2006

**Lab Schedule:** Th 11:30am -2:30pm CB3013

#### **INTRODUCTION**

Principles of tree growth, structure, function and regulation of development. Topics covered include: Roots – function, rhizography, anatomy, development, apical and lateral meristems, control of growth, and growth periodicity; Shoots – morphology, buds, shoot anatomy, apical and lateral meristems, control of shoot growth, photosynthesis and respiration; Stems – the vascular cambium, gymnosperm and angiosperm xylem, phloem and the periderm; Transport – source and sink systems, pressure potential, transport in the xylem and phloem; Reproduction – Life cycles, gymnosperm and angiosperm reproduction processes from seed development to dispersal.

#### **LEARNER OUTCOMES**

On completion of this course, students should have an understanding and be able to:

1. describe macroscopic and microscopic features of roots, shoots, stems, and reproductive systems in gymnosperms and angiosperms;
2. comprehend information regarding variability of tree species;
3. describe primary and secondary tissue formation including cell differentiation, cell wall layering and modifications;
4. understand the process of transport in trees via the xylem and phloem pathways;
5. understand the basic chemical composition of wood;
6. understand anatomical, chemical and physical characteristics associated with heartwood formation, growth stresses, reaction wood and natural features in trees;
7. be able to bring together all the individual components of a tree to understand how the system works as a whole in the environment.

## EVALUATION

Mid-term exam	15%
Lab Exam	15%
Labs	25%
Final Exam	45%
Total	100%

- lab assignments are due at the end of the given lab session.
- the laboratory final exam (last week of classes) will be held in CB3013 and is a bell-ringer multiple choice exam.

## REQUIRED TEXTS:

Some items in the course content will be covered in more detail than other items and will require you to explore them independently.

Course text: there is no course text.

Other interesting and useful texts worth looking at (in the library):

- \* Jane, F.W. 1956. The Structure of Wood. Adam and Charles Black Ltd. Publishing, London.
- \* Zimmermann, M.H. and Brown, C.L. 1971. Trees: structure and function. Springer-Verlag, NY.
- \* Wilson, B.F. 1984. The Growing Tree. University of Massachusetts Press, Amherst.

## ORGANIZATION OF THE COURSE

**Laboratory** classes will be held in the laboratory in CB3013. These will consist of a 3-hour session in Thursdays (11:30am-2:30pm). The laboratories are each week and cover topics that are line with the lectures for that week, ie the first lab is on Roots and the first portion of the lectures is on Roots. This will involve using compound and dissecting microscopes with prepared slides provided. Some labs will involve dissecting materials with razors and tweezers (provided). A Lab Manual is provided on the D2L site that contains reference materials for each lab and the lab assignment.

You will generally work in small groups and submit one completed lab for the group weekly at the end of the lab session.

It is recommended to carry a workbook to the laboratory so drawings and notes can be made from sections on the microscopes for future studying etc.

Safety rules in laboratories require closed shoes be worn (no sandals or open-toed

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shoes) at all times and a lab coat (optional) be worn while in the laboratory. Lab coats are to be supplied by the student but are not mandatory.

Safe procedures for use of razors and tweezers will be described and demonstrated during the first laboratory session. Demonstrators will be present to assist if you experience difficulties during lab sessions as will the Professor.

**Lectures** will follow the same topic outline as the laboratories running the two parallel in order for the information presented in the lectures be useful the same week in the labs. Three 1 hour lectures will occur each week. The Mid-term exam will occur before reading week and will cover the course material up until that time. The Final exam will occur during the exam period and will be a 3 hour sit down exam. The Final will consist of 3 sections, first being a multiple choice section, second a short answer section, and third short essay style questions.

All reasonable requests for extensions or missing exams will be considered on a case by case basis with the Professor.

**Late assignments:** All assignments in the course must be handed in by end of the lab on the assigned due date. Late assignments will not be accepted past the due date and time.