APBI 401/SOIL 501 (3) Soil Processes
2015W, Term 1 (Sep – Dec 2015)

Course Schedule MWF 11 – Noon

Location MacMillan 160

Instructor Sandra Brown

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A course on Soil Processes will be offered this fall jointly as APBI 401 and SOIL 501. The course may be taken for graduate or undergraduate credit. The course content and objectives are provided below.

Course Objective

APBI 401 aims for students to gain a basic understanding of the essential processes that take place in soils. It is best suited for students interested in gaining more depth in understanding soil processes and students interested in specializing in soil science. A background in the natural sciences is recommended.

Course Description

Soils are a fundamental component of agricultural, forest and other land use systems; reflecting natural processes and the influence of human activities.

Topics to be covered include: weathering and the development of soils, soil hydrology, decomposition and nutrient cycling, the essential function for biomass production, C sequestration and how processes are influenced by land use activities. It is expected that the students will gain sufficient knowledge to understand the role of soil in recycling of nutrients, soil formation, soil bio-meteorological processes, soil hydrology, soil quality and resilience, and spatial and temporal variability. Emphasis will be placed on the integration of soils, water, biota and the atmosphere, and anthropogenic influences on soil processes.

Course Organization and Delivery

This course will be taught using a modular format (4-5 hours for each module). Lectures are held 3 times weekly, M W F from 11 to 12pm. Approximately 40% of the lectures will be delivered by guest lecturers with expertise in specific topics, including faculty members from the Faculty of Land and Food Systems and the Faculty of Forestry. Readings will be assigned prior to the start of each module. Readings will include class handouts, journal articles from the library, and various soil textbook chapters. Textbooks will be placed on reserve at the Woodward library. Students are expected to complete relevant readings before the module lectures.

APBI 401 Assignments and Grading Scheme

Assignments 30%
Mid-Term Exam 30%
Final Exam 40%

SOIL 501 Assignments and Grading Scheme

Assignments 25%
Mid-Term Exam 25%
Term Paper 10%
Final Exam 40%

Learning objectives:

The following learning objectives are to be achieved:

- A fundamental understanding of the role and dynamics of soils
- Ability to assess how processes change over time and space
- An understanding of processes, cycles and interactions
- Capacity to determine mass balances for carbon, nutrients and water
- Understand the role of physical, chemical and biological processes, and their interdependence
- Ability to quantify rates of changes in the soils and understand the reasons for these changes
- Ability to identify dominant genetic processes in soil formation and determine potential changes in the soil due to external impacts
- Ability to scale soil processes from micro scales to pedons to the soil landscape
- Ability to apply the gained knowledge to predict soil behaviors as a result of different land use activities and management practices