## Introduction to Soil Science

Course # EAES 3246

Credits 6

**Pre-requisites and Co-requisites:** Introduction to the Earth and Environmental Sciences and Biology.

**Course Description**

Soil determines the nature of plant ecosystems and the capacity of land to support human, animal, plant, and other organisms. This introductory soil science course is designed to provide an overview of the fundamental concepts of soil science and lead to the development of students' understanding of the properties and processes that are basic to the use and management of soils. Specifically, this course covers the fundamentals of soils including soil formation, soil classification, soil physics, soil biology, soil ecology, soil chemistry along with soil management aspects such as soil fertility and nutrient management, soil erosion and control and soil health in the Anthropocene. Students are also expected to gain practical experience by creating a soil map and conducting soil lab experiments which would enhance their understanding about the importance of soil, various types of soil, physical, chemical, and biological properties of soil especially in mountainous areas.

**Course Learning Outcomes**

Upon completion, students will be able to:

- Explain the soil formation processes including the basic processes, environmental factors, weathering, and characteristics of soil profile.
- Evaluate various classes of soil including categories of soil classification systems, features of soil diagnostic horizons and characteristics of soil orders.
- Explain the basic physical, biological, ecological, chemical, and mineralogical properties of soil.
- Determine soil textural classes using soil textural triangle.
- Explain the chemical properties of soil such as pH, salinity, acidity, and the role of organisms that live in the soil.
- Explain the importance of the soil in the environment, the interactions of various properties of soil and its impact on plant growth, soil behavior, and soil management.
- Evaluate the challenges of soil management related to nutrients, erosion, and maintenance of soil health.

**Course Assessments and Grading**

| Item | Weight |
|---|---|

| | |
|---|---|
| Class participation | 10 % |
| Quizzes | 20 % |
| Coursework accompanied by QGIS mapping | 25 % |
| Soil laboratory report | 15 % |
| Final exam | 30 % |