**II.2.11 SOIL SCIENCE**

**A. Course description:**

**1. Credit points: 3 ECTS**

**2. Time commitment**

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| --- | --- | --- | --- | --- | --- |
| Items | Lecture | Tutorial/Exercise | Practice/Assignment | Lab-work | Total |
| No. of hours | 21 | 10 |  | 5 | 36 |

**3. Prerequisites**

N/A

**4. Recommended background knowledge**

General chemistry and physics of B1 and B2

**5. Subject description**

This course provides an introduction to soil science with a focus on the physical and chemical properties of soils as well as a short overview of the soil biotic properties.

The goal of this course is to present soils in the environment: What are soils? How do they form? What are their roles in the environment? Knowledge on soils is necessary for site assessment, urban and regional planning, and pollution mitigation. This course will be a prerequisite to the course on soil and water pollution.

**6. Objectives & Outcome**

* Listed below are the principal points students should be able to do upon completion of each chapter of the course (a,b,d,f,g,j,k outcomes of ABET, cf. table in annexA).
* Describe the place of soil in the environment.
* List and describe the different soil components including minerals, organic materials and living organisms. Explain the main properties of each component in the soil. Measure and determine the different soil fractions in laboratory.
* Explain how soils are formed and what the main parameters that are involved in soil formation are. List different types of soil formed under different environmental conditions.
* Describe and explain the main physical properties of soil such as structure, texture, soil aeration, porosity and water in soils. Measure and calculate soil bulk density. Be able to compare different soil types and their physical properties.
* Describe and explain chemical properties of soil such as pH, reactions at surfaces. Measure and determine some of the soil chemical properties and be able to compare different soil types and their chemical properties. Students will also develop ability to function effectively on team in laboratory.
* Outline the processes linked to nutrient cycling in soils and be able to explain each of them.

**7. Assessment/ Evaluation**

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| --- | --- | --- | --- | --- |
| Component | Attendance | Exercises | Practical | Final |
| Percentage % | 10 | 10 | 30 | 50 |

**8. Prescribed Textbook(s)**

**B. Course content**

Introduction to soils: soil as a complex ecosystem, its dynamic role in the environment

Soil components: minerals, organic matter and soil organisms

Processes of soil formation

Physical properties of soils

Chemical properties of soils

Nutrient cycling in soils

**C. Reference Literature**

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| White R.E., 1997. *Principles and practice of soil science, the soil as a natural resource*, third edition. Blackwell Science. |
| Hillel D., 2007. *Soil in the Environment: Crucible of Terrestrial Life*. Elsevier Inc.  |