

5.0 credits

30.0 h + 22.5 h

2q

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| Teacher(s) :         | Delvaux Bruno ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Language :           | Français                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Place of the course  | Louvain-la-Neuve                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Inline resources:    | Lecture notes available on icampus website                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Prerequisites :      | Introduction aux sciences de la terre [LBIR1130]<br>Introduction à l'ingénierie de la biosphère [LBIR1230]<br>Sciences du sol [LBIR1336]<br>Excursions de pédologie et d'écologie agricole et forestière [LBIR1335]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Main themes :        | The soil, as bio-physico-chemical reactor at the interface between lithosphere, biosphere, hydrosphere and atmosphere evolves at the expense of parental material as a result of soil-forming factors, such as climate, vegetation and topography.<br>The study of soil formation and evolution (pedology) will be addressed through four topics: (1) processes controlling soil formation at pedon scale, (2) effect of environmental conditions and anthropic factors on soil evolution, (3) classification, distribution and functionality of major soil groups of the World, (4) soil management principles based on their agronomical and sylvicultural efficiency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Aims :               | a. Contribution of the activity to the framework AA<br>1.1, 1.2, 1.3, 1.4, 1.5<br>2.1, 2.2, 2.3, 2.4<br>3.4<br>6.2, 6.4<br><br>b. Expected learning outcomes<br>At the end of the activity, the student is able to:<br><br>- Integrate the fundamental disciplines to diagnose pedological processes and soil functioning and to assess the anthropic impact on soils,<br>- Discern and briefly and precisely summarize the laws governing soil development, based on the relation factors-processes-properties (part II),<br>- Describe and predict pedogenic processes controlling soil evolution according to environmental conditions by applying concepts and tools (analytical tables) taught (part III),<br>- Decipher soil-forming processes for the major soil groups of the World (in natural and anthropic environment), by integrating theoretical concepts taught (part IV) and illustrated in tutorials and field trips,<br>- Classify soil types by applying in operational terms the soil typology principles taught in lecture and tutorials (part IV),<br>- Describe properties and how soil operates for major soil types of the World in terms of agronomical and environmental functions, based on example taught in lectures and shown in field trips (part II, III et IV).<br><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i> |
| Evaluation methods : | - Group report on field sessions<br>- Oral exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Teaching methods :   | Teaching is in the form of lectures in classroom with active learning activities. Tutorial sessions in the field and in computer classroom are on the agenda as well as field trips to apply the concepts taught in lectures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Content :            | Part I. Introduction<br>Part II. Pedogenesis<br>II.1. Weathering and formation of mineral phases<br>II.2. Dynamic of soil organic matter<br>II.3. Organo-mineral interactions<br>II.4. Pedogenic factors and processes<br>Partie III. Soil evolution<br>III.1. Soil evolution cycles<br>III.2. Soil sequences<br>Partie IV. Applied pedology<br>IV.1. Interpretation of morphological and analytical data of typical soil profiles<br>IV.2. Classification principles<br>IV.3. Belgian soil typology principles (Tutorial)<br>IV.4. Soil description in the international soil classification system (WRB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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|                              | IV.5. Functioning and management of major soils of the World<br>IV.6. Soil evolution and interactions with the biological environment (field trips) |
| Bibliography :               | Optional documentation<br>- Book : « Lectures notes of the major soils of the world »<br>- Scientific articles available on icampus                 |
| Faculty or entity in charge: | AGRO                                                                                                                                                |

| <b>Programmes / formations proposant cette unité d'enseignement (UE)</b> |        |         |           |                                                                                     |
|--------------------------------------------------------------------------|--------|---------|-----------|-------------------------------------------------------------------------------------|
| Intitulé du programme                                                    | Sigle  | Credits | Prerequis | Acquis d'apprentissage                                                              |
| Master [120] in Environmental Bioengineering                             | BIRE2M | 5       | -         |  |
| Master [120] in Forests and Natural Areas Engineering                    | BIRF2M | 5       | -         |  |
| Master [120] in Agricultural Bioengineering                              | BIRA2M | 5       | -         |  |