Universität für Bodenkultur Wien
University of Natural Resources and Life Sciences, Vienna

# Curriculum

for the Master's Programme in

# International Master in Soils and Global Change (IMSOGLO)

Programme classification no. 066 472

Effective date October 1, 2024

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## § 1 QUALIFICATION PROFILE

The international joint master's programme in Soils and Global Change (IMSOGLO) is a joint degree programme which serves to deepen and extend students' pre-vocational academic education, building on the basis provided by a bachelor degree programme (§ 51 [2] item 5 of the Universities Act UG 2002, Federal Law Gazette BGBl I no. 81/2009). The programme fulfils the requirements of Directive 2005/36/EC on the recognition of professional qualifications, article 11, letter e.

The international joint master's programme in Soils and Global Change is a joint degree offered by the University of Natural Resources and Life Sciences, Vienna, Austria (BOKU), Ghent University, Belgium (UGent), Aarhus University, Denmark (AU) and the University of Göttingen, Germany (UGOE).

### 1a) Knowledge and personal and professional skills

After completing the programme, IMSOGLO graduates have the knowledge and skills to characterise soils and understand soil evolution in an ecosystem context under global change because they understand the underlying processes and interactions.

Graduates of the joint master's programme in Soils and Global change (IMSOGLO) are able to

1. demonstrate a broad knowledge at an advanced level in basic disciplines (soil physics, soil biology, soil chemistry, land information systems);
2. explain the evolution of soil (agro-/forest/natural) ecosystems under natural conditions and human-impact, in relation to global change;
3. characterise soil, assess soil quality, and relate it to natural and anthropogenic factors;
4. conduct field work (soil survey, soil profile description, soil sampling), interpret analytical data, classify the soil, and manage and interpret existing geospatial (soil) data;
5. plan and execute target-orientated experiments or simulations in- dependently and critically evaluate the collected data;
6. demonstrate a holistic understanding of the interactions and processes in the agro-ecosystem and natural ecosystems, using statistical tools and advanced (geospatial) information- and modelling techniques;
7. act from a researchers' perspective using creativity, accuracy, critical reflection, curiosity, and justifying choices based on scientific criteria;
8. integrate and extend acquired knowledge towards innovative solutions, knowing the limits of own competences;
9. develop and implement scientifically-sound field and lab experimental procedures to test research hypotheses;
10. participate in and lead interdisciplinary groups for development of sustainable environmental solutions at local, regional and global scale;
11. possess qualifications for employment in private and public-sector companies and organisations where high level expertise in soil management is required;
12. communicate, orally and written, in words and in graphs, on the own discipline to experts and the general public.

### 1b) Professional qualifications

IMSOGLO 'Soil-Plant System Processes and Global Change' focuses on the interactions between soils, plants, microbes and management in a changing world, with a strong emphasis on biogeochemical processes in managed and natural ecosystems across different climates,

to understand the feedbacks between land management, environmental impacts and global change. Specifically, graduates will be able to:

1. sample, measure and describe basic concepts of biogeochemistry, in particular pools and fluxes of carbon, nitrogen and water in (agro-) ecosystems
2. analyse and describe the impact of soil properties and processes on plant nutrition and health;
3. explain and describe the global role of soils and soil microorganisms, in the exchange of greenhouse gases with the atmosphere;
4. evaluate the impact of land management on soils and on the environment in different regions of the world;
5. apply stable isotopes in the context of biogeochemical research;
6. apply stable isotopes in the context of biogeochemical research

## § 2 ADMISSION REQUIREMENTS

To enter the IMSOGLO programme, candidates must have at least an academic Bachelor degree (minimum 180 ECTS credits or equal) in pure or applied sciences (e.g., chemistry, biology, geology, physical geography, geo-ecology, civil or agricultural engineering, environmental or agricultural sciences, etc.) or an equivalent level from a recognised university or engineering college.

The obtained bachelor degree must contain at least 40 ECTS credits or equal in natural sciences, covering at least four of the following disciplines: physics, chemistry, mathematics, ecology, biology, geology, physical geography, environmental sciences and agricultural sciences.

In addition, knowledge of English at level B2/C1 (Common European Framework of Reference for Languages) is required.

The English language proficiency can be met by providing a certificate of one of the following tests:

- TOEFL IBT 90 (TOEFL Home Edition 95-100)

- ACADEMIC IELTS 6,5 overall score with a min. of 6 for writing

Cambridge C1 advanced certificateMode of instruction: completion of a study programme that was entirely taught in English from countries with English as the official language.

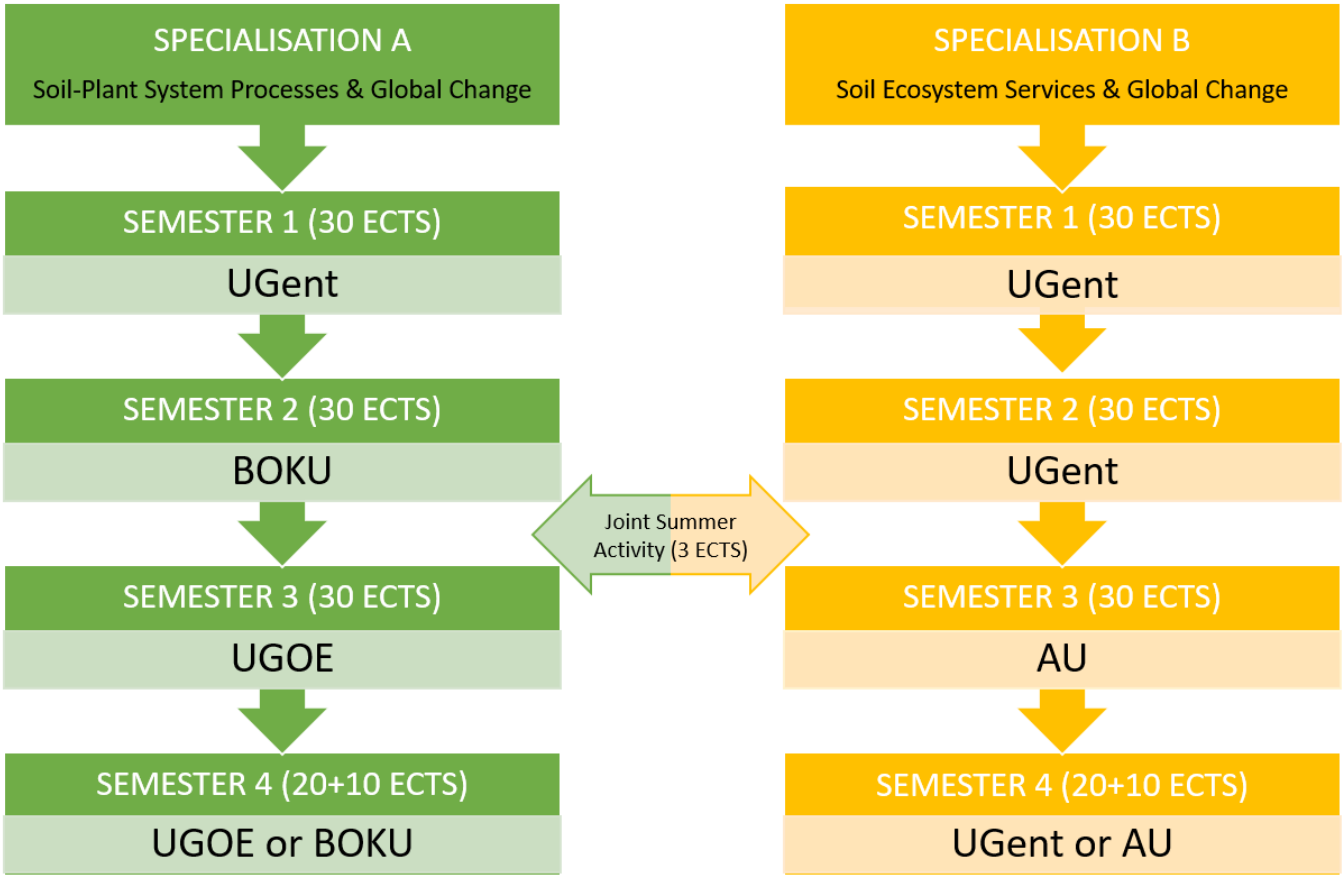
## § 3 PROGRAMME STRUCTURE

### 3a) Duration, total ECTS credits, and structure

The programme consists of courses and other requirements worth a total of 120 ECTS credits. This is equivalent to a duration of four semesters (a total of 3,000 60-minute credit hours). The programme is divided into

| | |
|---|---|
| Compulsory courses: | 66 ECTS credits Master's |
| thesis: | 30 ECTS credits |
| Elective courses: | 15 ECTS credits |
| Free electives: | 9 ECTS credits |

**Mobility track:**




All students start at UGent. After the first semester, the students have a basic overview on soil sciences and are ready for one of the two specialisations that each cover the next three semesters. According to their chosen specialisation (A or B) students move to BOKU for the 2nd semester (specialisation "Soil-Plant System Processes and Global Change") or stay at UGent (specialisation "Soil Ecosystem Services and Global Change"). The Joint Summer Activity is offered during the summer break between the second and third semester and is organised in rotation by one partner. The 3 ECTS credits that can be obtained by successfully participating in the Joint Summer Activity, are part of the mandatory curriculum of the second semester.

Students spend the 3rd semester either at UGOE (Specialisation “Soil-Plant System Processes and Global Change”) or AU (Specialisation “Soil Ecosystem Services and Global Change”).

In both the second and third semester, students take compulsory courses but also choose from elective courses.

In the 4th semester students can conduct their master’s thesis research at one of the institutions organising their specialisation, under supervision of two lecturers of two consortium partner institutions (BOKU, UGOE). The students will receive 30 ECTS for their Master’s thesis, whereby 20 ECTS will be from the partner university of the first supervisor and 10 ECTS from the partner university of the second supervisor.

All courses are offered in English.

### 3b) Three-pillar principle

The three-pillar principle is the central identifying characteristics of both the bachelor’s and master’s programmes offered at the University of Natural Resources and Life Sciences, Vienna. In the master’s programmes, the sum of the compulsory and elective courses must be made up of at least

15% technology and engineering
15% natural sciences
15% economic and social sciences, law

The master’s thesis is excluded from the three-pillar rule.

## § 4 COMPULSORY COURSES

The following compulsory courses worth a total of 18 ECTS credits at BOKU are required to complete the master’s programme (Specialisation A):

| **Specialisation A: Soil-Plant System Processes and Global Change** | **Course type** | **ECTS credits** |
|---|---|---|
| **Course title** | | |
| **Ecosystem dynamics and their effect on greenhouse gases** | **VO** | **3** |
| **Soil protection** | **VO** | **3** |
| **Sustainable land use in developing countries** | **SE** | **3** |
| **Stable isotopes (C, N, S, O, H) in soil and environmental sciences** | **VX** | **3** |
| **Soil problems in aridic and semiaridic regions** | **VO** | **3** |
| **Summer school** | **PJ** | **3** |

In addition, students have to complete 30 ECTS compulsory courses at the partner university UGent and 18 ECTS compulsory courses at the partner university UGOE.

## § 5 ELECTIVE COURSES

Elective courses worth a total of 9 ECTS credits at BOKU are required to complete the master's programme (Specialisation A).

| **Specialisation A:**<br>**Soil-Plant System Processes and Global Change** | **Course type** | **ECTS credits** |
|---|---|---|
| **Course title** | | |
| **Possible impacts of climate change on water resources** | **VO** | **3** |
| **Soil pollution and remediation** | **VU** | **3** |
| **In-situ treatment of polluted soils and sediments: phytoremediation, in-situ fixation and attenuation techniques** | **UE** | **3** |
| **Soil management in tropical and subtropical developing regions** | **VO** | **3** |
| **Soil fertility and soil ecology in organic agriculture** | **VU** | **3** |
| **Agroforestry in mountain regions** | **VS** | **3** |
| **Soil - plant science workshop: From the hypothesis to publication II** | **SE** | **3** |
| **Forest soil biology** | **VU** | **3** |
| **Soil microbiology course** | **UE** | **4** |
| **Globalisation and rural development** | **VO** | **3** |
| **Internship** | **SE** | **3** |

In addition, students have to complete 6 ECTS elective courses at the partner university UGOE

## § 6 FREE ELECTIVES

Free electives worth a total of 9 ECTS credits are required to complete the master's programme. Free electives may be selected from all courses offered by all recognized universities in Austria and abroad and need to be approved by the IMSOGLO programme coordinator before including them into the individual course plan. 3 ECTS have to be completed at BOKU. Free electives are intended to impart knowledge and skills in the student's own academic subject as well as in fields of general interest. It is recommended to cover at least part of the free elective course requirements with courses from the elective modules offered within this curriculum.

## § 7 MASTER'S THESIS

Master's theses are academic papers in the Master's studies that serve to demonstrate the ability to work on academic topics independently and in a way that is justifiable in terms of content and methodology (§ 51 para 2 sub-para 8 UG 2002). The study regulations for the Master's thesis can be found in the statutes of the University of Natural Resources and Life Sciences, Vienna.

The Master's thesis comprises a total of 30 ECTS credits including the defensio.

The topic of a master's thesis shall be chosen in such a way that it is reasonable to expect a student to be able to complete it within six months. Multiple students may jointly address a topic, provided that the performance of individual students can be assessed (§ 81 [2] UG 2002 BGBl. I no. 81/2009).

Students will conduct their master's thesis research at one of the institutions organising their

specialisation, under supervision of two lecturers of either BOKU or UGOE. Each student will have a supervisor from one partner university and a co-supervisor from another partner university of his/her specialisation, to ascertain a joint approach towards the quality assurance and evaluation of the thesis work. The students will receive 30 ECTS for their master's thesis, whereby 20 ECTS will be from the partner university of the first supervisor and 10 ECTS from the partner university of the second supervisor.

The master's thesis shall be written in English. The thesis defensio must be held in English.

The master´s thesis has to be defended at the university of the thesis supervisor. The co-supervisor will be invited to be present for the thesis defensio (on-site or via video conference).

### § 8 COMPLETION OF THE MASTER'S PROGRAMME

The international joint master's programme in Soils and Global Change has been completed when the student has passed all required courses and received a positive grade on the master's thesis and defensio.

## § 9 ACADEMIC DEGREE

Graduates of the international joint master's programme in Soils and Global Change are awarded the academic title Master of Science, abbreviated as MSc or M.Sc. The academic degree MSc (M.Sc.), if used, shall follow the bearer's name (§ 88 [2] UG 2002 BGBl. I no. 81/2009).

## § 10 EXAMINATION REGULATIONS

(1) The international joint master's programme in Soils and Global Change has been completed successfully when the following requirements have been met:

- positive completion of the compulsory courses worth a total of 66 ECTS credits (§ 4)
- positive completion of elective courses worth a total of 15 ECTS credits (§ 5)
- positive completion of free electives worth a total of 9 ECTS credits (§ 6)
- a positive grade on the master's thesis and the defensio worth a total of 30 ECTS credits

(2) Student evaluation takes the form of course and module examinations. Course examinations can be either written or oral, as determined by the course instructor, taking the ECTS credit value of the course into account. Any prerequisites for admission to examinations shall be listed in § 4 under the respective course/module.

(3) Student evaluation in modules: Module evaluation is based on the grades given the students in the individual courses that make up the module. The total evaluation for the module is calculated as the average of the grades of all module courses, weighted by ECTS credits. Average values of .5 or lower are rounded to the better (numerically lower) grade; values of over .5 are rounded to the worse (numerically higher) grade. If deemed necessary, the Dean of Students may require a module examination at his/her discretion.

(4) The choice of examination method shall be based on the type of course: Lectures shall conclude with a written or oral examination, if continuous assessment of student performance is not applied. Seminars (SE) and project-based courses (PJ) can be evaluated based on independently written papers, length and contents of which are determined by the course instructor. For all other course types, the examination type is at the instructor's discretion.

(5) After the successful completion of all the courses and examinations required in the master's programme, the completed master's thesis, after it has been given a positive evaluation by the thesis supervisor and co-supervisor, shall be publically presented by the student and defended in the form of an academic discussion (defensio). The committee shall consist of a committee chair and two additional university teachers with a venia docendi or equiva- lent qualification. The student's total performance (thesis and defensio) will be assigned a comprehensive grade. Both thesis and defensio must receive a passing grade for the student to complete the programme. The written evaluations stating the rationale for the thesis grade and the defensio grade are included in calculating the comprehensive grade and are documented separately.

The comprehensive grade is calculated as follows:

- Master's thesis: 70%
- Defensio (incl. presentation): 30%

(6) A comprehensive evaluation of the student's performance on the entire programme shall be assigned. A comprehensive evaluation of "passed" means that each individual component of the programme was completed successfully. If individual components of the programme have not been successfully completed, the comprehensive evaluation is "failed". A comprehensive evaluation of "passed with honours" is granted if the student has received no grade worse than a 2 (good) on all individual components, and if at least 50% of the individual components were graded with 1 (excellent).

## § 11 EFFECTIVE DATE

This curriculum shall take effect on October 1, 2024 and expires at the end of September 30, 2029.

## ANNEX A TYPES OF COURSES

The following types of courses are available:
*(Please only offer course types included in this list from now on.)*

**Lecture (VO)**
Lectures are courses in which certain areas of a subject and the methods used in this area are imparted through didactic presentation.

**Exercise course (UE)**
Exercise courses are courses in which students are instructed in specific practical skills, based on theoretical knowledge.

**Practical course (PR)**
Practical courses are classes in which students deal with specific topics independently, based on previously acquired theoretical and practical knowledge.

**Compulsory internship seminar (PP)**
The compulsory internship seminar is a class in which students deal independently with topics related to their internship placements, based on previously acquired theoretical and practical knowledge.

**Seminar (SE)**
Seminars are courses in which students are required to work independently on the respec- tive subject, deepen their knowledge of the topic and discuss relevant issues.

**Field trips (EX)**
Field trips are courses in which students have the opportunity to experience relevant fields of study in real-life practical application, to deepen their knowledge of the respective subject. Field trips can be taken to destinations both in Austria and abroad.

**Master thesis seminar (MA)**
Master thesis seminars are seminars intended to provide students with academic support during the thesis writing process.

***Mixed-type courses:***
Mixed-type courses combine the characteristics of the courses named above (with the exception of project-type courses). Integration of different course-type elements improved the didactic value of these courses.

**Project course (PJ)**
Project courses are characterized by problem-based learning. Under instruction, students work - preferably in small groups - on case studies, applying appropriate scientific methods.

**Lecture and seminar (VS)**
**Lecture and exercise (VU)**
**Lecture and field trip (VX)**
**Seminar and field trip (SX)**
**Exercise and seminar (US)**
**Exercise and field trip (UX)**