



## Curriculum

for the Master's Programme in

## International Master in Soils and Global Change (IMSOGLO)

Programme classification no.

Effective date October 1, 2019



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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) with contributions from the following associate partners: the Joint Research Centre (Ispra) and the Chinese Academy of Sciences (Nanjing).

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

After completing the programme, IMSOGLO graduates will have an understanding of the impact of global change on soil health and functioning from the microbiological level to the landscape level, and vice versa, and will be able to employ a wide range of sampling, laboratory and geospatial analytical techniques for better management of soils in a changing environment.

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

1. possess a broad knowledge at an advanced level in basic disciplines (soil physics, soil biogeochemistry, land information systems, geology, meteorology and climatology);
2. understand the evolution of soil (agro-/forest/natural) ecosystems under natural conditions and human-impact, as well as its relation to global change;
3. have the ability to characterise soil physically, biologically and chemically, using advanced techniques to understand soil processes, to translate this to soil quality and to assess the influences by and on natural and anthropogenic factors;
4. master the basic methods to 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. have the ability to plan and execute target-orientated experiments or simulations independently and critically evaluate the collected data;
6. possess a holistic understanding of interactions and processes in the agro-ecosystem and natural ecosystems, using statistical tools and advanced (geospatial) information- and modelling techniques;
7. have the ability to act from a researchers' perspective: creativity, accuracy, critical reflection, curiosity, justification of choices based on scientific criteria;
8. have the ability for independent integration and extension of acquired knowledge to update concepts and innovate implementation possibilities, knowing the limits of own competences;
9. have the ability to participate in and lead interdisciplinary groups that contribute the development of sustainable environmental solutions at local, regional and global scale;
10. possess qualifications for employment in private and public-sector companies and organisations where high level expertise in soil management is required;

11. have the ability to communicate, orally and written, in words and in graphs, on the own discipline to experts and the general public.

### **1b) Professional qualifications**

IMSOGLO graduates are prepared for innovative research as they are educated in state-of-the-art laboratory and geospatial analytical techniques to improve soil resilience in a context of global change. IMSOGLO 'Soil biogeochemistry and global change' graduates will be able to:

1. sample, measure and describe basic concepts of biogeochemistry, in particular sediment cycles and element fluxes in (agro-) ecosystems;
2. recognise the impact of soil properties and processes on plant nutrition and health;
3. evaluate the role of trees in land use systems, with particular emphasis on agroforestry;
4. develop appropriate field designs and experimental procedures to address testable hypotheses;
5. design, apply and evaluate experiments using both stable and radioactive isotopes;
6. understand the role of soil microorganisms for soil properties and plant nutrition in relation to their activities in the environment.

## **§ 2 ADMISSION REQUIREMENTS**

To enter the IMSOGLO programme, candidates must have at least an academic Bachelor degree (minimum 180 ECTS credits) in pure or applied sciences (e.g., chemistry, biology, geology, civil or agricultural engineering, environmental or agricultural sciences, etc.) or an equivalent level from a recognised university. Sufficient academic knowledge of mathematics, physics and chemistry is a requirement.

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

The English language proficiency can be met by providing a certificate (not older than 5 years) of one of the following tests:

- TOEFL IBT 90
- TOEFL PBT 577
- ACADEMIC IELTS 6,5 overall score with a min. of 6 for writing
- ESOL CAMBRIDGE English CAE (Advanced)

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

For graduates of other bachelor's programmes, mastery of the following learning outcomes is required for admission:

Sufficient academic knowledge (at least 40 ECTS) in Natural Sciences is required, where Natural Sciences are specified as: physics, chemistry, mathematics, ecology, biology, physical geography, environmental sciences and agricultural sciences.

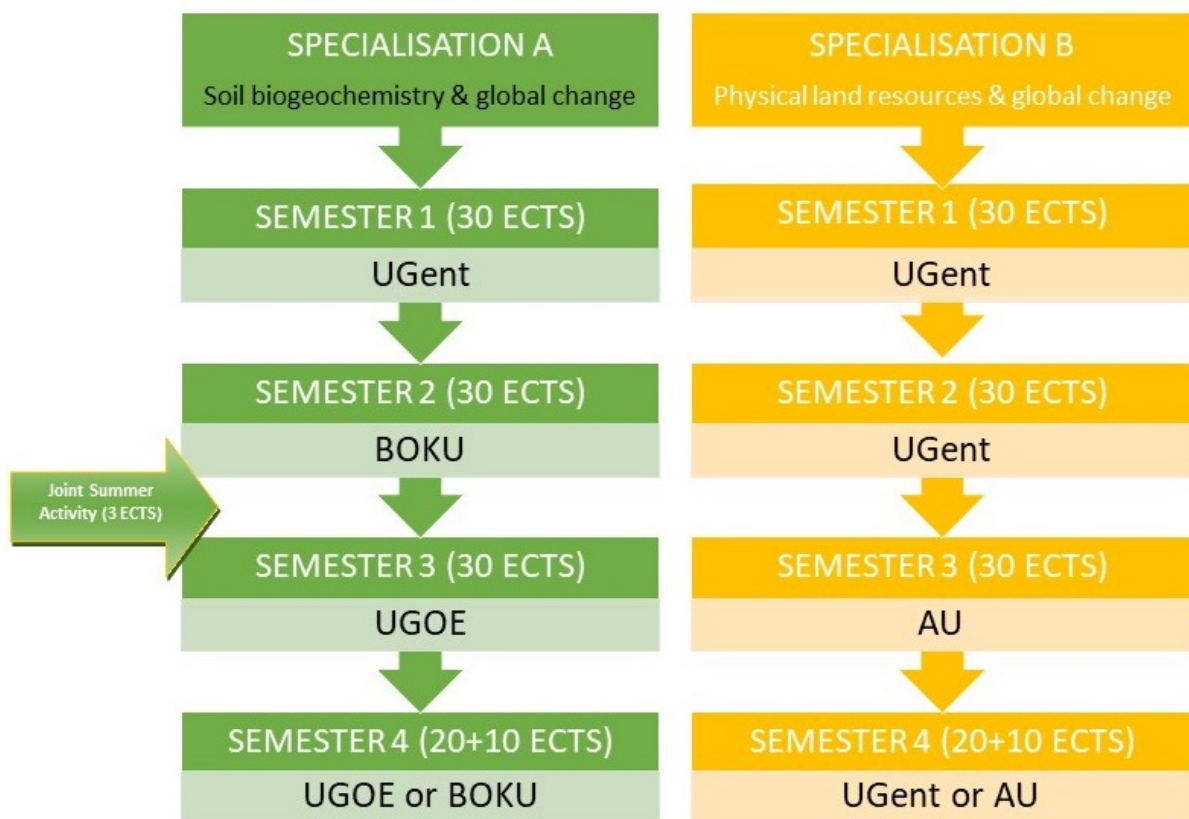
## § 3 PROGRAMME STRUCTURE

### 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:	no fewer than 66 ECTS credits
Master's thesis:	30 ECTS credits
Elective courses:	24 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 (specialization “Soil biogeochemistry & global change”) or stay at UGent (specialization “Physical land resources & global change”). The first modules of both Specialisations contain both theoretical classes and practical exercises, field trips and excursions. At BOKU the module ‘Sustainable land management’ will be completed by the students in the second semester of Specialization A. The Joint Summer Activity is offered during the summer break between the second and third semester. Alternatingly, a Field Work in China and a Summer School at BOKU are organised. The three 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 (Specialization “Soil biogeochemistry & global change”) or AU (Specialization “Physical land resources & global change”). If students specialise in ‘Soil biogeochemistry and global change’, they move to UGOE for the ‘Biogeochemical consequences of global change’ Module. Students specialising in ‘Physical land resources and global change’ move to AU for the ‘Soil physical consequences of global change’ Module.

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 organizing their specialization, under supervision of two lecturers of two consortium partner institutions (BOKU, UGOE). The students will receive 30 ECTS for their MSc 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 (Specialization A):

Specialization A: Soil biogeochemistry & global change A2. Sustainable land management	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
Globalisation and rural development	VO	3
Soil problems in aridic and semiaridic regions	VO	3
Summer school (Vienna, with JRC) or field work (China, with CAS)	PJ	3

In addition, students will have to complete the 30 ECTS compulsory courses at the partner university UGent in the area of “Soil fundamentals” and 18 ECTS compulsory courses at the partner university UGOE in the area of “Biogeochemical consequences for global change”.

## § 5 ELECTIVE COURSES

Elective courses worth a total of 12 ECTS credits at BOKU are required to complete the master's programme (Specialization A).

<b>Specialization A: Soil biogeochemistry &amp; global change A2. Sustainable land management</b>	<b>Course type</b>	<b>ECTS credits</b>
<b>Course title</b>		
<b>Possible impacts of climate change on water resources</b>	<b>VO</b>	<b>3</b>
<b>Environmental risk analysis and management</b>	<b>VO</b>	<b>3</b>
<b>Valuation methods for natural resources</b>	<b>VO</b>	<b>3</b>
<b>Soil management in tropical and subtropical developing regions</b>	<b>VO</b>	<b>3</b>
<b>Soil fertility and soil ecology in organic agriculture</b>	<b>VU</b>	<b>3</b>
<b>Agroforestry in mountain regions</b>	<b>VS</b>	<b>3</b>
<b>Field trip – rural water management</b>	<b>EX</b>	<b>1</b>
<b>Forest soil biology</b>	<b>VU</b>	<b>3</b>
<b>Soil microbiology course</b>	<b>UE</b>	<b>4</b>

In addition, students will have to complete 12 ECTS elective courses at the partner university UGOE in the area of "Biogeochemical consequences for global change".

## § 6 MASTER'S THESIS

A master's thesis is a paper on a scientific topic, to be written as part of a master's degree programme (for exceptions please see the By Laws (Satzung) of the University of Natural Resources and Life Sciences, Vienna, part III- Teaching, § 30 [9]). The thesis is worth a total of 30 ECTS credits. With their master's theses, students demonstrate their ability to independently address a scientific topic, both thematically and methodologically (§ 51 [8] UG 2002 BGBl. I no. 81/2009).

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 can conduct their master's thesis research at one of the institutions organizing their specialization, under supervision of two lecturers of two consortium partner institutions (BOKU or UGOE). Each student will have a supervisor from one partner university and a co-supervisor from another partner university of his/her specialization, 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 should be integrated in the thesis defensio (on-site or via video conference).

## **§ 7 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.

## **§ 8 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).

## **§ 9 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 24 ECTS credits (§ 5)
- a positive grade on the master's thesis worth a total of 30 ECTS credits and the defensio

(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 equivalent 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).

## **§ 10 EFFECTIVE DATE**

This curriculum shall take effect on October 1, 2019 and expires at the end of September 30, 2024.

## **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 respective 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)**