

Universität für Bodenkultur Wien

University of Natural Resources and Life Sciences, Vienna



## Curriculum

for the Master's Programme in

## International Master in Horticultural Sciences

Programme classification no. 066 454

Effective date October 1<sup>st</sup>, 2019



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## Preamble

The international master's programme "**International Master in Horticultural Sciences**" (**IMaHS**) is conducted and offered by six European universities in collaboration – each providing high quality specialization in an individual specific field:

- Alma Mater Studiorum - University of Bologna (UNIBO; Università di Bologna, Italy) / Free University of Bozen-Bolzano (FUB; Bolzano, Italy).
- Technical University of Munich (TUM; Technische Universität München-Weihenstephan, Germany),
- Humboldt University of Berlin (HUB; Humboldt-Universität zu Berlin, Germany),
- University for Natural Resources and Life Sciences Vienna (BOKU; Universität für Bodenkultur Wien, Austria),
- Szent István University (SZIU, Szent István Egyetem, Hungary),

## § 1 QUALIFICATION PROFILE

The master's programme "International Master in Horticultural Sciences" (IMaHS) 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.

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

Graduates of the programme will have gained technological, socio-economic and life-sciences expertise and competence focused on cultivation, control, management of highly value creating and minor horticultural crops. This expertise will enable them to develop interdisciplinary solutions in the contexts of research, horticultural entrepreneurship and public domain. It will enable them to work for an increase of life standard and quality of life both in developing and developed countries. As well innovation and requirements for permanent improvement of processes, products and technologies are addressed.

Graduates will have gained the ability to understand, apply and evaluate actual techniques in a) biochemistry and molecular physiology of plants in horticultural biotechnology, b) environmental and ecological aspects of horticulture, c) design of experiments for studying environmental, technological and human impacts on the quantity and quality of horticultural crops, d) methodology of analyzing of horticultural plant-propagation, production systems and postharvest-management.

They will have developed the highly skilled ability to understand and reproduce scientific research in horticultural crop production, management and applications as well as knowledge-transfer in the fields of horticulture - from designing a research plan, data analysis up to presentation of results and discussion to develop competence for future professional and scientific activities.

### 1b) Professional qualifications

The objective is to train and educate students on a high level in research-based knowledge and academic skills. All levels from plant-stands to genes are covered. Fields of expertise from biotechnology to sustainability and organic strategies are represented. The focus for students will be on theoretical studying to gain and improve academic qualifications and skills.

Graduates of the programme are qualified to start and develop future career profiles in: research and development (R&D); in the horticultural and related business and industries; horticultural nursery management; training, guidance and teaching; public administration and agricultural chambers as well as green technologies.

## **§ 2 ADMISSION REQUIREMENTS**

Graduates of the following bachelor's programmes offered by BOKU University of Natural Resources and Life Sciences, Vienna are eligible for admission with no further requirements on:

1. BSc Agricultural Sciences
2. BSc Viticulture, Oenology and Wine Economics
3. BSc Environment and Bio-Resources Management
4. BSc Landscape Architecture and Landscape Planning

Graduates of agricultural, horticultural and biological bachelor's programmes offered by the partner universities within the consortium are also eligible for admission with no further requirements.

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

- Horticultural and agricultural plant-production (minimum 12 ECTS credits)
- Plant-health-management (plant protection) (minimum 6 ECTS credits)
- Horticultural/agricultural management, business and social sciences (minimum 6 ECTS credits)
- Life sciences (minimum 12 ECTS credits)
- Science of human nutrition or landscape or garden design (minimum 3 ECTS credits)

Preferably graduates from programmes such as "Horticulture", "Agriculture / Crop production", "Landscaping" "Biology / Botany" or "Human nutrition" are regarded qualified for the master's programme "International Master in Horticultural Sciences".

Admission criteria also comprise English Language Skills at the Level B2 of the Common European Framework of References for Languages (CEFR). Equivalent test and their required minimum scores are as following:

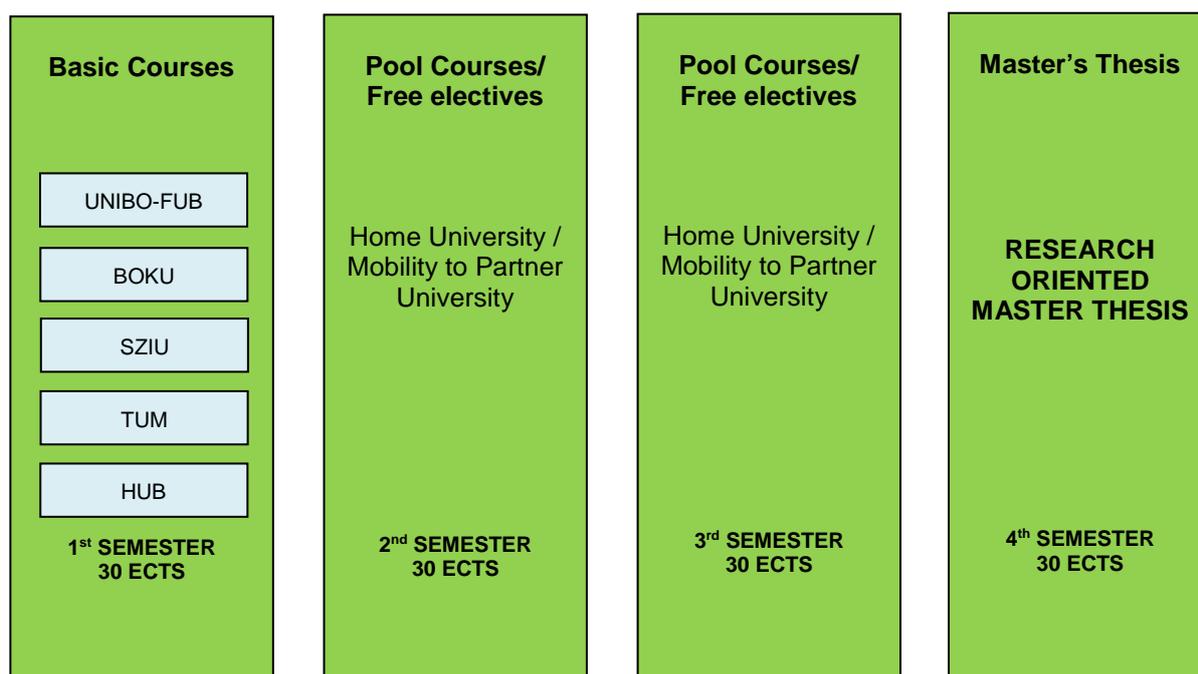
- Cambridge Certificate of Advanced English
- IELTS score 6.0 or better
- TOEFL (paper based 577 or computer-based 233 or 90-91 internet based)
- TOEIC (at least 785 points)

Admission is granted to prospective students who meet the admission criteria and admission at one of the Parties is automatically accepted at all other Parties.

## **§ 3 PROGRAMME STRUCTURE**

Registration for the first semester of the master's programme "International Master in Horticultural Sciences" can be done at any of the partner universities:

- University of Natural Resources and Life Sciences Vienna" (BOKU)
- University of Bologna (UNIBO) / Free University of Bozen-Bolzano (FUB)
- Szent István University (SZIU)
- Humboldt University Berlin (HUB)
- Technical University Munich (TUM)



Each student has to study at least at 2 different universities, each semester comprising at least 30 ECTS credits,

### 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 the duration of four semesters (a total of 3,000 60-minute credit hours). The programme is conducted entirely in English language.

Based upon the specialized topic chosen by the student, the amount of compulsory (for partners basic) and elective (for partners pool) courses can differ between the University partners. The total amount of compulsory, elective and free elective courses at BOKU are as following:

|                         |   |
|-------------------------|---|
| Compulsory courses:     | 30 ECTS credits including                                   |
| Master's thesis seminar | min. 2 ECTS   |
| Master's thesis:        | 30 ECTS credits (not including the Master's thesis seminar) |
| Elective courses:       | 42 ECTS credits   |
| Free electives:         | 18 ECTS credits   |

The master's programme "International Master in Horticultural Sciences" consists of topics with modules, each comprising 5 or 6 ECTS credits and offered in the form of several courses with different characters (different at the partner universities) – in lectures, lecture and tutorial, seminar or project (in total 90 ECTS credits). The modules are offered at the different universities, their comparability is assured based on the learning outcomes.

The master's thesis is 30 ECTS credits and is supervised by a competent professional person at the chosen university within the IMaHS network. A co-supervision by a second competent professional person at a cooperating university is compulsory.

The ECTS acquired for courses offered at the partner university will count towards the 120 ECTS required to complete the study programme. They can either be acknowledged as elec-

tive (pool) courses or free electives. The elective courses taken at the partner university have to be in one of the five topic areas agreed between the partner universities (see §3c). During the mobility at least 30 ECTS have to be completed at the partner institution.

The first semester is equally offered by all of the partners. It comprises 5 compulsory areas, which aim to provide the essential knowledge needed by all students to successfully face the topics offered in the following semesters.

### **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, compulsory internship and free electives are excluded from the three-pillar rule.

### **3c) Joint degree programmes**

Students in the master's programme "International Master in Horticultural Sciences" have free choice of mobility among the partners, with a minimum of one mobility-activity during the master's programme

Then specialization courses in the five areas of

1. Plant Physiology and Chemistry
2. Breeding and Biotechnology
3. Plant Pathology and Protection
4. Production Process Design and Quality Management
5. Horticultural Economy/Horticultural Systems – Management and Resources

have to be completed. The master's thesis can be conducted at any of the partner universities. In case of the choice of a host-university it counts as fulfilment of the international mobility-activity only in agreement with the university where the master's thesis will be conducted.

The structure of the courses will be divided into Basic and Pool courses which will be divided according to the five topic areas.

The fourth semester is designed to conduct the master's thesis under academic supervision of competent professional persons. The master's thesis can be conducted at any of the partner institutions within the partner universities. It is compulsory to choose a second supervisor from another partner institution.

The topic of the master's thesis has to be selected from one of the fields of horticulture present, respectively addressed, in the curriculum. Ideally the thesis creates significant scientific new value or knowledge.

## § 4 COMPULSORY COURSES

Compulsory courses (for partners basic courses) worth a total of 30 ECTS credits are required to complete the master's programme.

The following compulsory courses are required to complete the master's programme:

### **Compulsory Courses (Basic Courses) - BOKU (home university)**

| 1. Physiology of horticultural crops (6 ECTS)  | Course type | ECTS credits |
|--|-------------|--------------|
| Course title   |             |              |
| Biology and physiology of the grapevine  | VS          | 3            |
| Basics of plant, stress and storage physiology in horticulture                               | VS          | 3            |
| 2. Basics of biotechnology in horticulture (6 ECTS)  | Course type | ECTS credits |
| Course title   |             |              |
| Plant biotechnology  | VO          | 3            |
| Gene technology for plant pathologists   | VO          | 3            |
| 3. Phytopathology in horticulture (6 ECTS)   | Course type | ECTS credits |
| Course title   |             |              |
| Ecological plant protection  | VU          | 3            |
| Global change and pest management  | VO          | 3            |
| 4. Horticultural crop quality management (7 ECTS)  | Course type | ECTS credits |
| Course title   |             |              |
| Horticultural products as a source of functional food: physiological and nutritional aspects | VS          | 3            |
| Aspects of product quality in plant production   | VX          | 4            |
| 5. Scientific methods in horticultural research (min. 5 ECTS)                                | Course type | ECTS credits |
| Course title   |             |              |
| Presenting at a scientific conference  | SE          | 3            |
| Master's thesis seminar  | SE          | 2            |

*Tech./Eng.= technology and engineering; Nat.sci. = natural sciences; EcSoLa = economic and social sciences, law*

## § 5 ELECTIVE COURSES

42 ECTS credits of pool courses in the five topic areas are required to complete the master's programme.

## Elective Courses (Pool Courses) at BOKU

| 1. Plant Physiology and Chemistry (min. 9 ECTS)   | Course type | ECTS credits |
|---|-------------|--------------|
| Course title  |             |              |
| Physiology of crop nutrition  | VO          | 4            |
| Physiology of crop nutrition – Laboratory exercises                                     | UE          | 3            |
| Biology and physiology of the grapevine-exercises                                       | UE          | 3            |
| Plant based aspects of abiotic stress responses in grapevine                            | VS          | 3            |
| Methods in horticultural physiology   | US          | 3            |
| Plant and environment   | VO          | 3            |
| Water relations of plants   | VO          | 3            |
| Ecology and population biology of plants in agro-ecosystems                             | VX          | 5            |
| Plant sensing, response and adaptation to the environment                               | SE          | 2            |
| 2. Breeding and Biotechnology (min. 6 ECTS)   | Course type | ECTS credits |
| Course title  |             |              |
| Traditional and molecular aspects of grapevine breeding and selection                   | VS          | 3            |
| Genetic control of secondary metabolites in perennial crop plants                       | VS          | 3            |
| Plant breeding – principles and methods   | VO          | 3            |
| Plant breeding – principles and methods – practical exercises                           | UX          | 3            |
| 3. Plant Pathology and Protection (min. 6 ECTS)   | Course type | ECTS credits |
| Course title  |             |              |
| Laboratory diagnosis of plant damages   | UE          | 3            |
| Plant virology and bacteriology   | VU          | 3            |
| Plant nematology  | VU          | 1,5          |
| 4. Production Process Design and Quality Management (min. 12 ECTS)                      | Course type | ECTS credits |
| Course title  |             |              |
| Special vegetable growing   | VS          | 3            |
| Vegetable growing – field trip  | EX          | 0,5          |
| Medicinal and aromatic plants   | VO          | 3            |
| Production of medicinal and aromatic plants   | US          | 3            |
| Irrigation design   | VU          | 3            |
| Floriculture  | VS          | 3            |
| Project in horticulture   | PJ          | 4            |
| Organic fruit production and organic viticulture  | VX          | 3            |
| World wines and viticulture   | VS          | 3            |
| Organic horticulture (vegetables and ornamentals)                                       | VX          | 3            |
| Rhizosphere processes and application to agriculture and soil protection                | VO          | 3            |
| 5. Horticultural Economy/Horticultural Systems – Management and Resources (min. 6 ECTS) | Course type | ECTS credits |
| Course title  |             |              |
| System analysis and scenario technique – methods and practises                          | SE          | 5            |
| E-business in the agriculture and food value chain                                      | SE          | 3            |
| European regulatory framework for organic production                                    | VO          | 3            |
| Global networking   | SE          | 6            |
| Soil fertility and soil ecology in organic agriculture                                  | VU          | 3            |
| Planting design and horticultural ecosystem management                                  | PJ          | 3            |
| Getting to the point: Key messages and abstract writing in science                      | SE          | 2            |
| Viticulture and pomology journal club   | VS          | 3            |

|  |    |   |
|--|----|---|
| Ethics in organic agriculture                | SE | 3 |
| Sustainable land use in developing countries | VO | 3 |

*Tech./Eng.= technology and engineering; Nat.sci. = natural sciences; EcSoLa = economic and social sciences, law*

## § 6 FREE ELECTIVES

Free electives worth a total of 18 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. Free electives are intended to impart knowledge and skills in the student's own academic subject as well as in fields of general interest.

## § 7 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 thesis, 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).

The master's thesis shall be written in English. Languages other than English are permissible only if approved and confirmed by the thesis supervisors. The thesis defensio must be held in English regardless of the language of the thesis.

The master's thesis is 30 ECTS credits and is supervised by a competent professional person at the chosen university within the IMaHS network. A co-supervision by a second competent professional person at a cooperating university is compulsory.

## § 8 COMPLETION OF THE MASTER'S PROGRAMME

The master's programme in "International Master in Horticultural Sciences" 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 master's programme in "International Master in Horticultural Sciences" are awarded the academic degree "Master of Science", abbreviated as "MSc" or "M.Sc." by the first supervisor's home university. The academic degree MSc (M.Sc.) shall follow the bearer's name (§ 88 [2] UG 2002 BGBl. I no. 81/2009).

## § 10 EXAMINATION REGULATIONS

(1) Examination regulations of the university where the exam was taken are applicable.

(2) The master's programme "International Master in Horticultural Sciences" has been completed successfully when the following requirements (corresponds to components in [8] below) have been met:

- positive completion of the compulsory courses worth a total of 30 ECTS credits (§ 4);
- positive completion of the elective courses worth a total of 42 ECTS credits (§ 5);
- positive completion of the free elective courses worth a total of 18 ECTS credits (§ 6);
- a positive grade on the master's thesis and the defensio.

(3) 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.

(4) 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.

(5) 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.

(6) 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%

(7) 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 TRANSITIONAL PROVISIONS**

(1) Students who are subject to the master curriculum Horticultural Sciences (UH 066 454, version October 1, 2016) that was in action to date, are entitled to complete their study programme until November 30, 2020.

(2) For those students who are repositioned to this master's programme after the transitional period or who voluntarily change to this master's programme, examinations for courses taken under the provisions of the previously valid curriculum shall be recognized towards the new programme under the provisions of this curriculum based on the list of equivalent courses.

## **§ 12 EFFECTIVE DATE**

This curriculum shall take effect on October 1<sup>st</sup>, 2019.

## **ANNEX A TYPES OF COURSES**

The following types of courses are available:

### **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's 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)**