



Universität für Bodenkultur Wien

University of Natural Resources and Life Sciences, Vienna

# Curriculum

for the Master Programme in

# Plant Sciences

Programme Classification No. 066 455

Effective Date: October 1<sup>st</sup>, 2023



For legal purposes, only the version of the curriculum that has been published in the official journal (Mitteilungsblatt) is binding and valid - this English translation is for information purposes only.

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**Curriculum of the Master Degree Programme  
“Plant Sciences”**

At the University of Natural Resources and Life Sciences, Vienna

*As at October 1<sup>st</sup>, 2023*

## **1 § QUALIFICATION PROFILE**

The Master programme in Plant Sciences is a 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**

The Master programme in Plant Sciences imparts students a substantial and cross-curricular knowledge of functions and strategies of the utilisation of agricultural ecosystems for the production of vegetable raw materials for food- and feedstuffs, industrial raw materials and energy carriers. Students of the Master programme in Plant Sciences acquire interdisciplinary, scientifically-based qualifications for their further career in the area of crop production.

The broad choice of elective courses allows students to choose an individual qualification profile that is characterized by advanced knowledge in the natural sciences from a molecular to an ecosystemic level as well as skills concerning the specific and relevant agrarian and horticultural scientific methods.

Through free elective courses as well as foreign language-taught courses and the possibilities of international student mobility, students acquire competences in the interdisciplinary cooperation with other programmes, such as Agricultural and Food Economy, Livestock Sciences, or Organic Agriculture, as well as in international cooperation.

In the course of the Master programme, graduates have acquired the following scientifically-oriented key qualifications: broad expert knowledge, interdisciplinary joined-up thinking, analytical and problem solving abilities, abilities of transfer from gained knowledge and conclusions in natural and engineering sciences to the agricultural practice, abilities of project work and team work as well as communication abilities.

### **1b) Professional Qualifications**

Graduates of this programme are active in various fields of work in private as well as public organisations related to agriculture and horticulture and on local, national or international level: e.g. in the fields of production, marketing and supply of services (agrarian businesses, business cooperations, producer groups), upstream and downstream areas (business, industry or trade in agricultural and horticultural economics), counselling and training (Chamber for Agriculture, freelance counselling, agrarian schools and education), agrarian administrative office work and politics (provincial governments, ministries, EU-institutions, lobbies, controlling and certifying) as well as research and development (universities, research centres, industry).

## **2 § ADMISSION REQUIREMENTS**

Graduates of the Bachelor programmes in Agricultural Sciences and Viticulture, Enology and Wine Economics offered by BOKU University of Natural Resources and Life Sciences are eligible for admission with no further requirements.

For graduates of other Bachelor programmes completed at BOKU or other universities, mastery of the following learning outcomes is required for admission:

1. Knowledge in the basics of natural sciences (e.g. botany, molecular biology, physics, chemistry, maths and statistics) with a certificate of a total of at least 20 completed ECTS points for these subjects.
2. Knowledge in the basic areas of agricultural production techniques (e.g. plant breeding, plant nutrition, plant protection, agricultural and horticultural crop production, agricultural engineering, basics in animal production) with a certificate of a total of at least 35 completed ECTS points for these subjects.
3. Knowledge in the basic areas of social and economic sciences as well as law (e.g. economics, business management, agricultural markets, policy, and law) with a certificate of a total of at least 20 completed ECTS points for these subjects.

Furthermore, competences in English at a level of B2 (according to the Common European Framework of Reference for Languages by the Council of Europe) are recommended.

## **§ 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:	40 ECTS credits (including Master's Thesis seminar)
Master's Thesis:	30 ECTS credits (excluding Master's Thesis seminar)
Elective courses:	32 ECTS credits
Free electives:	18 ECTS credits
Foreign language-taught courses*):	10 ECTS credits

\*) Re foreign language-taught courses

Students are required to complete courses, which are related to the field of study, worth a total of 10 ECTS credits taught in a foreign language. These courses can be compulsory courses, elective courses, internships or free electives. Courses taken at international universities abroad are to be credited. General language courses (with the exception of specialised language courses) will not be considered. (General foreign language courses may be credited in the framework of free elective courses.)

A total of 20 ECTS credits worth of courses taught in English must be offered in the list of compulsory and elective courses included in this curriculum.

### **3b) Three-Pillar Principle**

The three-pillar principle is one of the central identifying characteristics of both the Bachelor and Master programmes offered at the University of Natural Resources and Life Sciences, Vienna. In the Master 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) Limited Number of Participants in Courses**

For courses with a limited number of participants the head of the Master course is authorised to first admit students enrolled in the Master programme (that means that students enrolled in a Bachelor study programme can only be admitted to the courses if further spaces are left on the course!) The admission of students enrolled in the Master study programme is conducted according to the following order of required courses by the students: compulsory course, elective course, free elective course.

## § 4 COMPULSORY COURSES

### Used Abbreviations:

ECTS = European Credit Transfer System

WS = Winter Semester

SS = Summer Semester

### Notes:

- 1) In English
- 2) In English and German
- 3) Courses not offered in the academic year 2023/24
- 4) Courses only offered in uneven years (e.g. 2021/22, 2023/24)
- 5) Courses only offered in even years (e.g. 2020/21, 2022/23)

The following compulsory courses worth a total of 40 ECTS credits are required to complete the Master programme:

Course Number	Subject (Module)	Course Type	Semester	ECTS Credits
	<b>Course Title</b>			
	Master's Thesis seminar	SE	SS or WS	2
	Interdisciplinary field trip (2 ECTS from the excursion pool below)	EX	SS or WS	2
	<u>Excursion pool:</u>			
951302	Production technology in grassland	EX	SS	0.5
951303	Production technology in crop husbandry	EX	SS	0.5
951304	Crop production	EX	SS	1
958303	Field trip for fruitgrowing and viniculture	EX	SS	1
952304	Vegetable growing - field trip	EX	WS	0.5
952305	Cultivation of perennials and planting design	EX	SS	0.5
951330	Field crop production and products	VS	WS	4
957307	Field crop breeding	VO	SS	3
953303	Parasitology and pathology of crop plants	VO	WS	3
951333	Physiology of crop nutrition <sup>1</sup>	VO	WS	4
911300	Soil physics and chemistry <sup>1</sup>	VO	WS	3
952306	Special vegetable growing	VX	WS	3
958307	Specific fruit production	VX	WS	3
931300	Agricultural engineering in plant production – seminar <sup>1</sup>	SX	SS	4
736367	Agricultural law	VO	WS	3
851301	Experimental design	VO	WS	3
958349	Advanced vineyard management <sup>1</sup>	VS	WS	3

## § 5 ELECTIVE COURSES

Elective courses worth a total of at least 32 ECTS credits are required to complete the Master programme.

<b>Course Number</b>	<b>W-1: Crop Production and Grassland Management</b>	<b>Course Type</b>	<b>Semester</b>	<b>ECTS Credits</b>
	<b>Course Title</b>			
951331	Cropping systems analysis <sup>1</sup>	VS	SS	4
951332	Crop production in the tropics and subtropics <sup>1</sup>	VO	SS	4
951329	Regeneration resources I	VO	WS	4
957310	Aspects of product quality in plant production <sup>1</sup>	VX	WS	4
951316	Medicinal and aromatic plants <sup>1</sup>	VO	WS	3
951328	Grassland management	VS	SS	4
951301	Plant sociology and soil aspects of the grassland farming	VO	WS	2
951318	Grassland management	VO	WS	3
951319	Restoration in the alpine area	VO	WS	3
951306	Crop production - practical course	UX	SS	3
951310	Physiology of crop nutrition - laboratory exercises <sup>1</sup>	UE	WS	3
831304	Ecology and population biology of plants in agro-ecosystems <sup>1</sup>	VX	WS	5
<b>Course Number</b>	<b>W-2: Crop Protection</b>	<b>Course Type</b>	<b>Semester</b>	<b>ECTS Credits</b>
	<b>Course Title</b>			
953340	Biological and biotechnical plant protection	VU	SS	3
953306	Laboratory diagnosis	UE	WS	3
831311	Biology and ecology of weeds	VO	WS	3
953328	Principles and methods in weed control	VX	WS	3
953316	Phytopathology	VS	WS	3
953336	Global change and pest management <sup>1</sup>	VO	WS	3
953314	Protection of stored crops	VX	SS	3
953313	Current plant protection issues	SE	WS	3
953331	Soil-borne pathogenes and symbionts	VU	SS	3
953335	Phytomedicine in pomology <sup>1</sup>	VU	SS	3
953312	Integrated and biological pest management in horticultural crops	VU	SS	3
953305	Agricultural pest diagnostics	UX	SS	3
953329	Chemistry and application of pesticides	VX	WS	3
831335	Techniques for plant determination <sup>5</sup>	VS	WS	2
831336	Plant determination – exercises <sup>5</sup>	UX	SS	1
<b>Course Number</b>	<b>W-3: Plant Biotechnology and Breeding</b>	<b>Course Type</b>	<b>Semester</b>	<b>ECTS Credits</b>
	<b>Course Title</b>			
957320	Plant breeding - principles and methods <sup>1</sup>	VO	WS	3
957321	Plant breeding - principles and methods - practical exercises <sup>1</sup>	UX	WS	3
941328	Molecular phytopathology <sup>1</sup>	VU	SS	4
790111	Plant biotechnology <sup>1</sup>	VO	WS	3
790327	Practical course in plant biotechnology <sup>1</sup>	UE	SS	4.5
772312	Plant biochemistry	VO	WS	2

957325	Molecular plant breeding <sup>1</sup>	VO	WS	3
957329	Molecular plant breeding practical <sup>1</sup>	UE	WS	4
957327	Resistance breeding of crop plants <sup>1</sup>	VO	WS	3
957328	Oilseed crops - breeding, production, utilisation <sup>3</sup>	VS	WS	3
957308	Field crop breeding - exercise course and field trip	UX	SS	3
957323	Biometrics in plant breeding and breeding research	VU	WS	3
957311	Breeding of horticultural and fruit crops	VO	SS	3
957322	Breeding of horticultural and fruit crops	UE	SS	3
<b>Course Number</b>	<b>W-4: Viticulture and Pomology</b>	<b>Course Type</b>	<b>Semester</b>	<b>ECTS Credits</b>
	<b>Course Title</b>			
958332	Quality assurance in fruit growing <sup>5</sup>	VO	WS	3
958314	Pomology and variety preservation <sup>2, 3</sup>	VU	WS	3
958315	Processing technology of fruit and vegetable	VO	WS	3
958317	Organic fruit production and organic viticulture <sup>1</sup>	VX	WS	3
958318	Research project in viticulture and fruit sciences <sup>1</sup>	PJ	SS	4
958347	Genetic control of secondary metabolites in perennial crop plants <sup>1</sup>	VS	WS	3
958334	Viticulture and pomology journal club <sup>1</sup>	VS	WS	3
953334	Plant pathology in viticulture	VU	WS	3
958345	Risk analysis in viticulture	VS	SS	3
958341	Traditional and molecular aspects of grapevine breeding and selection <sup>1</sup>	VS	WS	3
958342	World wines and viticulture <sup>1</sup>	VS	SS	3
958348	Biology and physiology of the grapevine <sup>1</sup>	VS	WS	3
<b>Course Number</b>	<b>W-5: Horticulture and Horticultural Design</b>	<b>Course Type</b>	<b>Semester</b>	<b>ECTS Credits</b>
	<b>Course Title</b>			
952337	Horticultural products as a source of functional food: physiological and nutritional aspects <sup>1</sup>	VS	WS	3
952324	Use of ornamental and scented plants (indoor, balcony, terrace, garden)	UX	WS	3
952326	Use of ornamental trees in landscaping	VU	SS	3
952327	Colour in garden design	VS	WS	3
852307	Preservation of historic gardens <sup>3</sup>	VS	SS	3
916329	Tree diseases in urban areas and cultural landscapes	VO	WS	3
952309	Perennials and annuals	VU	SS	3
952333	Organic horticulture (vegetables and ornamentals) <sup>1</sup>	VX	WS	3
952318	Floriculture <sup>1</sup>	VS	SS	3
874315	The nature of tree nursery	VS	SS	3
952328	Methods in horticultural physiology <sup>1</sup>	US	SS	3
952334	Project in horticulture <sup>2</sup>	PJ	SS	4
952320	Quality in horticulture	VS	WS	3
<b>Course Number</b>	<b>W-6: Soil Science</b>	<b>Course Type</b>	<b>Semester</b>	<b>ECTS Credits</b>
	<b>Course Title</b>			
911304	Soil Indicators <sup>1</sup>	VO	SS	3
911307	Interdisciplinary project work: soil sciences <sup>1</sup>	PJ	WS	6



911308	Soil physics - exercises in the laboratory	UE	SS	3
911309	Soil chemistry laboratory <sup>1</sup>	UE	WS	3
911329	Soil microbiology	VO	WS	3
911333	Soil microbiology course <sup>1</sup>	UE	SS	4
911312	Rhizosphere processes and application to agriculture and soil protection <sup>1</sup>	VO	WS	3
911334	Soil structure: development, functions and changes in agricultural soils	VX	SS	4
911314	Molecular microbial ecology of soils <sup>1</sup>	VU	SS	3
911303	Land taxation and soil mapping	VU	WS	3
911323	Soil in the environment	VX	SS	3
<b>Course Number</b>	<b>W-7: Agricultural Engineering</b>	<b>Course Type</b>	<b>Semester</b>	<b>ECTS Credits</b>
	<b>Course Title</b>			
931301	Mechanisation on grassland	VO	WS	3
931314	GPS-based agriculture	VX	SS	3
931302	Climate engineering	VO	WS	3
931305	Post-harvest technology <sup>1</sup>	VO	WS	3
931306	Composting technology	VX	SS	3
892303	Physical properties of agricultural products and materials	VO	SS	3
931307	Technology assessment of agricultural systems.	VS	WS	3
931308	Instruments of an advisory service for agricultural engineering and construction	VS	WS	3
931317	Biogas technology	VU	WS	3
931362	Production systems and atmospheric pollution <sup>1</sup>	VO	SS	3
931318	Technology manure utilisation	VU	WS	3
931312	Mechanization of agriculture in developing countries <sup>1</sup>	VS	SS	4
<b>Course Number</b>	<b>W-8: Supplemental Courses</b>	<b>Course Type</b>	<b>Semester</b>	<b>ECTS Credits</b>
	<b>Course Title</b>			
953333	Scientific working for crop sciences	SE	SS	3
814304	Agrometeorology <sup>1</sup>	VO	WS	3
851302	Experimental design - lab	UE	WS	3
790383	Bioinformatics: Selected aspects <sup>1</sup>	VU	WS or SS	3
835305	Mathematical modelling in life sciences	VU	SS	3
831313	Water relations of plants <sup>1</sup>	VO	WS	3
815325	Soil - water - landscape	VO	SS	3
951324	International agriculture <sup>1</sup>	VO	SS	3
831331	Stress physiology of plants	VO	SS	2
911332	Humus	VO	WS	3
736323	Biotechnology law <sup>1</sup>	VU	SS	3
952323	Women in rural gardening and agriculture	VU	WS	3
952338	Quality evaluation of horticultural products	US	SS	3

## **§ 6 FREE ELECTIVES**

Free electives worth a total of 18 ECTS credits are required to complete the Master programme. Free electives may be selected from all courses offered by all recognised 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.

A list of recommended free electives is included in Annex B.

## **§ 7 INTERNSHIP**

For the Master programme in Plant Sciences no compulsory internship is required. It is, however, recommended to deepen those competences gained during the study programme in voluntary vocational practice experiences. A practical training can be completed both at a university facility and an appropriate institution, establishment or business if those facilities are adequate. The vocational practical experience can be completed in the frame of the free electives and to an extent of 4 weeks in terms of a full employment (this accounts for 3 ECTS credit points). This practical experience has to be approved by the Programme Coordinator and has to provide for a meaningful addition to the study programme.

## **§ 8 MASTER'S THESIS**

A Master's Thesis is a paper on a scientific topic, to be written as part of a Master degree programme (for exceptions please see the By Laws of the University of Natural Resources and Life Sciences, Vienna, § 86[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 the Master's thesis shall be taken from a subject of the study programme. The Master's thesis is supervised by a person with full teaching authorisation (*venia docendi*) in this subject (exception: § 86 para. 7 of the Constitution of the University of Natural Resources and Life Sciences, Vienna). Joint supervision by two persons with full teaching authorisation (*venia docendi*) is permissible if at least one of these two persons represents a subject of the study programme.

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 German or English. Languages other than German or English are permissible only if approved and confirmed by the thesis supervisor. The thesis defence must be held in German or English regardless of the language of the thesis.

## **§ 9 COMPLETION OF THE MASTER PROGRAMME**

The Master programme in Plant Sciences has been completed when the student has passed all required courses and received a positive grade on the Master's Thesis and defence examination.

## § 10 ACADEMIC DEGREE

Graduates of the Master programme in Plant Sciences are awarded the academic title Diplom-Ingenieur (m) or Diplom-Ingenieur<sup>in</sup> (f), abbreviated as Dipl.-Ing./ Dipl.-Ing.<sup>in</sup> or DI/DI<sup>in</sup>. The academic title Dipl.-Ing./Dipl.-Ing.<sup>in</sup> or DI/DI<sup>in</sup>, if used, shall precede the bearer's name (§ 88 [2] UG 2002 BGBl. I no. 81/2009).

## § 11 EXAMINATION REGULATIONS

(1) The Master programme in Plant Sciences has been completed successfully when the following requirements have been met:

- positive completion of compulsory courses, including the Master's Thesis seminar, worth a total of 40 ECTS credits (§ 4)
- positive completion of elective courses worth a total of 32 ECTS credits (§ 5)
- positive completion of free electives worth a total of 18 ECTS credits (§ 6)
- a positive grade on the Master's Thesis and the defence examination.

(2) Student evaluation takes the form of course 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.

(3) The choice of examination method shall be based on the type of course: Lectures shall conclude with a written and/or oral examination, if continuous assessment of student performance is not applied. Seminars and project-based courses 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.

(4) The topic of the Master's Thesis shall be selected from one of the subjects of the Master programme. The student must inform the dean in writing prior to the commencement of the work on the Master's Thesis. Thereby, the student has to state the Master's Thesis topic as well as the name of the supervisor of the Master's Thesis.

(5) The completed Master's Thesis which has been assessed positively by the supervisor shall be publically presented by the student and defended in the form of an academic discussion (defence examination) after successful completion of all courses. The committee shall consist of a committee chair and two additional university lecturers with a *venia docendi* or equivalent qualification. The student's total performance (thesis and defence examination) will be assigned a comprehensive grade. Both thesis and defence examination must receive a passing grade for the student to complete the programme. The written evaluations stating the grounds for the thesis grade and the defence examination grade are included in calculating the comprehensive grade and are documented separately.

The comprehensive grade is calculated as follows:

- Master's Thesis: 70%
- Defence examination (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).

## **§ 12 TRANSITIONAL REGULATIONS**

Students who have not completed the formerly effective Master’s curriculum in Plant Sciences (UH 066 455) when this new Master’s curriculum comes into force are transferred to the currently valid one.

For students in the new Master’s curriculum already positively completed exams on courses from the old Master’s curriculum are acknowledged based on the equivalence list for the respective study programme.

## **§ 13 EFFECTIVE DATE**

This curriculum shall take effect on October 1<sup>st</sup>, 2023.

## **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.

### **Lab Course (UE)**

Lab 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's Thesis seminars are seminars intended to provide students with academic support during the thesis writing process.

### **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.

### ***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.

### **Lecture /Seminar (VS)**

### **Lecture/Lab (VU)**

### **Lecture/Field Trip (VX)**

### **Seminar/Field Trip (SX)**

### **Lab/Seminar (US)**

### **Lab/Field Trip (UX)**