



# Curriculum

for the Master's Programme in

# Horticultural Sciences

Programme classification no. 066 454

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<p style="text-align: center;"><b>Curriculum of the Master Degree Programme</b> <b>“Horticultural Sciences”</b> At the University of Natural Resources and Life Sciences, Vienna</p>
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*As at October 1<sup>st</sup>, 2011*

**§ 1 General Preliminary Remark**

The international Master degree programme Horticultural Sciences is accomplished in a similar way by several partners, all using one course pool. It is incumbent upon the rules and requirements of each individual co-operating university to conduct administrative affairs. Graduation requirements are subject to the respective co-operating university at which students complete parts of their international Master degree programme.

The co-operating universities Università di Bologna (University of Bologna), Universität für Bodenkultur Wien (University of Natural Resources and Life Sciences, Vienna), the Center of Life and Food Sciences Freising-Weihenstephan of the Technische Universität München (Technical University Munich), the Faculty of Agriculture and Horticulture of the Humboldt Universität zu Berlin (Humboldt University Berlin) and the Faculty of Horticultural Sciences of the Corvinus University of Budapest determined the disposition and amount of their co-operation in a so-called “Agreement of Interuniversity Cooperation”.

For the duration of the ERASMUS MUNDUS Master programme „International Master in Horticultural Sciences“ (IMaHS) it is possible to complete this IMaHS as a specialization within the Master programme “Horticultural Sciences”.

**§ 2 Description of Qualification**

This international Master degree programme shall prepare for a large variety of fields of activity in the area of horticultural sciences and related fields of work. The university education is based and focused on the teaching of the scientific foundation and methods. It shall provide practical experience as well as a foundation and application-orientated research work which enables graduates of this international Master degree programme to do their own scientific work.

Due to the consolidated use of the course pool, which is fed by the internationally co-operating partner universities and the required courses which all offer an international connection there is a distinct focus on an international qualification of graduates.

Special educational goals and aims of the offer of the University of Natural Resources and Life Science, Vienna, focus on the scientific work on the problematic aspect of quality in horticultural and market gardening products and horticultural production chain. This quality connotation also includes the aspect of sustainability, environmental compatibility and social tolerance as well as equality (for example gender issues or development cooperation).

**§ 3 Format of the Master Degree Programme**

- (1) The Master degree programme “Horticultural Sciences” comprises four semesters with 120 ECTS-points.
- (2) The first semester has to be completed at the University of Natural Resources and Life Science, Vienna. The positive completion of courses to an extent of 30 ECTS (so-called “core lectures”) is required. 5 of these 30 ECTS can be completed as optional courses.

- (3) For further scientific deepening the student can choose courses from the course pool offered by all co-operating partner universities. The positive completion of courses of 55 ECTS is required (so-called "pool lectures"). A minimum of 30 of these 55 ECTS have to be completed at other co-operating partner universities.
- (4) For graduation of the Master degree programme at the University of Natural Resources and Life Science, Vienna, students have to successfully complete a Master degree seminar (2 ECTS) as well as one additional seminar taken from the offer "Science management" (3 ECTS).
- (5) Master degree theses – 30 ECTS  
A thesis for the Master degree is a scientific graduation paper which serves the evidence that the student can work on a scientific subject in an autonomous way which is justifiable as far as content and methodology are concerned (§ 51 (1) Z.8 university law 2002).
- (6) Students who opt for the specialization IMaHS must have completed their first semester at the University of Bologna, their second at the TUM, their third at the University of Natural Resources and Life Sciences and the fourth at the particular university out of these three where the Master thesis is written. The defence of the Master thesis must be conducted in Bologna in any case. Separate application procedures must be complied.

#### **§ 4 Acknowledgement of Examinations**

- (1) For the acknowledgement of examinations, which were successfully completed at other post-secondary institutions of education, at the University of Natural Resources and Life Science, Vienna § 78 UG 02 has to be applied.
- (2) Examinations, which were successfully completed within the scope of the curriculum of the international Master degree programme "Horticultural Sciences" at co-operating partner universities are generally acknowledged according to § 78 (1) UG 02.

#### **§ 5 Academic Qualification**

According to § 54 (1) of the university law of 2002 the Master degree programme "Horticultural Sciences" is an engineering degree. In accordance with this classification of engineering degrees, graduates of the Master degree programme will be awarded the academic qualification "Diplom-Ingenieur of technical sciences", shortened to "Dipl.-Ing." or "DI".

#### **§ 6 Types of Courses**

Courses within the Master degree programme "Horticultural Sciences" as far as the courses at the University of Natural Resources and Life Science are concerned are defined as follows:

- (1) Lectures (VO):

Courses in which portions of an academic discipline and the methods involved are didactically presented.

(2) Practical exercises (UE):

Practical exercises are courses which are in professional connection to a lecture. They serve to apply specific practical abilities and skills presented theoretically during the lectures. Furthermore, these practical exercises also serve the acquisition of specific practical knowledge.

(3) Seminars (SE):

Seminars are courses which assist in the development of academic abilities. They serve to gain knowledge autonomously and deepen learned course content and scientific discussion.

(4) Excursions (EX):

Excursions are courses held in Austria and abroad and focus on aspects of the Master degree programme which cannot be imparted at the University of Natural Resources and Life Science, Vienna, itself.

(5) Project Courses (PJ):

These are characterised by problem-based learning. Within a certain topic, students work, primarily in small groups with assistance, through case studies involving the definition of a problem through realisation of the project to the production of written work.

(6) Combinations (VU, VX, VZ, VY, VS, UX, UY, SX)

Courses in which aspects of courses referred to in (1) to (5) are combined didactically:

- lectures with practical exercises (VU)
- lectures with excursions (VX)
- lectures with seminars and excursions (VSX = VY)
- lectures with practical exercises and excursions (VUX = VZ)
- lectures with seminars (VS)
- exercises with excursions (UX)
- exercises with seminars and excursion (USX = UY)
- seminars with excursion (SX)

(7) If necessary courses can also be held out of the University of Natural Resources and Life Science, Vienna.

## § 7 Timetable of Courses

### Used abbreviations:

LV = course

SST = semester hours

ECTS = European Credit Transfer System points

WS = Winter Semester

SS = Summer Semester

T2 = 2-year rotation 2 = Courses which take place on even academic years (every two years), for example 2008/09 and 2010/11.

T1 = 2-year rotation 1 = Courses which take place on uneven academic years (every two years), for example 2009 and 2011.

### (1) “Core Lectures“ (C)

1. Core Lectures to an extent of **at least 25 ECTS** – Points have to be completed.

<i>Number</i>	<i>Type</i>	<i>Name</i>	<i>Language</i>	<i>Semester</i>	<i>SST</i>	<i>ECTS</i>
<b>Core Lectures</b>						
952.306	VX	Special Vegetable-Growing	German	WS	2.0	3.0
952.307	VX	Specific Fruit production	German	WS	2.0	3.0
951.316	VO	Medicinal and Aromatic Plants	English	WS	2.0	3.0
951.311	VO	Breeding of Horticultural and Fruit Crops	German	SS	2.0	3.0
951.309	VO	Physiology of Plant Nutrition	German	WS	3.0	4.5
951.310	UE	Plant Nutrition - Practical Lab	German	WS	2.0	3.0
953.324	VU	Ecological Plant Protection	German	WS	2.0	3.0
953.316	VS	Phytopathology	German	WS	2.0	3.0
791.111	VO	Plant Biotechnology	English	WS	2.0	3.0
772.312	VO	Plant Biochemistry	German	WS	2.0	3.0
952.320	VS	Quality in Horticulture	German	WS	2.0	3.0
911.300	VO	Soil Physics and Soil Chemistry	English	WS	2.0	3.0
952.153	VY	Phytopathology in Horticulture	German	T2, WS	2.0	3.0

2. Free Elective Courses: Courses to an extent of 5 ECTS-Credits have to be completed. These can be chosen from the list of core lectures or from the further course offer of the Master study of the University of Natural Resources and Life Sciences or other national and international universities.

## (2) **“Pool Lectures” (P)**

For now, these courses are offered in German – if required they can also be offered in English (at least course materials and examinations are provided in English).

### **POOL Lectures (International Pool):**

<b>Number</b>	<b>Course</b>	<b>Type</b>	<b>SST</b>	<b>ECTS</b>	<b>Semester (W..Winter, S..Summer)</b>	<b>Language (G..German, E..English)</b>
<b>Breeding and Biotechnology</b>						
954.321	Plant Molecular Biology	VO	2.0	3.0	S (G)	
772.306	Proteomics	VU	2.0	3.0	S (E)	
952.329	Genetics in Viticulture and Pomology	VO	2.0	3.0	W (E)	
951.325	Molecular Plant Breeding	VO	2.0	3.0	W (E)	
951.326	Molecular Plant Breeding-UE	UE	3.0	4.5	W (E)	
952.330	Viticulture and Pomology Journal Club	SE	2.0	3.0	W (E)	
756.334	Biomarkers in Food Characterization	VS	2.0	3.0	S (E)	
<b>Total</b>			<b>15</b>	<b>22.5</b>		

### **Plant and Soil Biochemistry**

911.307	Interdisciplinary Project Work: Soil Sciences	PJ	4.0	6.0	W (G)	
953.309	Introduction to Plant Nematology	VU	1.0	1.5	W (E)	
911.312	Rhizosphere Processes and Application to Agriculture and Soil Protection	VO	2.0	3.0	S (E)	
911.313	Soil Structure: Development, Functions and Changes in Agricultural Soils	VX	3.0	4.5	S (G)	
953.310	Soil-borne Pathogenes and Symbionts	VZ	2.0	3.0	S (G)	
<b>Total</b>			<b>12</b>	<b>18</b>		

### **Plant Protection**

953.319	Literature Seminar - Applied Plant Science	SE	2.0	3.0	S (G)	
953.306	Laboratory Diagnosis of Plant Damages	UE	2.0	3.0	W (G)	
953.301	The Ecological Basis of Biological Control	VO	2.0	3.0	W (E&G)	
953.312	Integrated and Biological Pest Management in Horticultural Crops	VU	2.0	3.0	W(G)	
954.313	Genetically modified organisms in the environment	SE	2.0	3.0	S(E)	

953.102	Applied Entomology in orchards, vineyards and horticultural crops	VY	2.0	3.0	W(E)
954.309	Molecular Phytopathology	VU	3.0	4.5	S(G)
<b>Total</b>			<b>15</b>	<b>22.5</b>	

### Economics

735.329	Decision Making in Management with Special Emphasis on Cultural Differences	VO	2.0	3.0	S(E)
731.348	Managerial Economics	VU	2.0	3.0	S(E)
731.324	Resource and Environmental Economics	VO	2.0	3.0	S(E)
913.302	Decision Support Systems	VS	2.0	3.0	W(E)
<b>Total</b>			<b>8</b>	<b>12</b>	

### Crop Management

952.316	Organic Fruit Growing and Viticulture	VY	2.0	3.0	W(G)
952.317	Biological Production of Vegetables and Ornamentals	VY	2.0	3.0	W(E)
952.318	Floriculture (Ornamentals Supply Chains)	VX	2.0	3.0	W(E)
951.315	Aspects of Product Quality in Plant Production	VZ	2.0	3.0	S(E)
952.315	Processing Technology of Fruit and Vegetable	VO	2.0	3.0	W(G)
952.328	Postharvest Technology (Horticulture)	VX	2.0	3.0	W(G)
952.311	Interdisciplinary Project in Organic Horticulture, Fruit Growing and Viticulture	PJ	4.0	6.0	S(G)
952.310	Interdisciplinary Project in Horticulture, Fruit Growing and Viticulture	PJ	4.0	6.0	S(G)
933.303	Safety and Quality of Organic Foods	VO	2.0	3.0	S(E)
	Physiology and Management of Grape Vines		2.0	3.0	W (E)
<b>Total</b>			<b>24</b>	<b>36</b>	

### Crop Ecophysiology

831.302	Methods of Measuring Stress Resistance in Plants	VU	2.0	3.0	S (G)
831.313	Water Relations of Plants	VO	2.0	3.0	T2, W (G)
831.321	Woody plant physiology - practical exercises	UE	1.0	1.5	S(G)
831.312	Plants and their Environment	VO	2.0	3.0	W (E)

814.301	Meteorological conditions and precipitation	VS	2.0	3.0	W(E)
<b>Total</b>			<b>9</b>	<b>13.5</b>	

### Complementary activities

852315	Design Theory in Landscape Architecture	VS	2.0	3.0	S(E)
954.318	Developmental Genetics of Plants	SE	2.0 o 2.0	3.0 o 3.0	W/S (E)
	Master's Thesis Seminar (obligatory for graduation at the University of Natural Resources and Life Sciences)	SE	2.0 o 2.0	2.0 o 2.0	W/S (G/E)
120.029	English for Science and Technology	VO	2.0, 2.0	2.0, 2.0	W&S (E)
<b>Total</b>			<b>10</b>	<b>13.5</b>	

### Excursion

952.303	Excursions for Fruit Growing and Viniculture	EX	1.0	1.0	S(G)
952.304	Excursion of Vegetable Growing	EX	0.5	0.5	W(G)
952.305	Excursion of Cultivation of Ornamentals	EX	0.5	0.5	S(G)

## § 8 Thesis for the Master Degree

- (1) The thesis for the Master degree is an integral part of the Master degree programme Horticultural Sciences. 30 ECTS are granted for the thesis for the Master degree.
- (2) The scientific subject of the graduation paper has to be chosen from a subject relevant and related to the Master degree programme Horticultural Sciences.
- (3) The supervision and grading of the candidate's work is incumbent upon the university professor who has assigned the chosen subject for the graduation paper.
- (4) The thesis for the Master degree has to be presented and defended in a public expert talk before evaluation by the supervisor. The result of this presentation has to be integrated in the grading of the Master degree thesis.

## § 9 Graduation Requirements

- (1) For those parts of the Master degree programme completed at co-operating partner universities the examination regulations of the respective university has to be applied.
- (2) At the University of Life Sciences Vienna the Master degree programme Horticultural Sciences is concluded upon the successful completion of the following requirements:
  - Positive completion of all required compulsory courses of the first semester ("core lectures") including 30 ECTS (according to §3 (2) and §7 (1)),
  - positive completion of a minimum of 55 ECTS taken from the course pool of co-operating partner universities ("pool lectures"),
  - a minimum of courses to an extent of 30 ECTS have to be completed at co-operating partner universities,

- positive completion of the Master degree seminar (2 ECTS) and one further seminar taken from the offer of “Science management” (3 ECTS),
  - positive evaluation of the Master degree thesis and its public defence (according to § 8).
- (3) Evaluation takes place as course exams. Course examination may be oral and / or written, as defined by the lecturer. Students are granted the right to request a different method of course examination.
  - (4) The course examination has to be in accordance with the type of course: lectures are concluded either orally or in a written, unless they are not evaluated accompanying the lecture. Courses of the types SE, VS, VSX, SX and USX can be concluded by handing in a self-composed, written seminar paper. The amount of this seminar paper has to be defined by the lecturer of the course. With all other types of courses the method of course examination will be defined individually by the lecturer.
  - (5) The graduation paper is a scientific piece of work which serves the evidence of the student's ability to work autonomously on a scientific subject in a way that is justifiable as far as content and methodology are concerned. (§ 51 (1) Z. 8 UG 2002).
  - (6) The concluded graduation paper has to be presented and defended in a public expert talk. This presentation and defence has to be organised by the supervisor of the thesis. At least two additional university lecturers with respective professional competence have to be nominated. These persons also have to participate in the subsequent expert talk. The candidate has the right to suggest these persons. These summoned university lecturers have to be informed on the topic of the graduation paper in advance.

## **§ 10 Admission to the Master Degree**

- (1) Graduates of a Bachelor degree programme “Agricultural Sciences” or of a similar Bachelor degree programme taken from the field of “Life Sciences” of a national or international university are admitted to this Master degree programme.
- (2) It has to be stated that knowledge in the fields of natural sciences, socio-economy basics, agrarian production, horticultural and market gardening production is required for graduates of other Bachelor degree programmes.
- (3) For the specialisation IMaHS admission requirements and procedures as specified on the website [http://www.agrsci.unibo.it/dicabo/imahs/index\\_file/page0004.htm](http://www.agrsci.unibo.it/dicabo/imahs/index_file/page0004.htm) have to be followed.

## **§ 11 Commencement**

The Master degree programme Horticultural Sciences comes in force on October 1, 2004.

## **§ 12 Appendix: Courses Offered by Co – Operating Universities**

Please see the attached tables on the next pages

(3) Equivalence table between the “Laurea specialistica **Ortofrutticoltura internazionale**” and the corresponding titles given by TUM and BoKu. (I) given in Italian; (E) given in English, (G) given in German; (G/E) available in English on request. (W: 1st and 3rd semester) = winter semester; (S: 2nd and 4th semester) = summer semester

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Breeding and Biotechnology</b>					
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale *		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)	
Breeding & biotechnology applied to fruit trees)	6 (S)	Biotechnology in horticulture (E)	5 (S)		
Advanced techniques applied to grape	5 (S)				
		Horticultural plant breeding (E)	5 (W)	Genetics in viticulture (E)	3 (W)
		Crop biotechnology: plant breeding and micropropagation (G)	5 (W)		

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Plant and soil Biochemistry</b>					
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale *		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)	
Soil fertility	4(S)	Control and optimization of secondary plant metabolites (E)	5(S)	Rhizosphere Processes and Application to Agriculture and Soil Protection (E)	3 (W)
Rhizosphere microbial ecology and biotechnology	4 (S)	Analysis of bioactive compounds in fruits and vegetables (E)	5 (CC, S, W)	Ecology and Management of the Rhizosphere in Ecological Engineering (E)	4.5 (W)
		Genetic and environmental control of vegetal plants (G/E)	5 (S)	Soil and Plant Ecology	3 (W)
		Secondary plant metabolites and human health (E)	5 (S)		

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Plant Protection</b>					
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale *		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)	
Post-harvest protection and storage	4 (W)	Host parasite interaction (E)	5 (W)		
Insect resistance mitigation to artificial control methods (E)	3 (W)				
Fruit tree pathology	4 (W)	Methods in woody plant pathology (E)	5 (S)		
Diagnosis and control of plant disease	3 (W)				
Ecology of insect population (E)	3 (S)				
				The ecological basis of biological control (E)	3 (W)
				Introduction to plant nematology (E)	1,5 (W)

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Economics</b>					
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale *		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)	
		Controlling (in horticultural farms) I (G)	5 (W)	Economics is not included. In order to achieve the recognition of the degree in Italy, a total amount of 5 credits during the University career (including Bachelor degree) is required	
Agricultural policies	5 (W)				
		Controlling (in horticultural farms) II (G)	5 (S)		
Measuring management performance C	4(W)				
		Management planning and control (G)	5 (S)		
Agrifood marketing	6(W)				
		Natural Resource Management (E)	5 (S)		

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Crop Management</b>					
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale *		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)	
		Systems analysis as a research method (E)	5 (S)		
Nursery & Orchard management A	5 (W)				
Fruit tree physiology A	3(W)			Physiology and management of grapevines	3 (W)
Non-destructive methods for fruit quality assessment (E)	3 (W)	Model systems and crop quality (E)	5 (W)		
Vegetable crops (I)	5 (S)	Energy conservation and alternative energy resources(E)	5 (CC, S, W )		
Mechanization ergonomics and safety of spraying machines (I)	5(S)	Crop physiology: growth and development of plants (G)	5 (W)		
		Crop quality: basic of quality control and assurance (G)	5 (W)		
				Biological Production of Vegetables and Ornamentals (G/E)	3 (W)
				Postharvest Technology (E) offered at alternate years	3 (W)

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Crop Ecophysiology</b>					
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale *		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)	
		Ecophysiology and crop quality (E)	5 (S)		
		Physics of plant environment (E)	5 (S)		
Ecosystems and environmental stress physiology	3(W)				
				Water relations of plants(G)	3 (W )
		Ecophysiology: technical procedures and principles of protected cultivation (E)	5 (W)		

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Mathematics, Statistics, and Information Technologies</b>					
(In order to achieve the multiple degree a total amount of 9 credits during the University career)					
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale *		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)	
Statistics and computer sciences	3	Mathematics is not included. In order to achieve the recognition of the degree in Italy, a total amount of 6 credits during the University career (including Bachelor degree) is required		Mathematics is not included. In order to achieve the recognition of the degree in Italy, a total amount of 5 credits during the University career (including Bachelor degree) is required;	
		Statistics and Information Technologies are not included. In order to achieve the recognition of the degree in Italy, a total amount of 12 credits during the University career (including Bachelor degree) is required		Statistics and Information Technologies are not included. In order to achieve the recognition of the degree in Italy, a total amount of 10 credits during the University career (including Bachelor degree) is required	

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Complementary activities</b>					
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale *		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)	
Research project	5 (W)	Project administration, documentation and publication (E)	5 (W)	Literature seminar - Applied plant science (G)	3 (S)
		Research and science management (E)	5(S)	Masterseminar (G/E)	2 (S)
				Developmental Genetics of Plants (E)	3(W;S)
		Research project (oral presentation in English) (G/E)	5(W)	Viticulture & Pomology Journal Club (E)	3 (W)
<b>Free choice courses</b>	12	<b>Free choice courses</b>	15	<b>Free choice courses</b>	5
<b>Thesis</b> (written and discussed in English)	25	<b>Thesis</b> (written and discussed in English)	25	<b>Thesis</b> (written and discussed in English)	25

(3) Equivalence table between the “Laurea specialistica **Ortofrutticoltura internazionale**” and the corresponding titles given by TUM, BoKu and HU. (I) given in Italian; (E) given in English , (G) given in German; (G/E) available in English on request. (W: 1st and IIIrd semester) = winter semester; (S: IInd and IVth semester) = summer semester

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Breeding and Biotechnology</b>									
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)		Berlin – Master of Science (M.Sc.)		Budapest – Master of Horticultural Science	
Breeding & biotechnology applied to fruit trees)	6 (S)	Biotechnology in horticulture (E)	5 (S)	Plant Molecular biology (G/E)	2 (S)	Plant Biotechnology (G/E)	6 (W)	Propagation biology of plants (G/E)	3 (W)
Advanced techniques applied to grape	5 (S)			Proteomics (E)	3 (S)	Biology of generative propagation in horticulture (G/E)	6 (S)	Evaluation of fruit cultivars (E)	4 (W)
		Horticultural plant breeding (E)	5 (W)	Genetics in viticulture (E)	3 (W)			Applied biotechnology and resistance breeding (E)	3 (S)
				Viticulture & Pomology Journal Club (E)	3 (W)				
				Biomarkers in Food Characterization (E)	3 (S)				
		Crop biotechnology: plant breeding and micropropagation (G)	5 (W)	Molecular Plant Breeding (E)	3 (W)				
				Molecular Plant Breeding – Practices (E)	3 (W)				

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Plant and Soil Biochemistry</b>									
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)		Berlin – Master of Science (M.Sc.)		Budapest – Master of Horticultural Science	
Soil fertility	4(S)	Control and optimization of secondary plant metabolites (E)	5(S)	Rhizosphere Processes and Application to Agriculture and Soil Protection (E)	3 (W)	Effects of plant nutrition and other environmental factors on composition and quality of vegetable and ornamental plants (G/E)	6 ( S)	Ecology and environmental protection (E)	4 (W)
Rhizosphere microbial ecology and biotechnology	4(S)	Analysis of bioactive compounds in fruits and vegetables (E)	5 (CC, S, W ) 5 ( S )	Soil structure: Development, functions and changes in agricultural soil (G/E)	3 (S)	Plant nutrition and nutrient supply in environmentallyfriendly horticultural systems (G/E)	6 ( S)	Special plant compounds in nutrition and therapy (Phytotherapy) (E)	4 (W)
		Genetic and environmental control of vegetal plants (G/E)	5 (S)	Interdisciplinary project work: soil sciences (G/E)	6 (W)	Crop Quality Assessment (G/E) Symbiotics in Plant Nutrition (G/E)	6 ( S)	Chemical diversity of medicinal plants (E)	4 (W)
		Secondary plant metabolites and human health (E)	5 (S)						

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Plant Protection</b>									
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)		Berlin – Master of Science (M.Sc.)		Budapest – Master of Horticultural Science	
Post-harvest protection and storage	4 (W)	Host parasite interaction (E)	5 (W)	Laboratory diagnosis of plant damages (G)	3 (W)	Diagnosis of Plant Pathogens (G/E)	6 (S)	Biological bases of plant entomology (E)	
Insect resistance mitigation to artificial control methods (E)	3 (W)								
Fruit tree pathology	4 (W)	Methods in woody plant pathology (E)	5 (S)	Integrated and biological pest management in horticultural crops (G)	3 (W)	Lab Course Plant Pathogens or Pests (G/E)	6 (W)	Biological bases of plant pathology (E)	3 (W)
Diagnosis and control of plant disease	3 (W)			Molecular phytopathology (G)	4,5 (S)			Applied entomology (E)	5 (W, S)
Ecology of Insect population (E)	3 (S)			Soil-borne pathogenes and symbionts (E)	3 (S)			Plant virology (E)	3 (S)
				The ecological basis of biological control (E)	3 (W)				
				Plant nematology (E)	1,5 (W)				
								Diagnostics and forecast of pathogenes (E)	4 (S)
				Genetically modified organisms in the environment (E)	3 (S)				
				Applied Entomology in orchards, vineyards and horticultural crops (E)	3 (W)				

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Economics</b>									
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)		Berlin – Master of Science (M.Sc.)		Budapest – Master of Horticultural Science	
Agricultural policies	5 (W)	Controlling (in horticultural farms) I (G)	5 (W)	Economics is not included. In order to achieve the recognition of the degree in Italy, a total amount of 5 credits during the University career (including Bachelor degree) is required		Management in Horticulture (G/E)	6 (W)	Agrarmanagement (G/E)	3 (S)
		Controlling (in horticultural farms) II (G)	5 (S)	Decision Making in Management with Special Emphasis on Cultural Differences (E)	3 (S)			Business strategy planning in rural areas (E)	5 (W)
Measuring management performance C	4 (W)			Managerial Economics (G)	3 (S)			Horticultural marketing and quality management (E)	4 (W, S)
		Management planning and control (G)	5 (S)	Resource and Environmental Economics (E)	3 (S)				
Agri-food marketing	6 (W)			Decision Support Systems (E)	3 (W)				
		Natural Resource Management (E)	5 (S)						

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Crop Management</b>									
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)		Berlin – Master of Science (M.Sc.)		Budapest – Master of Horticultural Science	
		Systems analysis as a research method (E)	5 (S)	Floriculture (Ornamentals Supply Chains) (E)	3 (W)	Food Chain Management (G/E)	6 (W)	Environmental management (E)	4 (W, S)
Nursery & Orchard management A	5 (W)			Safety and Quality of Organic foods (E)	3 (S)			Woody plant nursery (E)	4 (S)
Fruit tree physiology A	3 (W)			Physiology and management of grapewine	3(W)				
Nondestructive methods for fruit quality assessment (E)	3 (W)	Model systems and crop quality (E)	5 (W)	<i>Interdisciplinary project in horticulture, fruit growing and viticulture (E)</i>	6 (S)	Hydroponical systems in Horticulture (G/E)	6 (W)	Special technical knowledge (E)	3 (W, S)
Vegetable crops (I)	5 (S)	Energy conservation and alternative energy resources (E)	5 (CC, S, W )	Aspects of product quality in plant production (E)	3 (W)	Cultivation of Vegetables in the Tropics and Subtropics (G/E)	6 (W)	Geobotany and plant ecology (E)	3 (W)
Mechanization ergonomics and safety of spraying machines (I)	5 (S)	Crop physiology: growth and development of plants (G)	5 (W)	<i>Organic fruit growing and viticulture(G)</i>	3 (W)	Land use systems in horticulture (G/E)	6 (S)	Growth control of ornamental plants (E)	3 (W)

		Crop quality: basic of quality control and assurance (G)	5 (W)	Technology of fruits and vegetable processing (G)	3 (W)	Horticultural outdoor plant systems (decorative plants) (G/E)	6 (W)	Horticultural dendrology (G/E)	4 (W)
				Biological Production of Vegetables and Ornamentals (G/E)	3 (W)	International Floriculture and Nursery (G/E)	6 (W)	Cultivation of greenhouse ornamental plants (G/E)	4 (S)
				Postharvest Technology (E) offered at alternate years	3 (W)	Development of new floricultural products (G/E)	6 (S)	Growing of nut fruit species (E)	5 (W)
				Interdisciplinary project in organic horticulture, fruit growing and viticulture (G/E)	4 (S)	Organic Farming and Sustainable Land Use (G/E)	6 (S)	Cultivation of medicinal plants and spices (G/E)	4 (S)
						Urban Horticulture - an introduction (G/E)	6 (W)	Quality oriented viticulture, productiondevelopment (E)	4 (W)
						Methods of monitoring and evaluation of horticultural processes (G/E)	6 (W)	Modern mushroom growing (E)	4 (W)
								Vegetable growing	3 (W, S)

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Crop Ecophysiology</b>									
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)		Berlin – Master of Science (M.Sc.)		Budapest – Master of Horticultural Science	
		Ecophysiology and crop quality (E)	5 (S)	Methods of measuring stress resistance of plants (G)	3 (S)	Ecophysiological basics of urban horticulture (G/E)		Plant stress physiology (E)	5 (S)
		Physics of plant Environment (E)	5 (S)	Meteorological conditions and precipitation (E)	3 (W)	Physiology of woody plants and applied dendrology		Fruit and seed physiology (E)	3 (W)
Ecosystems and environmental stress physiology	3(W)							Biotechnological methods in plant breeding (E)	5 (S)
				Water relations of plants(G)	3 (W)	Post harvest quality and stock protection of plant food crops (G/E)			
		Ecophysiology: technical procedures and principles of protected cultivation (E)	5 (W)	1 ECTS selected by students in one Partner University		Environmental Impact on Photosynthesis and Abiotic Stress Response (G/E)			

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Mathematics, Statistics, and Information Technologies</b> (In order to achieve the multiple degree a total amount of 9 credits during the University career)									
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)		Berlin – Master of Science (M.Sc.)		Budapest – Master of Horticultural Science	
Statistics and computer sciences	3	Mathematics is not included. In order to achieve the recognition of the degree in Italy, a total amount of 6 credits during the University career (including Bachelor degree) is required		Mathematics is not included. In order to achieve the recognition of the degree in Italy, a total amount of 5 credits during the University career (including Bachelor degree) is required;				Methods of experimental design and evaluation (G/E)	4 (W)
		Statistics and Information Technologies are not included. In order to achieve the recognition of the degree in Italy, a total amount of 12 credits during the University career (including Bachelor degree) is required		Statistics and Information Technologies are not included. In order to achieve the recognition of the degree in Italy, a total amount of 10 credits during the University career (including Bachelor degree) is required					
								Decision support systems of extention service (E)	3 (W)

Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)	Course	Credits (semester)
<b>Complementary activities</b>									
Bologna – Laurea Specialistica in Ortofrutticoltura Internazionale		Munich – Master of Science (M.Sc.)		Wien – Diplom Ingenieur (Dipl.-Ing. or DI)		Berlin – Master of Science (M.Sc.)		Budapest – Master of Horticultural Science	
Research project	5 (W)	Project administration, documentation and publication (E)	5 (W)	Literature seminar - Applied plant science (G)	3 (S)			Research activity for the thesis	10 (S, W)
		Research and science management(E)	5 (S)	Magisterseminar (G/E)	2	Current problems in horticulture	6 (S)	Internship: at the research station	Depends On time
				Developmental Genetics of Plants (E)	2(W;S)				
				English for Science and Technology (E)	3 (W)				
		Research project (oral presentation in English) (G/E)	5 (W)	Design Theory in Landscape Architecture (E)	3 (S)	Seminar Horticultural Sciences with oral presentation (G/E)	6 (W)		
<b>Free choice courses</b>	12	<b>Free choice courses</b>	15	<b>Free choice courses</b>	5	<b>Free choice courses</b>	6	<b>Free choice courses</b>	6
<b>Thesis</b> (written and discussed in English)	25	<b>Thesis</b> (written and discussed in English)	25	<b>Thesis</b> (written and discussed in English)	25	<b>Thesis</b>	25	<b>Thesis</b> (written and discussed in English)	25
						Disputation of Thesis	5	Disputation of Thesis	5