

HUMBOLDT-UNIVERSITÄT ZU BERLIN



LANDWIRTSCHAFTLICH-GÄRTNERISCHE FAKULTÄT

Modules Catalogue (Berlin)
Modulverzeichnis

International Master Programme Horticultural Science

Berlin, October 2013

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10 credits for FCM: from CEM I not taken

International Master in Horticultural Science				
Compulsory Module Crop Quality Assessment		CM 1		Credits: 6
Learning Objectives		<p>The students</p> <ul style="list-style-type: none"> • have a clear understanding and know-how of the methods for quality evaluation and determination of horticultural crops • have a fundamental know-how of destructive and non-destructive methods being applied during production, postharvest operations and distribution • have the capability to apply common biochemical, physical and instrumental methods for quality determination including food nutritional and food safety relates issues 		
Key qualifications		Creativity, abstract thinking		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	1	1,5	45	<ul style="list-style-type: none"> - Methods for quality evaluation and determination of horticultural crops - Destructive and non-destructive methods being applied during production, postharvest operations and distribution - Application of common biochemical, physical and instrumental methods for quality determination including food nutritional and food safety relates issues
Lab-course	3	4,5	135	
Total			180	
Examination		Oral exam 30 minutes (100%), Precondition: written assignment ´ (10 pages) with presentation in class (15 minutes)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input type="checkbox"/> SS		
Teaching staff		Dr. S. Huyskens-Keil susanne.huyskens@agrار.hu-berlin.de		

International Master in Horticultural Science				
Compulsory Module Ecophysiological Basics of Urban Horticulture		CM 2	Credits: 6	
Learning Objectives		The students <ul style="list-style-type: none"> - have a clear understanding of effects of urban stressors for plant quality - be able to categorize urban stress factors - Know the possibilities to quantify stress factors 		
Key qualifications		Creativity, abstract thinking		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	4	6	180	Contents: <ul style="list-style-type: none"> - Physiological and ecological bases of plant performance in urban landscapes, Ecology of interaction between native and introduced plant species, Protection against plant pests and pathogens in urban contexts, Urban Stressors and their impact on plant health
Total			180	
Examination		Written exam 90 minutes (100%), Precondition: written assignment (10 pages) with presentation in class (15 minutes)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input type="checkbox"/> SS		
Teaching staff		Prof. Dr. Christian Ulrichs christian.ulrichs@agrar.hu-berlin.de		

Compulsory Module: CM 3 (C): Advanced Plant Pathology			
Credits: 6			
Learning objectives: The students <ul style="list-style-type: none"> • have a clear understanding of isolation and purification of specific pathogens, • assess the pathogenicity of pathogens, • be able to apply specific methods using different kind of samples, • reflect the relevance of the investigated pathogens in agriculture and horticulture as well as the quality rating of the applied methods and • have the capability to evaluate the results of diverse methods applied in diagnosis. 			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and preconditions for granting	Topics, contents
L	<u>2 SWS</u> <u>30 hours</u> 25 hours presence in class, 5 hours preparation and learning	1 credit, participation	<ul style="list-style-type: none"> • isolation and purification of specific pathogens • pathogenicity of pathogens • relevance of investigated pathogens • evaluation of diagnosis methods
PR	<u>1 SWS</u> <u>60 hours</u> 12 hours presence in class, 48 hours preparation and learning	2 credits, Lab-paper, ca. 15,000 characters	Lab-course, deepening of lecture-contents
SE	<u>1 SWS</u> <u>60 hours</u> 12 hours presence in class, 48 hours preparation and learning	2 credits, Presentation of lab-paper, 15 minutes	Deepening of lecture-contents
Final exam	<u>30 hours</u> Written exam, 90 minutes, and preparation	1 credit	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

Compulsory Module CM 4 (E) : Farm Management in the Agricultural and Horticultural Sector Credits: 6			
Learning objectives: The students are able <ul style="list-style-type: none"> • to describe and to explain basic concepts and theoretical approaches of agricultural Management and • to use and to evaluate models for decision support. 			
Preconditions: none, recommended: Basics in Farm management			
Teaching formats	Hours per week, workload in hours	Credits and preconditions for granting	Topics, contents
L	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> • Strategic Management in Agribusiness <ul style="list-style-type: none"> -Theoretical approaches -Planning • Organization theory <ul style="list-style-type: none"> -Theoretical approaches -Design principles • Interorganisational coordination <ul style="list-style-type: none"> -Cooperation -Chain management • Basics of information and knowledge management
SE	<u>2 SWS</u> <u>90 hours</u> 25 hours presence in class, 65 hours preparation and learning	3 credits, participation	•
Final exam	<u>30 hours</u> Oral exam, 30 minutes, and preparation	1 credit	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input checked="" type="checkbox"/> winter semester <input type="checkbox"/> summer semester		

International Master in Horticultural Science				
Compulsory Module Seminar Horticultural Sciences			CM 5	Credits: 6
Learning Objectives		The students <ul style="list-style-type: none"> - know how to execute an oral presentation inside actual topics in horticultural science and prepare manuscript, handout and digital materials 		
Key qualifications		Creativity, abstract thinking, publishing of results		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Seminar	4	6	180	<ul style="list-style-type: none"> - Intensive practice into a sub area of basics of horticultural sciences - accumulation and selection of information - analysis and processing of data from experiments - critical discussion of experimental results - basics, material and methods, discussion and results of scientific explorations
Total			180	
Examination		Written assignment (10 pages, 50%) with presentation in class (15 minutes, 50%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input type="checkbox"/> SS		
Teaching staff		<u>Prof. Dr. Uwe Schmidt</u> uwe.schmidt@agrar.hu-berlin.de Prof. Dr. Christian Ulrichs, Dr. Susanne Huyskens-Keil, Prof. Dr. Carmen Büttner		

International Master in Horticultural Science				
Compulsory Elective Module I Biology of Generative Propagation in Horticulture		CEM 1		Credits: 6
Learning Objectives		<p>The students</p> <ul style="list-style-type: none"> - know about biology of pollination, fertilization and embryogenesis - know the criteria of seed quality - are able to apply methods to investigate seeds quality - have a clear understanding of factors affecting the seed quality 		
Key qualifications		Methods competence		
Preconditions for participation: none, recommended: botany, plant physiology				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Seminar	4	6	180	<ul style="list-style-type: none"> - flower biology - aspects of plant breeding - physiology of fertilization, embryogenesis, and germination - seed production , effect of environmental factors on seed quality - methods of seed quality evaluation - storage of orthodox and recalcitrant seeds - seed production, effect of environment on seed quality - effect of seed quality on growth and yield
Total			180	
Examination		Written exam (90 minutes, 100%) precondition: presentation in class (15 minutes)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		<u>Dr. Ina Pinker</u> ina.pinker@agrار.hu-berlin.de PD Dr. Regina Schenk		

International Master in Horticultural Science				
Compulsory Elective Module I		CEM 2		Credits: 6
Effects of plant nutrition and other environmental factors on composition and quality of vegetable and ornamental plants				
Learning Objectives		<ul style="list-style-type: none"> - Participants have a clear understanding of the plant physiological role of mineral elements - Participants have a clear understanding of the effect of environmental factors on plant composition and quality - Participants are able to design new horticultural systems with the potential to grow high-quality horticultural products 		
Key qualifications		Methods competence		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Practical	2	3	90	<ul style="list-style-type: none"> - Functions of mineral elements in the primary and secondary metabolism of plants - Effects of plant nutrition and other environmental factors on plant composition, taste, and quality
Seminar	1	1,5	45	
Excursion	1	1,5	45	
Total	4	6	180	
Examination		Oral exam (20 minutes, 100%) or oral contribution in seminar (100%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		<u>Prof. Dr. Eckhard George</u> george@igzev.de <u>Prof. Dr. Christof Engels</u> , Dr. Bernhard Brückner (IGZ), Dr. Angelika Krumbein (IGZ), Dr. Uwe Drüge (IGZ), Dr. Elke Neumann (IGZ)		

International Master in Horticultural Science				
Compulsory Elective Module I Plant Nutrition in Environmentally-friendly Horticultural Systems		CEM 3		Credits: 6
Learning Objectives		<ul style="list-style-type: none"> - Participants have a clear understanding of environmental effects of fertilization and horticultural production systems - Participants have a clear understanding of mineral element cycles and energy production and consumption in horticultural systems - Participants are able to design new horticultural systems with low nutrient and energy requirements 		
Key qualifications		Methods competence		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	2	3	90	<ul style="list-style-type: none"> - Environmental benefits and costs of fertilization in horticultural systems - Interactions of fertilization with plant CO₂ fixation - Low-energy horticultural production and intelligent nutrient supply systems - Plant nutrition in biological horticultural production systems
Seminar	1	1,5	45	
Excursion	1	1,5	45	
Total	4	6	180	
Examination		Oral exam (20 minutes, 100%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		<u>Prof. Dr. Eckhard George</u> george@igzev.de <u>Prof. Dr. Christof Engels</u> , Dr. Carmen Feller (IGZ), Dr. Dietmar Schwarz (IGZ), Dr. Yvonne Klopotek (IGZ), Dr. Elke Neumann (IGZ), Dr. Benard Ngwene		

CEM 4 (J): Current Topics in Phytomedicine Credits: 6			
Learning objectives: The students: <ul style="list-style-type: none"> • know about consolidation and enhancement in specific research fields in Phytomedicine and • have applied interdisciplinarity (quality and quantity of agricultural and horticultural production beginning with planting/sowing up to processing of plant products including the promotion of food stuff). 			
Preconditions: none			
Teaching formats	Hours per week, workload in hours	Credits and preconditions for granting	Topics, contents
L	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, participation	<ul style="list-style-type: none"> • specific research fields in Phytomedicine • quality and quantity of agricultural and horticultural production beginning with planting/sowing up to processing of plant products including the promotion of food stuff
SE	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, Seminar paper, ca. 30,000 characters	Deepening of lecture contents
FT	<u>30 hours</u> 12 hours participation and preparation	1 credit, participation	Excursion to relevant sites
Final exam	<u>30 hours</u> Oral exam, 20 minutes, based on seminar paper, and preparation	1 credit	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

International Master in Horticultural Science				
Compulsory Elective Module I Plant Disease and Control Management			CEM 5	Credits: 6
Learning Objectives		Students <ul style="list-style-type: none"> - have a clear understanding of isolation and purification of specific pathogens alternatively isolation and preparation of pests - have a clear understanding of pathogenicity and the impact of selected pathogens/pests - are able to apply specific methods using different kind of samples - reflect the relevance of the investigated pathogens/pests in agriculture and horticulture as well as the quality rating of the applied methods - have the capability to evaluate the results of diverse methods applied in diagnosis/identification - are familiar with plant protection tools (prophylactic procedures, biological and chemical measures) 		
Key qualifications		Methods competence		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	1	1,5	45	<ul style="list-style-type: none"> - isolation and purification of specific pathogens alternatively isolation and preparation of pests - pathogenicity and virulence - relevance of selected pathogens/pests in agriculture and horticulture - plant protection measures - ecochemistry and ecotoxicology in regard to chemical plant protection - storage protection or herbology
Seminar	1	1,5	45	
Practical	2	3	90	
Total	4	6	180	
Examination		Written exam (90 minutes, 75%) and oral presentation (10 minutes, 25%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input checked="" type="checkbox"/> SS one week block, march or august (different foci)		
Teaching staff		Prof. Dr. Carmen Büttner carmen.buettner@agrar.hu-berlin.de Prof. Dr. Christoph Reichmuth, Prof. Dr. Wilfried Pestemer, Prof. Dr. B. Freier, Dr. Martina Bandte, Dr. Monika Goßmann, Dr. Maria Landgraf		

International Master in Horticultural Science				
Compulsory Elective Module I Environmental Management and Information Systems			CEM 6	Credits: 6
Learning Objectives		<p>The students</p> <ul style="list-style-type: none"> - are able to identify driving forces for the introduction of QM/EM systems; - know basic concepts and theoretical approaches for quality-/ environmental management; - can describe and assess basic concepts and data bases of environmental information systems; - are familiar with principles and problems of assessment. 		
Key qualifications		Communication skills, abstract thinking		
Preconditions for participation: none, recommended: knowledge in environmental economics				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	2	4	90	<ul style="list-style-type: none"> - Introduction: <ul style="list-style-type: none"> o Motives for the introduction of QM/EM o Approaches (system approach, stakeholder concept) o Basic ethical positions - Options of politicians, authorities and enterprises <ul style="list-style-type: none"> o Legal restrictions; market mechanisms, negotiation solutions o Integrated management; management systems - Information and assessment systems <ul style="list-style-type: none"> o Data basis o Modelling o Approaches for assessment and related problems - Environmental marketing/environmental and risk communication
Teamwork	1	1	45	
Case studies	1	1	45	
Total			180	
Examination		Homework 20 pages (100%), Case studies and presentation as precondition		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input type="checkbox"/> SS		
Teaching staff		<u>Prof. Dr. W. Bokelmann</u> , wolfgang.bokelmann@agar.hu-berlin.de Dr. P. Grundmann, Dr. Meyer-Aurich		

International Master in Horticultural Science				
Compulsory Elective Module I Cultivation of Vegetables in the Tropics and Subtropics		CEM 7		Credits: 6
Learning Objectives		The Students <ul style="list-style-type: none"> - know the growing conditions for vegetables in tropics and sub tropics - are able to develop production systems for different locations - know the most important vegetables of the tropics and sub tropics - are able to establish technological algorithm of production cycles and adequate quality measurements 		
Key qualifications		Methods competence		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	3	4,5	135	<ul style="list-style-type: none"> - Geographical and climatical description of the tropics and subtropics - Edaphic and climatic growing conditions for vegetables in different regions - Land use and production systems for vegetables in tropic and sub tropic regions - Dietary and economical value of the most important subtropic and tropic vegetables - Evaluation of growth of tropical and subtropical vegetables - Basics of propagation and breeding of subtropic and tropic vegetables including biotechnological methods
Seminar	1	1,5	45	
Total	4	6	180	
Examination		Oral exam (30 minutes, 100%), precondition: exercise-records		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		<u>Doz. Dr. Michael Böhme</u> michael.boehme@agrار.hu-berlin.de Dr. Ina Pinker		

International Master in Horticultural Science				
Compulsory Elective Module I Development of New Floricultural Products		CEM 8		Credits: 6
Learning Objectives		The Students <ul style="list-style-type: none"> - have a clear understanding of structures and problems of the development of new floricultural products - have the capability to formulate solutions for development trends - are able to answer questions of the international development of new floricultural products 		
Key qualifications		Methods competence		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	3	4,5	135	<ul style="list-style-type: none"> - up-to-date national and international trends and methods to develop new floricultural products - diversification and evaluation of the assortments - specific development of selected groups of flowers and model products
Seminar	1	1,5	45	
Total	4	6	180	
Examination		Presentation 15 minutes (50%) and oral exam (15 minutes, 50%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input type="checkbox"/> SS		
Teaching staff		PD Dr. H. Grüneberg hgrueneberg@agrار.hu-berlin.de Dr. C. Oschmann		

International Master in Horticultural Science				
Compulsory Elective Module I Food Chain Management		CEM 9		Credits: 6
Learning Objectives		<p>The Students</p> <ul style="list-style-type: none"> • have a clear understanding of plant food quality criteria, quality indicators and quality index • have knowledge of national and international laws and orders in food chain management systems • have knowledge and an understanding of methods of quality assurance in food chain management systems (production, processing, industrial utilization, fresh market) including critical control points and food safety • have the capability to evaluate postharvest technological operations • have the capability to evaluate the possibilities and problems in management of food supply chain systems 		
Key qualifications		Methods competence		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	2	3	90	<ul style="list-style-type: none"> • Concepts of plant food supply management systems • National and international laws and orders • Evaluation of quality control systems in food supply chains from production until utilization • Quality assurance and process operations (consumer oriented aspects; physiological, nutritional and technological aspects) • Quality management systems
Seminar	2	3	90	
Total	4	6	180	
Examination		Oral exam (30 minutes, 100%), precondition: seminar presentation 15 minutes		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		Dr. S. Huyskens-Keil, susanne.huyskens@agrar.hu-berlin.de		

International Master in Horticultural Science				
Compulsory Elective Module I Horticultural Outdoor Plant Systems (Decorative Plants II)		CEM 10		Credits: 6
Learning Objectives		The Students <ul style="list-style-type: none"> - have a clear understanding of meaning, structures and requirements of special urban groups of decorative plants - are able to tackle problems into solutions for special situations - have the capability to assess schemes of improvements and situations of practical utilization 		
Key qualifications		Methods competence		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	3	4,5	135	<ul style="list-style-type: none"> - Basics of the establishing and maintenance of plants on special urban places like roof gardens, water cleaning systems with plants/rainwater management, playing and leisure grounds, dry places, rail bed greening systems, cemeteries e.g. - Imparting of basic knowledge of planning processes at the urban outdoor designing
Excercise	1	1,5	45	
Total	4	6	180	
Examination		Case study 10 pages (50%) and presentation 15 minutes (50%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		Dr. C. Oschmann c.oschmann@agrار.hu-berlin.de		

<u>International Master in Horticultural Science</u>				
<u>Compulsory Elective Module I</u> <u>Hydroponical Systems in Horticulture</u>			<u>CEM 11</u>	<u>Credits: 6</u>
<u>Learning Objectives</u>		<u>The Students</u> <ul style="list-style-type: none"> - <u>have a clear understanding of different hydroponical systems and are able to plan such systems for different crops</u> - <u>are able to evaluate different substrates by use of modern physical and chemical methods</u> - <u>are able to calculate the amount of water and the composition of nutrient solutions for hydroponics</u> - <u>know methods for regulating of processes in hydroponics and analysing growth factors in the rhicosphere and biomass production</u> 		
<u>Key qualifications</u>		<u>Methods competence</u>		
<u>Preconditions for participation: none</u>				
<u>Teaching formats</u>	<u>Hours per week in class</u>	<u>Credits</u>	<u>Workload (h) incl. preparation</u>	<u>Contents</u>
<u>Lecture</u>	<u>3</u>	<u>4,5</u>	<u>135</u>	<ul style="list-style-type: none"> - <u>Definition and principle of von hydroponical (soilless) systems for horticultural crops,</u> - <u>Technical characteristics and technological systems in hydroponics (substrate culture, water culture, aeroponics,</u> - <u>Substrates, their characteristics, evaluation and standardization</u> - <u>Calculation of water and nutrient supply for different hydroponical systems</u> - <u>Cultivation methods of selected horticultural crops in hydroponics</u>
<u>Excercise</u>	<u>1</u>	<u>1,5</u>	<u>45</u>	
<u>Total</u>	<u>4</u>	<u>6</u>	<u>180</u>	
<u>Examination</u>		<u>Oral exam 30 minutes (100%), precondition: excercise records</u>		
<u>Duration</u>		<input checked="" type="checkbox"/> <u>1 Semester</u> <input type="checkbox"/> <u>2 Semester</u>		
<u>Start of module</u>		<input type="checkbox"/> <u>WS</u> <input checked="" type="checkbox"/> <u>SS</u>		
<u>Teaching staff</u>		<u>Doz. Dr. M. Böhme</u> <u>michael.boehme@rz.hu-berlin.de</u>		

International Master in Horticultural Science				
Compulsory Elective Module I International Floriculture and Nursery			CEM 12	Credits: 6
Learning Objectives		The Students <ul style="list-style-type: none"> - have a good knowledge of the meaning and the structures from special product groups of decorative plants and nursery products - have a clear understanding on requirements of the specific use of the products - have the capability to evaluate the different production structures - are able to make inquiries to the production, trade and consumption of floricultural and nursery products - are able to assess the ecological and social aspects of production and marketing 		
Key qualifications		Analysis competence		
Preconditions for participation: none, horticultural basic modules				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	3	4,5	135	<ul style="list-style-type: none"> - international production systems - the use of main groups of flowers and nursery products - analysis of countries and continents - networking and international trade with flowers and nursery products - ecological and social aspects of the production
Excercise	1	1,5	45	
Total	4	6	180	
Examination		Seminar presentation 15 minutes (50%) and oral exam 15 minutes (50%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		PD Dr. H. Grüneberg, hgrueneberg@agrar.hu-berlin.de Dr. M. Zander		

International Master in Horticultural Science				
Compulsory Elective Module I Organic Farming and Precision Agriculture- Sustainable Cultivation Strategies		CEM 13		Credits: 6
Learning Objectives		<ul style="list-style-type: none"> - The students are familiar with the potentials of organic farming and precision agriculture for resource protection in Germany, Europe and worldwide. - The students can apply methods for describing the heterogeneity of locations and for organising resource protection by using the concepts of organic farming and precision agriculture 		
Key qualifications		Methodical competence, abstract thinking		
Preconditions for participation: none, recommended: modules soils sciences, farming, plant production, plant nutrition, statistics				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	3	4	135	<ul style="list-style-type: none"> - Knowledge on innovative strategies for sustainable land use illustrated by the examples "organic farming" and "precision agriculture" in the framework of European and national legislation, e.g., environmental law, environmental regulations of the EU, EU water directive - In ecologically sensitive areas, for example on marginal soils and in nature conservation areas, possibilities for sustainable cultivation based on organic farming and precision agriculture are demonstrated by means of practical examples. - The interface of the two cultivation strategies is reflected by the protection of biotic and abiotic resources - Practical examples of resource protection by organic farming and precision agriculture
Seminar	1	2	45	
Total			180	
Examination		Oral presentation 30 minutes (100%), precondition: seminar paper (10 pages)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		PD Dr. H. Hoffmann (Organic Farming), heide.hoffmann@agrار.hu-berlin.de Prof. Dr. R. Herbst (Precision Agriculture), r.herbst@agrار.hu-berlin.de		

International Master in Horticultural Science				
Compulsory Elective Module I Urban Horticulture – An Introduction		CEM 14	Credits: 6	
Learning Objectives		<ul style="list-style-type: none"> - The students are able to design and manage urban small-scale landscapes, Bio- and species-diversity, Human perceptions of urban vegetative environments, Indoor green, Sick building syndrome 		
Key qualifications		Methodical competence, abstract thinking		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	4	6	180	<ul style="list-style-type: none"> - Design and management of urban small-scale landscapes, Bio- and species-diversity, Human perceptions of urban vegetative environments, Indoor green, Sick building syndrome
Total			180	
Examination		Oral exam 20 minutes (50%), written homework (10 pages, 50%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		<u>Prof. Dr. Christian Ulrichs</u> christian.Ulrichs@agrار.hu-berlin.de		

International Master in Horticultural Science				
Compulsory Elective Module I Physiology of Woody Plants and Applied Dendrology			CEM 15	Credits: 6
Learning Objectives		<p>The students know</p> <ul style="list-style-type: none"> - the basics of woody plant physiology: energy delivering processes, reaction- and control mechanisms, water- and nutrient circulations, adaptation mechanisms, stress physiology, concurrence, coevolution between woody plants and herbivores - nomenclature and systematics of woody plants, explanation of botanical-dendrological terms, applied dendrology of deciduous plants, evergreen plants and conifers, genera and the most important species, plant determination 		
Key qualifications		Methodical competence, abstract thinking		
Preconditions for participation: none, recommended: modules biochemistry, plant biology, fruiticulture				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	2	3	90	<ul style="list-style-type: none"> - basics of woody plant physiology: energy delivering processes, reaction- and control mechanisms, water- and nutrient circulations, adaptation mechanisms, stress physiology, concurrence, coevolution between woody plants and herbivores - nomenclature and systematics of woody plants, explanation of botanical-dendrological terms, applied dendrology of deciduous plants, evergreen plants and conifers, genera and the most important species, plant determination
Excercise	1	1,5	45	
Excursion	1	1,5	45	
Total			180	
Examination		Oral exam 20 minutes (100%), including determination of woody plants		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		<u>Prof. Dr. Ralf Kätzel</u> Dr. Matthias Zander matthias.zander@agrار.hu-berlin.de		

International Master in Horticultural Science				
Compulsory Elective Module I Post-harvest Quality and Stored Product Protection		CEM 16		Credits: 6
Learning Objectives		<p>The students know</p> <ul style="list-style-type: none"> - agricultural and horticultural food crops: Quality characteristics and evaluation, food quality and food safety related laws and orders for local and export markets, methods of quality determination, post-harvest operations and storage regimes; abiotic and biotic stress factors -their evaluation and prevention; basics in stock protection (storage structures and habitats, stored-product pests, early detection of stored-product pests, monitoring, prevention strategies pest control methods) 		
Key qualifications		Methodical competence, abstract thinking		
Preconditions for participation: none, recommended: modules fruiticulture, vegetables production				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	3	4,5	135	<ul style="list-style-type: none"> - Agricultural and horticultural food crops: Quality characteristics and evaluation, food quality and food safety related laws and orders for local and export markets, methods of quality determination, post-harvest operations and storage regimes; abiotic and biotic stress factors -their evaluation and prevention; basics in stock protection (storage structures and habitats, stored-product pests, early detection of stored-product pests, monitoring, prevention strategies pest control methods)
Seminar	1	1,5	45	
Total			180	
Examination		Oral exam 20 minutes (100%), precondition: presentation 15 minutes		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input type="checkbox"/> SS		
Teaching staff		Dr. Susanne Huyskens-Keil susanne.huyskens@agrار.hu-berlin.de		

International Master in Horticultural Science				
Compulsory Elective Module I Methods of Monitoring and Evaluation of Technical Processes in Horticulture		CEM 17	Credits: 6	
Learning Objectives		<p>The students</p> <ul style="list-style-type: none"> - have a clear understanding of basic technical processes - have a clear understanding of methods for evaluation of process quality - are able to apply measuring equipment for measuring mass flow and energy fluxes in horticultural production processes - are able to use knowledge in engineering and thermo dynamics for evaluation of energy efficiency of greenhouse processes 		
Key qualifications		Methodical competence, abstract thinking		
Preconditions for participation: none, recommended: modules agricultural engineering				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Seminar	2	3	90	Analysis of pipeline systems, figure of merit in refrigeration technology, soil characteristics at building site, surveying and mapping, check-up of measuring systems, phytomonitoring, greenhouse processing, greenhouse automation, phytocontrol technology, quality of irrigation systems, planning and control of artificial light systems, methods for evaluation of climate condition and climate control in production and post-harvest processes
Excercise	2	3	90	
Total			180	
Examination		Course report 10 pages (100%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS		
Teaching staff		Prof. Dr. Uwe Schmidt u.schmidt@agrar.hu-berlin.de		

International Master in Horticultural Science				
Compulsory Elective Module I Symbioses in Plant Nutrition		CEM 18	Credits: 6	
Learning Objectives		- Students are able to assess the effects of site conditions and production methods on biological N ₂ -fixation and mycorrhizal colonization, and have an understanding of the possibilities to exploit beneficial microorganisms in horticulture and agriculture.		
Key qualifications		Methodical competence, abstract thinking		
Preconditions for participation: none, recommended: plant production, plant nutrition, statistics				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	3	4,5	135	<ul style="list-style-type: none"> - Physiology and ecology of biological N₂-fixation, mycorrhizal colonization, and other plant-associated microorganisms - Effects of mycorrhizal colonization on plant growth - Effects of agricultural and horticultural practices on biological N₂-fixation and mycorrhizal colonization - Use of beneficial microorganisms in plant production
Practical	1	1,5	45	
Total			180	
Examination		Oral examination 30 minutes (100%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input type="checkbox"/> SS		
Teaching staff		<u>Prof. Dr. Eckhard George</u> George@iqzev.de <u>Prof. Dr. Christof Engels</u> Dr. E. Neumann, Dr. S. Ruppel, Dr. R. Grosch, Dr. P. Franken		

International Master in Horticultural Science				
Compulsory Elective Module I Plant Biotechnology		CEM 19		Credits: 6
Learning Objectives		The students <ul style="list-style-type: none"> - have a clear understanding of interaction of conventional and biotechnological methods - are able to evaluate methods and risk management - have a clear understanding of factors affecting the quality of in vitro plants - have the capability for literature search and evaluation 		
Key qualifications		Analysis, methods competence		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Lecture	3	4,5	135	<ul style="list-style-type: none"> - methods and application of biotechnology in plant breeding and propagation - physiological fundamentals of regulation of plant growth and development in vitro - discussion of advantages and disadvantages of applied methods including risk management - somaclonal variability - molecular methods - Gene transfer - use of biotechnological methods for plant breeding (examples)
Excercise	1	1,5	45	
Total			180	
Examination		Written exam 90 minutes (100%), Precondition: presentation in class (15 minutes)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input type="checkbox"/> SS		
Teaching staff		Dr. I. Pinker ina.pinker@agrار.hu-berlin.de		

International Master in Horticultural Science			
Compulsory Elective Module I Methods in Molecular Plant Breeding		CEM 20	Credits: 6
Learning objectives: The students <ul style="list-style-type: none"> • have learned the basics of molecular methods applicable to plant breeding, • are able to implement these methods in breeding agricultural and horticultural crops, • have knowledge to critically interpret the usefulness of molecular versus conventional breeding and • have knowledge of the economic and legal situation of using molecular tools. 			
Preconditions: Basic knowledge in plant genetics, plant genome analysis, and plant breeding methods			
Teaching formats	Hours per week, workload in hours	Credits and preconditions for granting	Topics, contents
L	<u>2 SWS</u> <u>90 hours</u> 25 hours presence in class, 65 hours preparation and learning	3 credits, participation	<ul style="list-style-type: none"> • Basic principles of Genomics, Transcriptomics, Proteomics, Metabolomics, and Phenomics. • Classical versus Molecular Genetics. • Actual examples of application of molecular methods in breeding varieties of agricultural and horticultural crops. • Economic and technical limitations to use molecular techniques in practical breeding.
EX	<u>2 SWS</u> <u>60 hours</u> 25 hours presence in class, 35 hours preparation and learning	2 credits, participation	Deepening of lecture-contents.
Final exam	<u>30 hours</u> Oral exam, 30 minutes, and preparation	1 credit	
Duration	<input checked="" type="checkbox"/> 1 semester <input type="checkbox"/> 2 semesters		
Start of module	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> summer semester		

International Master in Horticultural Science				
Compulsory Elective Module II Information and Communication Technology in Horticultural Sciences		CEM 21		Credits: 6
Learning Objectives		Students <ul style="list-style-type: none"> - have an understanding of structure of data acquisition systems. They are able to install, setup and operate this systems - have a clear understanding of different types of data. They are able to transform these data - be able to apply remote control systems for setting up long distance experiments - have the capability to program simple software projects and connect these programs with measuring systems and data bases 		
Key qualifications		Methodical competence, abstract thinking		
Preconditions for participation: none, recommended: modules quantitative modelling				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Excercise	4	6	180	- Communication networks, Data acquisition, transfer and processing, remote sensing and remote control, process insurance and disturbance management, learning of a higher computer programming language (VB), generation of a complex software project
Total			180	
Examination		Oral examination 30 minutes (100%), precondition: self-provided software-program		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input checked="" type="checkbox"/> WS <input type="checkbox"/> SS		
Teaching staff		Prof. Dr. Uwe Schmidt u.schmidt@agrar.hu-berlin.de		

International Master in Horticultural Science				
Compulsory Elective Module II Current Topics in Horticultural Sciences			CEM 22	Credits: 6
Learning Objectives		Students <ul style="list-style-type: none"> - are able to deal with aspects of horticultural product-quality, production, storage and marketing - are capable of evaluating current developments and risks 		
Key qualifications		Methodical competence, abstract thinking		
Preconditions for participation: none				
Teaching formats	Hours per week in class	Credits	Workload (h) incl. preparation	Contents
Seminar	3	4,5	135	Phytomedicine Urban Horticulture Horticultural Engineering Quality Assurance -
Exkursion	1	1,5	45	
Total			180	
Examination		Presentation (50%), excursion report (50%)		
Duration		<input checked="" type="checkbox"/> 1 Semester <input type="checkbox"/> 2 Semester		
Start of module		<input type="checkbox"/> WS <input checked="" type="checkbox"/> SS during the excursion week		
Teaching staff		<u>Prof. C. Büttner</u> , carmen.buettner@agrار.hu-berlin.de Prof. U. Schmidt, Prof. Ch. Ulrichs, Dr. S. Huyskens-Keil		