

Winter Semester 2019/20

Module Directory

Faculty 09 - Agricultural Sciences, Nutritional Sciences and Environmental
Management

Core Modules Master Degree "Agrobiotechnology"

Please consult the timetable and Stud.IP for information regarding dates and
room numbers of the modules taught in the course:

<http://www.uni-giessen.de/cms/fbz/fb09/studium/msc/stpl>

MK 002 Biostatistics and Experimental Design	3
MK 007 Animal Nutrition and Feed Science.....	5
MK 011 Special Biochemistry II	7
MK 013 Risk Assessment, Biosafety and Patent Law	9
MK 015 Plant Protection and Bioengineering	11
MK 016 Biotechnology and Genomics	13
MK 018 Microbial Food Biotechnology	15
MK 019 Industrial Internship.....	17
MK 057 Molecular Phytopathology.....	19

MK 002	MK 002 Biostatistics and Experimental Design		6 CP
	Biostatistics and Experimental Design		
Core Module / Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Pflanzenbau und Pflanzenzüchtung II		1./2. Sem.;
	Offered for the first time: WS 2015/16		
	Intake capacity: not limited		
Frequency and Duration: WS, 1 semester			
Module Coordinator: Biometrie und Populationsgenetik mit dem Schwerpunkt Bioinformatik			
Applies to the Study Programmes: Agrobiotechnology, Master (1./2.); Insect Biotechnology and Bioresources, Master (1./2.);			
Prerequisites for Participation: None			
Learning Outcomes: Students <ul style="list-style-type: none"> • have profound knowledge of quantitative methods • have profound knowledge experimental designs • are able to design experiments • have profound knowledge in hypothesis testing and inferential statistics 			
Module Content: <ul style="list-style-type: none"> • Methods of descriptive statistics • Test-theory and estimation of parameters • Analysis of variance and analysis of regression • Data analysis using statistical software 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	30	60	
Seminar			
Practical training	30	60	
Exercises			
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Assignments (4), written examination – Components of final grade Assignments (100 %) or written examination (100 %) – Form of module retake examination Written examination			
Language: English			

MK 007	MK 007 Animal Nutrition and Feed Science	6 CP
	Animal Nutrition and Feed Science	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Tierernährung und Ernährungsphysiologie	1./2. Sem.;
	Offered for the first time: SS 2016	
	Intake capacity: not limited	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Tierernährung		
Applies to the Study Programmes: Agrobiotechnology, Master (1./2.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • can describe the basics of digestion and the metabolism of the main nutrients • know the parameters of the metabolic rate and the energy evaluation systems. • have an overview about origin, quality criteria, quality management, conservation and use of animal feeds • know the basics of the animal feed law • can apply the different feeding systems for farm animals in formulating feeding recipes • understand the relations between nutrition and performance, nutrient loss, animal health and product quality 		
Module Content: <ul style="list-style-type: none"> • nutritional physiology of farm animals • chemical composition (food, animal) • digestion and utilization of nutrients (carbohydrates, proteins, lipids) • metabolic rate and energy evaluation systems • minerals and vitamins (functional significance, feed situation) • characteristics, quality criteria and chief applications of animal feed • basics of feed conservation, storage and preparation • nutrition of farm animals • energy and feed demand of farm animals during the breeding, reproduction and growing phase • feeding strategies and feeding recipes • nutritional influence on performance, nutrient loss, health and product quality 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	54	108
Seminar		
Practical training		
Exercises	6	12
Excursion		
Total:	180	

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Written examination
- Components of final grade Written examination (100 %)
- Form of module retake examination Written examination

Language: English

MK 011	MK 011 Special Biochemistry II	6 CP
	Special Biochemistry II	
Core Module / Optional Module	Agrarwissenschaften, Ökotröphologie und Umweltmanagement / Institut für Ernährungswissenschaft	2./4. Sem.;
	Offered for the first time: SS 2016	
	Intake capacity: 30	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Biochemie und Molekularbiologie mit dem Schwerpunkt Ernährung des Menschen		
Applies to the Study Programmes: Agrobiotechnology, Master (2./4.);		
Prerequisites for Participation: None (recommended: knowledge in chemistry and Biochemistry)		
Learning Outcomes: Students will <ul style="list-style-type: none"> • have knowledge and proficiency in the application of molecular biology, spectrophotometric and chromatographic methods • be experienced and proficient in techniques of protein biochemistry and cell biology • have knowledge of the qualitative and quantitative value of biochemical, cell biological, molecular biological, and enzymatic analytic processes 		
Module Content: <ul style="list-style-type: none"> • primer design, PCR, cloning, use of restriction enzymes, ligation into vectors • transformation of Escherichia coli • heterologous overexpression of genes relevant to agrobiotechnology • production of recombinant proteins in genetically altered bacteria • purification of proteins with affinity chromatography • SDS-PAGE analysis and Coomassie staining for detection and quality of control of recombinant proteins • spectrophotometric analysis • principles of enzyme kinetics • determination of antioxidants in biological material • surface plasmon resonance spectroscopy (SPR) • crystallization of proteins, x-ray diffraction analysis and alternative methods of structure determination 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture		
Seminar	20	40
Practical training	40	80
Exercises		
Excursion		
Total:	180	

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Written examination
- Components of final grade Written examination (100 %)
- Form of module retake examination Written examination

Language: English

MK 013	MK 013 Risk Assessment, Biosafety and Patent Law	6 CP
	Risk Assessment, Biosafety and Patent Law	
Core Module / Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Phytopathologie	3. Sem.;
	Offered for the first time: WS 2015/16	
	Intake capacity: not limited	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Phytopathologie		
Applies to the Study Programmes: Agrobiotechnology, Master (3.);		
Prerequisites for Participation: cores of the 1st semester		
Learning Outcomes: Students will <ul style="list-style-type: none"> • have broad knowledge of various processes in the field of technology assessment of agricultural products • be able to explain the structure and the tasks of the different institutions responsible for evaluation of suitability, risk assessment, environment protection, farmer and consumer protection, and food security • be able to understand the ethic aspects of technology assessment • know fundamental principles of the European Patent Law 		
Module Content: <ul style="list-style-type: none"> • Development of guidances for the risk management of plant protection products • Evaluation of suitability of plant protection products • Tasks and structure of the EU Ethic and Food Safety Authority Commission • Tasks and structure of the Federal Institute for Consumer Protection and Food Security (BVL) • Tasks and structure of the Federal Institute for Risk Assessment (BfR), Environmental Agency (UBA), and Biological Research Centre for Agriculture and Forestry (BBA) • Tasks and structure of the European and Mediterranean Plant Protection Organization (EPPO) • Ecotoxicologic studies of side effects of plant protection products (e.g. surface water pollution, effects on beneficial insects) • Federal and European Patent Law • TA studies on environmental problems of agriculture • TA studies on renewable energies • TA and SD studies on agriculture, food chains and food • Terms and conditions for organic farming and Integrated Pest Management • Release and marketing of genetically modified organisms 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	60
Seminar	30	60
Practical training		
Exercises		
Excursion		
Total:	180	
Prerequisites for Examination: ...		
Module Examination:		
<ul style="list-style-type: none"> – Form(s) of assessment written examination and presentation – Components of final grade Presentation (50 %), written examination (50 %) – Form of module retake examination Oral or written examination 		
Language: English		

MK 015	MK 015 Plant Protection and Bioengineering	6 CP
	Plant Protection and Bioengineering	
Core Module / Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Phytopathologie	1./2. Sem.;
	Offered for the first time: WS 2015/16	
	Intake capacity: not limited	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Phytopathologie		
Applies to the Study Programmes: Agrobiotechnology, Master (1./2.);		
Prerequisites for Participation: None (recommended: Basic knowledge in plant pathology and molecular biology)		
Learning Outcomes: Students will <ul style="list-style-type: none"> • be able to understand and evaluate industrial strategies for disease control • have experience with basic biotechnological processes, such as tissue culture, high-throughput screening and pesticide applications • have a conception of the implementation impacts of plant biotechnology • have a command of the most important transformation techniques in the production of genetically modified plants • have a theoretical background of the biological mechanism modern plant protection is based on 		
Module Content: <ul style="list-style-type: none"> • transgenic plants • agronomically significant genes • biotechnological disease control techniques • tissue techniques and tissue cultures • high-throughput screening methods • industrial strategies in plant protection 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	40	70
Seminar	30	40
Practical training		
Exercises		
Excursion		
Total:	180	
Prerequisites for Examination: ...		
Module Examination:		
<ul style="list-style-type: none"> – Form(s) of assessment written examination and Presentation – Components of final grade written examination (50 %), Presentation (50 %) – Form of module retake examination Oral or written examination 		
Language: English		

MK 016	MK 016 Biotechnology and Genomics	6 CP
	Biotechnology and Genomics	
Core Module / Optional Module	Agrarwissenschaften, Ökotröphologie und Umweltmanagement / Institut für Pflanzenbau und Pflanzenzüchtung I	2. Sem.;
	Offered for the first time: SS 2016	
	Intake capacity: 30	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Pflanzenzüchtung		
Applies to the Study Programmes: Agrobiotechnology, Master (2.);		
Prerequisites for Participation: None (recommended: Knowledge of molecular genetics)		
Learning Outcomes: The students <ul style="list-style-type: none"> • should deepen their theoretical knowledge about genome analysis methods methods, with an emphasis on plant genome mapping and gene expression techniques • will gain insight into the practical applications of biotechnological and molecular genetic methods in plant breeding • will obtain the necessary theoretical background to apply experimental molecular genetics, biotechnological and gene technological methods in plant breeding 		
Module Content: <ul style="list-style-type: none"> • Molecular and cellular plant genetics • Methods and techniques of experimental biotechnology and genome analysis • Molecular plant breeding: Structure and function of plant genomes, molecular markers, genome mapping, QTL analysis, gene cloning techniques, gene expression methodology • Methods of gene technology in plant breeding: Gene isolation, gene transfer (transformation techniques), detection methods 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	50	70
Seminar		
Practical training		
Exercises		
Excursion	20	20
Total:	160	
Prerequisites for Examination: ...		
Module Examination:		
<ul style="list-style-type: none"> – Form(s) of assessment Written examination and Seminar Paper – Components of final grade Written examination (80%), Seminarpaper (20%) – Form of module retake examination Written examination and Seminar Paper 		
Language: English		

MK 018	MK 018 Microbial Food Biotechnology	6 CP
	Microbial Food Biotechnology	
Core Module / Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Angewandte Mikrobiologie	2./4. Sem.;
	Offered for the first time: SS 2016	
	Intake capacity: 30	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Mikrobiologie der Recycling-Prozesse		
Applies to the Study Programmes: Agrobiotechnology, Master (2./4.);		
Prerequisites for Participation: None		
Learning Outcomes: Students <ul style="list-style-type: none"> • will have knowledge of the industrial microbiological processes employed in industrial settings, including genetic engineering applications • be familiar with advanced application-oriented microbiological methods within the scope of industrial microbiology • know basic and advanced microbiological and molecular techniques for control purposes 		
Module Content: <ul style="list-style-type: none"> • food fermentations, Selected examples: Dairy products, wine, beer, fermented vegetables • microbial production systems, Vinegar, citric acid, acetone, amino acids as primary products of microbial metabolism • antibiotics, toxins (e.g. as insecticides) as secondary products of microbial metabolism • microbial transformation and biocatalysis • genetic engineering of microorganisms for optimal production • foodborne pathogenic bacteria, Selected examples: Salmonella, enterohemorrhagic bacteria, Clostridium • epidemiology of foodborne illness • Insects and other vectors for microbial spoilage • Inhibition of microbial growth by physical or chemical methods 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	60
Seminar		
Practical training	30	60
Exercises		
Excursion		
Total:	180	
Prerequisites for Examination: ...		
Module Examination:		
<ul style="list-style-type: none"> – Form(s) of assessment Written examination – Components of final grade Written examination (100 %) – Form of module retake examination Written examination 		
Language: English		

MK 019	MK 019 Industrial Internship	12 CP
	Industrial Internship	
Core Module / Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Phytopathologie	3. Sem.;
	Offered for the first time: WS 2015/16	
	Intake capacity: not limited	
Frequency and Duration: during the semester break, 8 weeks		
Module Coordinator: Phytopathologie		
Applies to the Study Programmes: Agrobiotechnology, Master (3.);		
Prerequisites for Participation: cores of the 1st and 2nd semester / (recommended: Basic knowledge in laboratory work; basic knowledge in chemistry and biology)		
Learning Outcomes: Students will <ul style="list-style-type: none"> • be able to understand and evaluate biotechnological processes in food and Agrobiotechnology • have practical experience with extended biotechnological processes, such as tissue culture, high-throughput screening and marker applications, fermentation • be able to execute extended biotechnological laboratory methods unassisted • have a conception of the problem solution strategies in biotechnology • get insight and broad information on technology and strategies used by food and agrobiotechnology industries 		
Module Content: <ul style="list-style-type: none"> • transgenic plants/microorganisms • agronomically important genes, proteins, and/or other metabolites • genetic transformation techniques • depending on industry laboratory : • biotechnological pest control techniques • biotechnological disease control techniques • tissue techniques and tissue cultures • high-throughput screening methods • molecular breeding techniques • food and feed safety • microbial production techniques • cell biology techniques • visualization techniques by marker genes 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture		
Seminar		
Practical training	360	
Exercises		
Excursion		
Total:		360
Prerequisites for Examination: ...		
Module Examination:		
<ul style="list-style-type: none"> – Form(s) of assessment oral examination – Components of final grade Oral examination (100 %) – Form of module retake examination Oral examination 		
Language: English		

MK 057	MK 057 Molecular Phytopathology	6 CP
	Molecular Phytopathology	
Core Module / Optional Module	Agrarwissenschaften, Ökotoxologie und Umweltmanagement / Institut für Phytopathologie	1. Sem.; 1./2. Sem.;
	Offered for the first time: WS 2015/16	
	Intake capacity: not limited	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Phytopathologie		
Applies to the Study Programmes: Agrobiotechnology, Master (1.); Nutzpflanzenwissenschaften, Master (1./2.); Oenologie, Master (1./2.);		
Prerequisites for Participation: None		
Learning Outcomes: Students will <ul style="list-style-type: none"> • have in-depth knowledge of the biochemical and molecular basis on host-parasite interactions • be able to describe the structure and function of the plant's immune system of model plants • be able to discuss possible means by which plants and their parasites coevolved 		
Module Content: <ul style="list-style-type: none"> • cytological, biochemical and molecular biological foundations background on host-parasite interactions • mechanisms of plant defensive reactions/defense reactions • structure and function of resistance and virulence genes • principles of modern disease control processes on the basis of induced resistance and genetic engineering techniques • effector biology, PAMP-triggered immunity, effector triggered immunity 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	45	90
Seminar	15	30
Practical training		
Exercises		
Excursion		
Total:	180	

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Written examination, Presentation
- Components of final grade Written examination (50 %), Presentation (50 %)
- Form of module retake examination Oral or written examination

Language: English