

Module Directory

Faculty 09 - Agricultural Sciences, Nutritional Sciences and Environmental Management

English Profile Modules for International Master Degree Courses

Please consult Stud.IP, the study schedule or current university calendar 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>

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MP 007	MP 007 Internationale Ernährungssicherung II	6 CP
	International Nutrition Security II	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Ernährungswissenschaft	1.-4. Sem.;
	Offered for the first time: SS 2016	
	Intake capacity: nicht limitiert	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Internationale Ernährung		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: Keine (empfohlen: ernährungswissenschaftliche Grundkenntnisse)		
Learning Outcomes: Die Studierenden <ul style="list-style-type: none"> • können das Management verschiedener Fehlernährungsformen benennen und einordnen (Marasmus und Kwashiorkor sowie und Mikronährstoffmangelzuständen), • können anthropometrische Verfahren zur Diagnostik von Malnutrition benennen und hinsichtlich ihrer Bedeutung im Rahmen von Public Health Maßnahmen abgrenzen • können die Voraussetzungen für Ernährungssicherheit für Länder und Regionen analysieren und Empfehlungen zur Förderung der Ernährungssicherung aussprechen, • können die Ursachen und Problematik der ‚double and triple burden‘ der Mangelernährung benennen, • können die Indikation für Nahrungsmittelhilfe stellen, • können Projektaktivitäten hinsichtlich Ihrer potentiellen Wirksamkeit auf die Ernährungssicherung einer Region, eines Landes einordnen, präsentieren und überzeugend verteidigen. 		
Module Content: <ul style="list-style-type: none"> • Pathogenese, Klinik, Diagnostik und Management verschiedener Fehlernährungsformen in Niedrigeinkommensländern • soziale und politische Rahmenbedingungen für Ernährungssicherheit • Analysen, Richtlinien und Probleme der Nahrungsmittelhilfe • anthropometrische Messverfahren mit Übungen • Übungen zu Methoden der Ernährungserhebung in Ländern mit niedrigem Einkommen • Nahrungsmittelkunde tropischer Länder mit Exkursion in den botanischen Garten der JLU Giessen • Rhetorikübungen (Fünfsatz) zur Förderung der Standpunktbildung im Themenfeld der Ernährungssicherung • Gender-Aspekte der Ernährungssicherung • Erarbeitung von Projekten der Entwicklungszusammenarbeit zur Förderung der Ernährungssicherung oder eines Forschungsvorhaben der Ernährungssicherung • Besuch von Vertreterinnen und Vertretern aus Einrichtungen der Entwicklungszusammenarbeit 		

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: – Form(s) of assessment Klausur und Vortrag mit schriftlicher Ausarbeitung – Components of final grade Klausur (50 %), Vortrag mit schriftlicher Ausarbeitung (50 %) – Form of module retake examination Klausur oder mündliche Prüfung		
Language: Deutsch (50%) / Englisch (50%)		

MP 020	MP 020 Plant Breeding: Special Topics of Resistance and Quality Breeding	6 CP
	Plant Breeding: Special Topics of Resistance and Quality Breeding	
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Pflanzenbau und Pflanzenzüchtung I	2. Sem.;
	Offered for the first time: SS 2016	
	Intake capacity: not limited	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Pflanzenzüchtung		
Applies to the Study Programmes: Profil, Master (2.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • will obtain profound knowledge about the breeding goals regarding disease resistances and quality aspects of important European crops • will obtain profound knowledge about essential methods to record the respective resistance and quality attributes • will obtain knowledge about how to realize breeding goals in the breeding process depending on the genetics and inheritance of the respective trait • will obtain knowledge about the application of biotechnological, gene technological and molecular-biological tools with respect to optimising resistance and quality parameters of important agricultural crops 		
Module Content: <ul style="list-style-type: none"> • natural diversity and genetics of resistance against the most important pests of major European crops • detection methods for resistance reactions in selected crops • detection methods for important quality parameters of selected crops • natural diversity and genetics of quality parameters (cereals, oil and protein plants) • methods to identify and increase genetic variation for important traits • methods of cell and tissue culture and their use in breeding for resistance and quality 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	60
Seminar		
Practical training		
Exercises		
Excursion	30	60
Total:		180

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Oral examination and seminar paper
- Components of final grade Oral examination (80 %), seminar paper (20%)
- Form of module retake examination Oral examination or written examination

Language: English

MP 029	MP 029 Plant-Microbe Interactions	6 CP
	Plant-Microbe Interactions	
Optional Module	Agrarwissenschaften, Ökotoxologie und Umweltmanagement / Institut für Phytopathologie	2./4. Sem.;
	Offered for the first time: SS 2016	
	Intake capacity: 60	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Phytopathologie		
Applies to the Study Programmes: Profil, Master (2./4.);		
Prerequisites for Participation: None (recommended: basics in microbiology and phytopathology)		
Learning Outcomes: Students will <ul style="list-style-type: none"> • be familiar with interactions of parasitic and symbiotic biocenoses • be able to discuss the application of alternative measures for reduction of pesticide and chemical fertilizers • be familiar with concepts of modern interdisciplinary approaches to the use of microorganisms in disease control 		
Module Content: <ul style="list-style-type: none"> • physical and chemical conditions in the rhizosphere (pH, O₂, exudate gradients) • root pathogens (fungi, bacteria) • pest control strategies on roots • growth promotion of rhizospheric microorganisms (N₂ fixation, regulation of the nif gene, plant-promoting factors, mycorrhiza) • resistance mechanisms • possibilities and limitations of inoculation with VAM or N₂-fixing bacteria • interaction with beneficial microorganisms (PGPR, BCAs) • microbial interactions with lower plants (mosses, lichens, etc.) • methods for the study of uncultivable microorganisms on/in plant tissues 		

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 and Presentation
- Components of final grade Written examination (70 %), Presentation (30 %)
- Form of module retake examination Oral or written examination

Language: English

MP 044	MP 044 Economy of Rural Institutions	6 CP
	Economy of Rural Institutions	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Agrarpolitik und Marktforschung	3./4. Sem.;
	Offered for the first time: WS 2015/16	
	Intake capacity: not limited	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Agrar- und Umweltpolitik		
Applies to the Study Programmes: Profil, Master (3./4.); Profil Transition Management, Master (3./4.);		
Prerequisites for Participation: None		
Learning Outcomes: Students will <ul style="list-style-type: none"> • have basic knowledge of the relationship between agriculture and society from perspectives of sociology and institutional economics • be able to recognize how human activity is determined in a social context, as well as how institutions are explained economically and socially • recognize the interactions between individuals and society and know methodical approaches to elucidating the structure of agrarian societies • be familiar with basic social issues in agrarian societies and be able to apply various social theories of work, land, credit, input markets 		
Module Content: <ul style="list-style-type: none"> • Foundations of & demands on agrarian institutions by transaction minimal costs • Efficient institutions and rural forms of organization • Work and land: theories of sharecropping and distribution of surplus • Land taxes: potentials and limitations in international comparison • Land policy and land reform, institutional regulation of rural credit markets • Water rights and technology • Comparison of agricultural law in various countries • Problems associated with institutional change • Institutional problems of agricultural transition in Eastern Europe • Interaction between individuals and societal institutions, • Theories of social stratification, community and society • Theories of social change and effects on the agricultural sector • Property and usage rights, property rights and rents • Theories of social justice and appropriation • Agrarian constitutions and labour regulations • Land access and regulations, land ownership • Rural behaviour, rural welfare systems in historical context • Traditional social safety nets • Peasantry and peasant behaviour, farming as a lifestyle 		

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:

- Form(s) of assessment Oral examination and presentation
- Components of final grade Oral examination (60%), presentation (40%)
- Form of module retake examination Oral examination

Language: English

MP 075	MP 075 Host-Intestine-Microbe Interactions for Nutrition and Health	6 CP
	Host-Intestine-Microbe Interactions for Nutrition and Health	
Optional Module	Agrarwissenschaften, Ökotrophologie 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: Allgemeine und Bodenmikrobiologie		
Applies to the Study Programmes: Profil, Master (2./4.);		
Prerequisites for Participation: None (recommended: basics knowledge in microbiology)		
Learning Outcomes: Students will: <ul style="list-style-type: none"> • have an overview over morphology and function of various digestive systems • have knowledge of commensalistic, mutualistic and pathogenic bacteria • understand the survival and adhering strategies of microbes in the intestine and the microbial primary and secondary metabolism (vitamin and toxin production) • understand the complexity of human microbiota also in relation to age, sex and disease • gain insight of the microbe interactions with epithel and paneth cells and about cell mediated immunity • become familiar with features of probiotic bacteria and bacteria causing food contamination • have practical experience with various microbial and molecular techniques to quantify and characterize bacteria. 		
Module Content: <ul style="list-style-type: none"> • Intestine systems of humans, ruminants and insects • Physiology and interactions of bacteria in the intestine • Knowledge on human microbiota based on latest publications • Cell mediated immunity • Methods for cultivation and identification of microorganisms 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	20	40
Seminar		
Practical training	70	50
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

MP 076	MP 076* Laboratory Course: Tissue Culturing and Genetic Transformation	6 CP
	Laboratory Course: Tissue Culturing and Genetic Transformation	
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Phytopathologie	. Sem.; 1./3. Sem.;
	Offered for the first time: WS 2015/16	
	Intake capacity: 30	
Frequency and Duration: WS, Block, 1 Semester		
Module Coordinator: Phytopathologie		
Applies to the Study Programmes: Profil, Master (1./3.);		
Prerequisites for Participation: Molecular Phytopathology (MK 057), Plant Protection and Bioengineering (MK 015)		
Learning Outcomes: Students will <ul style="list-style-type: none"> • have practical knowledge of the methods, strategies, and laboratory techniques for plant and microbe transformation • be able to understand technical problems related to genetic transformation of crop plants, and identify the risks involved in this strategy • have fundamental knowledge in risk assessment, environment protection, farmer and consumer protection, and food security 		
Module Content: <ul style="list-style-type: none"> • guidance for the risk management of genetic engineered plant and microorganisms • practical training in plant transformation • practical training in microbe transformation techniques • practical training in tissue culturing techniques • practical training in detection of transgenes by molecular and cell biology techniques • practical training in confocal laser microscopy • practical training in transgene function assessment 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	5	10
Seminar	5	10
Practical training	50	100
Exercises		
Excursion		
Total:		180
Prerequisites for Examination: ...		
Module Examination: – Form(s) of assessment Oral examination, project work – Components of final grade Oral examination (50%), project work (50%) – Form of module retake examination Oral examination		
Language: English		

*Only students of the master degree course Agrobiotechnology

MP 077	MP 077* Laboratory Course: Methods in Molecular Phytopathology		6 CP
	Laboratory Course: Methods in Molecular Phytopathology		
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Phytopathologie		1./3. Sem.;
	Offered for the first time: WS 2015/16		
	Intake capacity: 30		
Frequency and Duration: WS, Block, 1 Semester			
Module Coordinator: Phytopathologie			
Applies to the Study Programmes: Profil, Master (1./3.);			
Prerequisites for Participation: Molecular Phytopathology (MK 057), Plant Protection and Bioengineering (MK 015)			
Learning Outcomes: Students will <ul style="list-style-type: none"> • become acquainted with plant pathogenic organisms and will learn different inoculation techniques • learn laboratory techniques in molecular biology • know different biotechnological strategies in plant protection • broaden their knowledge of plant microbe interactions • gain knowledge about pathogen effector molecules and their targets in the host cell • gain knowledge about protein-protein interactions 			
Module Content: <ul style="list-style-type: none"> • practical training in detection methods of DNA, RNA and proteins • practical training in biotechnological plant protection strategies • practical training in bioinformatics related to sequence similarities and diagnostic matter • practical training in inoculation methods and disease assessment • practical training in detection of protein-protein interactions 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	5	10	
Seminar	5	10	
Practical training	50	100	
Exercises			
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Presentation and project work – Components of final grade Presentation (50%), project work (50%) – Form of module retake examination Oral examination			
Language: English			

*Only students of the master degree course Agrobiotechnology

MP 087	MP 087 Global Nutrition and Agriculture	6 CP
	Global Nutrition and Agriculture	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Agrarpolitik und Marktforschung	1.-4. Sem.;
	Offered for the first time: WS 2015/16	
	Intake capacity: non limited	
Frequency and Duration: WS, 1 semester		
Module Coordinator: Agrar- und Umweltpolitik		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • know the determinants of food and nutrition security, • are able to make estimates of the regional food requirements and the carrying capacity, • are able to overlook the associations between health and nutrition, • have an overview about structures and strategies of nutrition promotion. 		
Module Content: <ul style="list-style-type: none"> • global nutrition a challenge for agricultural development • food requirements, natural resources and population • regional potential of food production • technology development, institutions and human capital • sectoral development strategies, agriculture and nutrition • commercialisation of agriculture, cash-crop- vs. food-crop-debate • international labour division and nutrition security • nutrition security and health • migration and malnutrition • cultural, economic and social determinants of nutrition • breastfeeding and nutrition security • nutrition security and food aid • development aid approaches • international organisations for nutrition security and agricultural development <p>Excursion to Rome or Geneva (participation optional)</p>		

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:

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

Language: English

MP 090	MP 090 Biotechnology for pest control		6 CP
	Biotechnology for Pest Control		
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie		1./3. Sem.;
	Offered for the first time: WS 2015/16		
	Intake capacity: 40		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Insektenbiotechnologie im Pflanzenschutz			
Applies to the Study Programmes: Profil, Master (1./3.);			
Prerequisites for Participation: None (recommended: basic knowledge in zoology, biotechnology, and genetics)			
Learning Outcomes: Students will <ul style="list-style-type: none"> • get an introduction to insect biotechnology • learn about biotechnological applications of insect-derived bioresources in medicine, agriculture, and industry • learn about the importance of genetic and epigenetic tools in model insect species • learn about diseases transmitted by insects and comparative genomic analysis • learn to synthesize and prepare the seminar work on insect biotechnology and molecular entomology 			
Module Content: <ul style="list-style-type: none"> • concepts of insect biotechnology and relevant basics in insect immunity, physiology and epigenetics • application of insect-derived bioresources in medicine, agriculture and industry • a detailed view on environment friendly methods of pest control including molecular, transgenic and gene editing technologies 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	36	72	
Seminar	24	48	
Practical training			
Exercises			
Excursion			
Total:		180	
Prerequisites for Examination: ...			
Module Examination: – Form(s) of assessment Written examination and presentation – Components of final grade Written examination (50 %), presentation (50 %) – Form of module retake examination Oral examination or written examination or presentation			
Language: English			

MP 097	MP 097 Microbial Diagnostics		6 CP
	Microbial Diagnostics		
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Angewandte Mikrobiologie		3./4. Sem.;
	Offered for the first time: WS 2015/16		
	Intake capacity: 30		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Mikrobiologie der Recycling-Prozesse			
Applies to the Study Programmes: Profil, Master (3./4.);			
Prerequisites for Participation: None (recommended: Angew. und Umweltmikrobiologie (BK 034) and/or Lebensmittelmikrobiologie (BP 092))			
Learning Outcomes: Students <ul style="list-style-type: none"> will have detailed knowledge of the fundamentals of microbial diagnostics will learn methods of quantification and qualification of bacteria with cultivation-dependent and cultivation-independent methods 			
Module Content: <ul style="list-style-type: none"> microbiological diagnostics (conventional and molecularbiological methods in the context of quality management measures), microbial contamination of food and the environment, in everyday life and in the working environment (legal foundations and standards) quantification and qualification of biotechnologically important microorganisms; identification of bacteria with conventional and molecularbiological methods; enzyme detection, bacteriological analyses in the context of microbiological quality control 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	30	60	
Seminar	30	60	
Practical training			
Exercises			
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Presentation, written examination – Components of final grade Presentation (20 %), written examination (80 %) – Form of module retake examination Written examination			
Language: English			

MP 098	MP 098 Molecular Plant Breeding	6 CP
	Molecular Plant Breeding	
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Pflanzenbau und Pflanzenzüchtung I	1.-4. Sem.;
	Offered for the first time: WS 2015/16	
	Intake capacity: 30	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Pflanzenzüchtung		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: Biotechnology and Genomics (MK 016) / (recommended: Plant Breeding: Special Topics of Resistance and Quality Breeding (MP 020))		
Learning Outcomes: The students <ul style="list-style-type: none"> • will gain practical and/or theoretical experience in DNA and RNA extraction and analysis techniques, PCR, genetic mapping and QTL analysis, DNA hybridisation, gene expression and next-generation sequencing • will learn practical applications of biotechnological and molecular genetic methods in plant breeding • will obtain the necessary practical background to apply experimental molecular genetics, biotechnological and gene technological methods in plant breeding 		
Module Content: <ul style="list-style-type: none"> • DNA extraction and quantification • Polymerase chain reaction (PCR) • Agarose and polyacrylamide gel electrophoresis • Next-generation DANN sequencing • Molecular marker analysis, genome mapping and QTL analysis • DNA filter hybridisation, genome libraries • Quantitative real-time PCR • New methods of gene technology in plant breeding: Genome editing, cis-genetics 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	30
Seminar		
Practical training	40	80
Exercises		
Excursion		
Total:		180

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Oral examination and project work
- Components of final grade Oral examination (50 %), project work (50 %)
- Form of module retake examination Oral exam

Language: English

MP 100	MP 100 Bioinformatics		6 CP
	Bioinformatics		
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Pflanzenbau und Pflanzenzüchtung II		1.-4. Sem.;
	Offered for the first time: WS 2015/16		
	Intake capacity: 60		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Biometrie und Populationsgenetik mit dem Schwerpunkt Bioinformatik			
Applies to the Study Programmes: Profil, Master (1.-4.);			
Prerequisites for Participation: Angewandte Statistik (MK 062) oder Biostatistics and Experimental Design (MK 002)			
Learning Outcomes: Students <ul style="list-style-type: none"> • know the concept of random variates and probability distributions • understand the basics of statistical test and estimation theory • can apply tests to bioinformatics data • have basic knowledge about the analysis of high dimensional data sets 			
Module Content: <ul style="list-style-type: none"> • Probability theory • Test theory • Data and control structures in R • Statistical tests with R and Bioconductor • Visualisation of high dimensional data 			
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: – Form(s) of assessment Assignments (4) or written examination – Components of final grade Assignments (100 %) or written examination (100%) – Form of module retake examination Written examination			
Language: English			

MP 126	MP 126 Selection for disease resistance in farm animals		6 CP
	Selection for Disease Resistance in Farm Animals		
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Tierzucht und Haustiergenetik		3./4. Sem.;
	Offered for the first time: WS 2015/16		
	Intake capacity: 30		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Haustier- und Pathogenetik			
Applies to the Study Programmes: Profil, Master (3./4.);			
Prerequisites for Participation: None (recommended: enhanced knowledge of genetics and molecular genetics; e. g.: Biotechnology and Genomics (MK 016), Molekulare Tierzucht und Biotechnologie (MK 021))			
Learning Outcomes: The students <ul style="list-style-type: none"> • will know phenotypic parameters and molecular mechanisms underlying genetic differences in disease susceptibility • will have practical experience in sample collection, laboratory and data analysis • will be able to assess different strategies for identification of indirect and direct markers for disease susceptibility • will be able to evaluate scientific research projects on disease resistance in farm animals 			
Module Content: <ul style="list-style-type: none"> • barriers of infections, innate and acquired immunity • genetics of disease susceptibility • phenotypic parameters for diagnosis of host infection/susceptibility status • practical exercises: sample collection from farm animals (e. g. sheep, cattle), laboratory analysis of phenotypic parameters for infection/susceptibility status, genetic analysis (genotyping of markers) data analysis (phenotyping and genotyping data, genome-wide association analysis) • strategies for identification of indirect and direct genetic markers for disease resistance 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	30	60	
Seminar	15	30	
Practical training			
Exercises	15	30	
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Assignments and written examination (optionally in English or in German language) – Components of final grade Assignments (20 %), written examination (80 %) – Form of module retake examination Written examination			
Language: English			

MP 149	MP 149 Molecular Techniques		6 CP
	Molecular Techniques		
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie		1./3. Sem.;
	Offered for the first time: WS 2017/18		
	Intake capacity: not limited		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Insektenbiotechnologie im Pflanzenschutz			
Applies to the Study Programmes: Profil, Master (1./3.);			
Prerequisites for Participation: None (knowledge in genetics recommended)			
Learning Outcomes: The students <ul style="list-style-type: none"> • have a basic knowledge of molecular biology, • know important vector and plasmid systems • know important molecular pathways as well as cloning strategies • have a good knowledge of molecular techniques used in insect biotechnology • can independently compile, summarize and present literature on a given topic in a lecture 			
Module Content: <ul style="list-style-type: none"> • Fundamentals in molecular biology • History and evolution of plasmids and DNA cloning • Molecular biology and their benefits in biotechnology • Transformation possibilities and transgenesis in insects • "From plasmids to biotechnologically modified insects" • Current molecular tools in insect biotechnology and their risk assessment 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	28	56	
Seminar	24	48	
Practical training			
Exercises	8	16	
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 or oral examination			
Language: English			

MP 150	MP 150 Milestones of Insect Biotechnology & Bioresources	6 CP
	Milestones of Insect Biotechnology & Bioresources	
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie	2./4. Sem.;
	Offered for the first time: SS 2018	
	Intake capacity: 40	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Insektenbiotechnologie im Pflanzenschutz		
Applies to the Study Programmes: Profil, Master (2./4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • have an overview of currently discussed relevant topics in science and industry in the field of insect biotechnology • have an overview of currently discussed relevant topics in science and industry in the field of bioresources • Get an overview of research and presentation of current relevant publications and discussion within the context of the lecture, classification of potential industrial and social relevance 		
Module Content: <ul style="list-style-type: none"> • Discussion of regulatory and ethical topics on the use of insect biotechnology and the generation of novel products for pest control and human health • presentation and discussion of currently important topics in insect biotechnology & bioresources • literature research and presentation of currently relevant topics in pharmaceutical and industrial biotechnology based on publications 		

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

Language: English

MP 151	MP 151 Antibiotics: Present, Past and Future		6 CP
	Antibiotics: Present, Past and Future		
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Insektenbiotechnologie		2.-4. Sem.;
	Offered for the first time: WS 2018/19		
	Intake capacity: 30		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Naturstoffforschung mit Schwerpunkt Insektenbiotechnologie			
Applies to the Study Programmes: Profil, Master (2.-4.);			
Prerequisites for Participation: Natural Product Discovery Platforms (MK 090)			
Learning Outcomes: The students <ul style="list-style-type: none"> get comprehensive insight into the main chemical classes of antibiotics used in human and veterinary medicine as well as for agricultural applications. 			
Module Content: <ul style="list-style-type: none"> Main chemical classes (β-lactams, tetracyclins, aminoglycosides, macrolides, peptide antibiotics, 'hybrid' structures, others) of antibiotics used in human and veterinary medicine as well as for agricultural applications; Microbial secondary metabolism as the primary source of antibiotics, including biosynthesis of the most important classes; Modes of action and target sites of important classes of antibiotics; Resistance to antibiotics and novel strategies to overcome antibiotic resistance; Optimizing the effectiveness of antibiotics by chemical and biosynthetic modification (partial synthesis, precursor-directed biosynthesis etc.); Design & optimization of antibiotic fermentation processes; History of antibiotic research and to antimicrobial metabolites from other than microbial sources; 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	48	96	
Seminar	12	24	
Practical training			
Exercises			
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Written examination, presentation and project work – Components of final grade Written examination (50 %), presentation (20 %), project work (30 %) – Form of module retake examination Written examination			
Language: English			

MP 152	MP 152 Trends and Advances in Natural Product Research		6 CP
	Trends and Advances in Natural Product Research		
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie		2.-4. Sem.;
	Offered for the first time: WS 2018/19		
	Intake capacity: 30		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Naturstoffforschung mit Schwerpunkt Insektenbiotechnologie			
Applies to the Study Programmes: Profil, Master (2.-4.);			
Prerequisites for Participation: Natural Product Chemistry (MK 087)			
Learning Outcomes: The students <ul style="list-style-type: none"> will be introduced to modern approaches and state-of-the-art instrumentation applied from bioresource selection until natural product discovery. These are presented in a historic, comparative context. 			
Module Content: <ul style="list-style-type: none"> empiric use of natural products in a historic context (arrow poisons, 'magic' potions, ancient insecticides, monastic herbal medicines etc.) history of natural product chemistry as a discipline of science from the beginning until present important classes of other than microbial or insect origin, their practical use and importance recently discovered, bioactive specialized metabolites, which display novel structures/modes of action achievements and limits of classical approaches in natural products research modern approaches and state-of-the-art instrumentation for natural product dereplication novel target-oriented screening strategies to find new lead structures and novel modes of action 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	48	96	
Seminar	12	24	
Practical training			
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			

MP 153	MP 153* Instrumental, Biochemical and Trace Analytical Methods in Food Analysis		6 CP
	Instrumental, Biochemical and Trace Analytical Methods in Food Analysis		
Optional Module	Biologie und Chemie / Institut für Lebensmittelchemie und Lebensmittelbiotechnologie		3. Sem.;
	Offered for the first time: WS 2017/18		
	Intake capacity: 11		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Lebensmittelchemie			
Applies to the Study Programmes: Profil Insect Biotechnology and Bioresources, Master (3.);			
Prerequisites for Participation: None			
Learning Outcomes: The students <ul style="list-style-type: none"> • learn sophisticated analytical procedures used in the working groups of the Institute of Food Chemistry and Food Biotechnology • gain detailed knowledge of analytical quality assurance and GLP • present their research results in form of a protocol 			
Module Content: <ul style="list-style-type: none"> • Research-related methods of modern food chemistry • Food Chemical trace- and other high-performance analytical methods • Electrophoretic techniques • Methods in molecular biology 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture			
Seminar	6	12	
Practical training	108	54	
Exercises			
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Project work – Components of final grade Project work (100 %) – Form of module retake examination Revision of the project work within 4 weeks			
Language: English			

*Only students of the master degree course Insect Biotechnology and Bioresources

MP 154	MP 154* Method Development in Food Analysis and Food Biotechnology		6 CP
	Method Development in Food Analysis and Food Biotechnology		
Optional Module	Biologie und Chemie / Institut für Lebensmittelchemie und Lebensmittelbiotechnologie		2./4. Sem.;
	Offered for the first time: SS 2018		
	Intake capacity: 11		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Lebensmittelchemie			
Applies to the Study Programmes: Profil Insect Biotechnology and Bioresources, Master (2./4.);			
Prerequisites for Participation: None			
Learning Outcomes: The students <ul style="list-style-type: none"> • learn analytical procedures used in the working groups of the Institute of Food Chemistry and Food Biotechnology • develop and establish new experiments for practical courses • gain detailed knowledge of analytical quality assurance and GLP • present their research results in the form of a protocol 			
Module Content: <ul style="list-style-type: none"> • basic methods used in modern food analysis • gravimetric, photometric, chromatographic and titrimetric methods • Analysis of available databases and literature 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture			
Seminar	6	12	
Practical training	108	54	
Exercises			
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Project work – Components of final grade Project work (100 %) – Form of module retake examination Revision of the project work within 4 weeks			
Language: English			

*Only students of the master degree course Insect Biotechnology and Bioresources

MP 156	MP 156* Laboratory Course I		6 CP
	Laboratory Course I		
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Insektenbiotechnologie		1.-4. Sem.;
	Offered for the first time: WS 2017/18		
	Intake capacity: not limited		
Frequency and Duration: WS and SS (blockmodule), 1 Semester			
Module Coordinator: Angewandte Entomologie			
Applies to the Study Programmes: Profil Insect Biotechnology and Bioresources, Master (1.-4.); Profil, Master (1.-4.);			
Prerequisites for Participation: see http://www.uni-giessen.de/fbz/fb09/institute/iib/ibp/Teaching/mp156			
Learning Outcomes: The students <ul style="list-style-type: none"> acquire specific research-relevant laboratory knowledge improve their cooperative work skills across groups 			
Module Content: <ul style="list-style-type: none"> cooperation with different work groups training of modern laboratory techniques and autonomous lab work in specialized topics topic specific literature research and presentation 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture			
Seminar	10	10	
Practical training	80	30	
Exercises		50	
Excursion			
Total:		180	
Prerequisites for Examination: ...			
Module Examination: – Form(s) of assessment Presentation or protocol – Components of final grade Presentation (100 %) or protocol (100 %) – Form of module retake examination Presentation or protocol			
Language: English			

*Only students of the master degree course Insect Biotechnology and Bioresources

MP 157	MP 157* Laboratory Course II		6 CP
	Laboratory Course II		
Optional Module	Fachbereich/Institut		1.-4. Sem.;
	Offered for the first time: WS 2017/18		
	Intake capacity: not limited		
Frequency and Duration: WS and SS (blockmodule), 1 Semester			
Module Coordinator: ...			
Applies to the Study Programmes: Profil Insect Biotechnology and Bioresources, Master (1.-4.); Profil, Master (1.-4.);			
Prerequisites for Participation: see http://www.uni-giessen.de/fbz/fb09/institute/iib/ibp/Teaching/mp156			
Learning Outcomes: The students <ul style="list-style-type: none"> • acquire specific research-relevant laboratory knowledge • improve their cooperative work skills across groups 			
Module Content: <ul style="list-style-type: none"> • cooperation with different work groups • training of modern laboratory techniques and autonomous lab work in specialized topics • topic specific literature research and presentation 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture			
Seminar	10	10	
Practical training	80	30	
Exercises		50	
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Presentation or protocol – Components of final grade Presentation (100 %) or protocol (100 %) – Form of module retake examination Presentation or protocol			
Language: English			

*Only students of the master degree course Insect Biotechnology and Bioresources

MP 158	MP 158 Insects for Food and Feed Production Systems		6 CP
	Insects for Food and Feed Production Systems		
Optional Module	Fachbereich/Institut		1.-4. Sem.;
	Offered for the first time: WS 2018/19		
	Intake capacity: 30		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: ...			
Applies to the Study Programmes: Profil, Master (1.-4.);			
Prerequisites for Participation: None			
Learning Outcomes: The students <ul style="list-style-type: none"> • learn analytical procedures used in the area of food and feed • gain insight into processing systems for food production • learn to identify edible insects and get information about their morphology, physiology, and ecology • gain knowledge on strategies to convert waste to food • present their research results in the form of a seminar talk 			
Module Content: <ul style="list-style-type: none"> • basic methods used in modern food analysis • Analysis of available databases and literature for suitable insects, protein requirements and improved waste management 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	42	84	
Seminar	18	36	
Practical training			
Exercises			
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Written examination and presentation – Components of final grade Written examination (50%), presentation (50%) – Form of module retake examination Written examination			
Language: English			

MP 163	MP 163 Python for Environmental Scientists		6 CP
	Python for Environmental Scientists		
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement		1.-4. Sem.;
	Offered for the first time: WS 2018/19		
	Intake capacity: 30		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt			
Applies to the Study Programmes: Profil, Master (1.-4.);			
Prerequisites for Participation: None			
Learning Outcomes: The students <ul style="list-style-type: none"> • understand the basic concepts of Python, • can work with data from different sources and formats, • know common scientific Python packages and what they are used for, • can perform basic time series analysis, • can create graphics for environmental data, • can perform basic statistics in Python. 			
Module Content: <ul style="list-style-type: none"> • Basic concepts of Python • Scientific Python packages like numpy, matplotlib, pandas • Using data form different formats • Plotting in Python • Time series analysis in Python • Statistics in Python 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	15	30	
Seminar			
Practical training			
Exercises	45	90	
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: <ul style="list-style-type: none"> – Form(s) of assessment Assignments and presentation – Components of final grade Assignments (50 %), presentation (50 %) – Form of module retake examination Failed individual projects will be re-examined after 4 weeks 			
Language: English or German			

MP 164	MP 164 Geomatics for Development	6 CP
	Geomatics for Development	
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement	1.-4. Sem.;
	Offered for the first time: WS 2018/19	
	Intake capacity: 30	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None (understanding of basic GIS concepts is recommended)		
Learning Outcomes: The students <ul style="list-style-type: none"> • Acquire geospatial data, assess its quality and organize it, • Analyze biophysical and socioeconomics data sets using open source software, • Assess the potential and limitations of using geomatics to promote development in transition and developing countries, • Communicate research effectively, • Gain confidence and competency in using geomatics. 		
Module Content: <ul style="list-style-type: none"> • Understanding & mapping our changing world • Understanding cartographic projections • Assessing geospatial data quality • Evaluating demographic changes at national level • Finding satellite images • Visualizing and interpreting images • Using geospatial data & information for promoting sustainable development goals 		

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

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Seminar paper, Project work
- Components of final grade Seminar paper (25 %), Project work (75 %)
- Form of module retake examination Failed individual projects will be re-examined after 4 weeks

Language: English

MP 165	MP 165 Land Potential Evaluation Systems, Strategies and Tools		6 CP
	Land Potential Evaluation Systems, Strategies and Tools		
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement		1.-4. Sem.;
	Offered for the first time: SS 2018		
	Intake capacity: 30		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt			
Applies to the Study Programmes: Profil, Master (1.-4.);			
Prerequisites for Participation: None (Basic knowledge of geography and GIS is recommended)			
Learning Outcomes: The students <ul style="list-style-type: none"> • Understand strategies, systems and tools needed to evaluate the potential of the land to sustainably generate ecosystem services • Identify the importance of geospatial and data information to evaluate land potential • Assess land suitability for specific land use types based on multi-criteria analysis using open source software. 			
Module Content: <ul style="list-style-type: none"> • Review and applications of existing land potential evaluation systems • Principles for improving existing land potential evaluation systems • Tools, resources and strategies for unlocking the potential of land resources • Options for applying land potential evaluation to land use planning and management 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	15	30	
Seminar			
Practical training			
Exercises	45	90	
Excursion			
Total:		180	
Prerequisites for Examination: ...			
Module Examination: – Form(s) of assessment Seminar paper and project work – Components of final grade Seminar paper (25 %), project work (75 %) – Form of module retake examination Failed individual projects will be re-examined after 4 weeks			
Language: English			

MP 166	MP 166 Mapping and Monitoring Landscape		6 CP
	Mapping and Monitoring Landscape		
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement		1.-4. Sem.;
	Offered for the first time: SS 2018		
	Intake capacity: 30		
Frequency and Duration: SS, block course, 1 Semester			
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt			
Applies to the Study Programmes: Profil, Master (1.-4.);			
Prerequisites for Participation: None (Understanding of basic GIS concepts is required)			
Learning Outcomes: The students <ul style="list-style-type: none"> • Understand concepts and criteria for climate and landform classification • Identify land cover units and assess land cover changes from remote sensing images, • Quantify landscape composition and configuration, • Compare spatial pattern of different landscapes, • Integrate existing geospatial data for biophysical characterization of landscapes and ecosystem mapping. 			
Module Content: <ul style="list-style-type: none"> • Climate and landform classification • Land cover classification • Land cover change • Landscape metrics • Spatial heterogeneity of landscapes • From land cover to ecosystems mapping • Land use and ecosystems services feedbacks 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	15	30	
Seminar			
Practical training			
Exercises	45	90	
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Seminar paper and project work – Components of final grade Seminar paper (25 %), project work (25 %) – Form of module retake examination Failed individual projects will be re-examined after 4 weeks			
Language: English			

MP 168	MP 168 GIS for Socio-Economic Analysis		6 CP
	GIS for Socio-Economic Analysis		
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement		1.-4. Sem.; 2./4. Sem.;
	Offered for the first time: SS 2018		
	Intake capacity: 30		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt			
Applies to the Study Programmes: Profil Transition Management, Master (2./4.); Profil, Master (1.-4.);			
Prerequisites for Participation: None (recommended: basic knowledge of geography and GIS)			
Learning Outcomes: The students <ul style="list-style-type: none"> • Understand the basics of Geographic Information Systems (GIS) • Understand how to use the ArcGIS-platform • Apply basic geospatial analysis for socio-economic questions • Are able to transfer and use of these techniques in an individual project 			
Module Content: <ul style="list-style-type: none"> • Overview of GIS and the ArcGIS platform in particular • GIS file formats (raster, vector) • Analyze spatial data and create cost-data-sets for transport-costs • Analyze individual data sets using ArcGIS • Evaluate results and use results in the frame of a decision support analysis, • Report results and decision in a final presentation 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	20	40	
Seminar			
Practical training			
Exercises	40	80	
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Seminar paper and presentation – Components of final grade Seminar paper (70 %), presentation (30 %) – Form of module retake examination Failed individual projects will be re-examined after 4 weeks			
Language: English			

MP 169	MP 169 Humanitarian Disasters and its Impact on Transition Management	6 CP
	Humanitarian Disasters and its Impact on Transition Management	
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Dekanat	1.-4. Sem.; 2./4. Sem.;
	Offered for the first time: SS 2018	
	Intake capacity: 20	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Studiendekanat		
Applies to the Study Programmes: Profil, Master (1.-4.); Profil Transition Management, Master (2./4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • have acquired knowledge about disaster risk reduction, resilience building, humanitarian disasters and the cycle of disaster management; • comprehend the impact of disasters on Food Security, Agriculture, Water and Sanitation and any other relevant sectors; • are able to understand sectoral policy and practice; • gain detailed information about rights based approaches and accountability mechanisms; • have specific knowledge on gender and other mainstreaming themes; • get insight into monitoring and evaluation and design M & E Tools; • are able to design transition / phase over Strategies. 		
Module Content: <ul style="list-style-type: none"> • Definition, concepts and root causes of Disasters, politics of disasters • Tools for Political, Environmental, Social and Technological analysis • Tools for Data collection and Baseline study • Sectoral linkages and effectiveness • Policy analysis • Rights Based Approaches and Accountability Mechanisms • Gender and Mainstreaming themes • Project /Program cycle with strong emphasis on Monitoring and Evaluation • Transition modalities and strategy 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	60
Seminar	18	36
Practical training	4	8
Exercises		
Excursion	8	16
Total:		180

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Written exercises (5) and presentation with written assignment
- Components of final grade Written exercises (30 %), presentation with written assignment (70 %)
- Form of module retake examination Written exercises and revision of the written assignment within 4 weeks

Language: English

MP 170	MP 170 Capacity Development – Organisational and Institutional Strengthening	6 CP
	Capacity Development – Organisational and Institutional Strengthening	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Dekanat	1./3. Sem.; 1.-4. Sem.;
	Offered for the first time: WS 2018/19	
	Intake capacity: 20	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Studiendekanat		
Applies to the Study Programmes: Profil, Master (1.-4.); Profil Transition Management, Master (1./3.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • understand and learn definitions and methodologies of Capacity Development; • have profound knowledge and understanding about State and Non- State Actors; • conduct stakeholder and Actors Profiling; • acquire knowledge about the relevance of Capacity building for state and Non-state actors; • are able to execute various tools; • are able to to design and develop a Capacity building strategy and operational plan; • are able to develop result based monitoring framework and plans; • understand the politics and challenges associated with Capacity building work; • are able to analyse Capacity building policy. 		
Module Content: <ul style="list-style-type: none"> • Detailed and various definitions and methodologies about Capacity development; • Theory about role of State and engagement of Non-State actors; • Tools for Stakeholders and Actors profiling; • Tools for capacity assessment for Organisations and Institutions; • Strategic and operational planning tools; • Logical framework analysis, Monitoring and Evaluation tools and framework • Capacity building policy of a country in transition 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	60
Seminar	18	40
Practical training	4	20
Exercises		
Excursion	8	
Total:		180

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Written exercise (5) and presentation with written assignment
- Components of final grade Written exercise (30 %), presentation with written assignment (70 %)
- Form of module retake examination Written exercises and revision of the written assignment within 4 weeks

Language: English

MP 175	MP 175 Effect-directed Analysis by HPTLC-Assay-HRMS	6 CP
	Effect-directed Analysis by HPTLC-Assay-HRMS	
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Ernährungswissenschaft	1.-4. Sem.;
	Offered for the first time: WS 2018/19	
	Intake capacity: 12	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Lebensmittelwissenschaften		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: Keine		
Learning Outcomes: The students <ul style="list-style-type: none"> • understand the meaning of effect-directed analysis and possible techniques, • know the advantages and disadvantages of the different techniques, • survey the variety of in situ assays (in the adsorbent bed), • experience the fast effect-directed profiling (2-15 min/sample), • recognize the efficient combination of planar chromatography with biological and biochemical assays, • realize the power of hyphenated high-performance thin-layer chromatography (HPTLC), • know the streamlined workflow on one plate, • separate complex samples in parallel, discover active compounds and characterize these, • transfer the knowledge gained to a new assay to be outlined in a subsequent project work. 		
Module Content: <ul style="list-style-type: none"> • Theoretical basics of the different options for the performance of effect-directed analysis, • Benefits of coupling the different assays with HPTLC, • Different options for couplings to mass spectrometry (MS), • Training in the straightforward workflow of HPTLC-UV/Vis/FLD-assay-MS, • Performance of a specific assay type on each of the five practical days: <ol style="list-style-type: none"> 1. Antimicrobials against Gram-negative bacteria via <i>Aliivibrio fischeri</i> bioassay, 2. Antimicrobials against Gram-positive bacteria via <i>Bacillus subtilis</i> bioassay, 3. Hormone-effective compounds via planar yeast estrogen/androgen screen (pYES/pYAS), 4. Enzyme inhibitors via cholinesterase/tyrosinase assay, 5. Enzyme inhibitors via α/β-glucosidase/amylase assay, • Project work: Task to outline a new assay for transfer or application on the plate. 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	35	50
Seminar		
Practical training	25	70
Exercises		
Excursion		
Total:		180

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Written examination and project work
- Components of final grade Written examination (60 %), project work (40%)
- Form of module retake examination Written examination and revision of the project work within 4 weeks

Language: English

MP 176	MP 176 Food Systems	6 CP
	Food Systems	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Pflanzenbau und Pflanzenzüchtung II	1.-4. Sem.;
	Offered for the first time: WS 2019/20	
	Intake capacity: 30	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Ökologischer Landbau mit dem Schwerpunkt nachhaltige Bodennutzung		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • Can apply inter- and transdisciplinary research approaches (e.g. participatory research, action research) • Can analyse their own food systems • Know about best practices of sustainable food system components • Are able to critically examine food systems and suggest improvements • Are able access and address a topic by means of scientific methodologies 		
Module Content: <ul style="list-style-type: none"> • Widening the focus from farming/agroecosystems to food systems • Methods to assess the sustainability of different food systems • Components of sustainable food systems (agricultural production, transformation, logistics, ...) • Food system innovations (e.g. Food Policy Councils, Community Supported Agriculture, Food Saving) • Discussions with local food system stakeholders • Writing and presenting own contributions to the given topics 		
Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture		
Seminar	50	100
Practical training		
Exercises		
Excursion	10	20
Total:	180	
Prerequisite for Examination: ...		
Module Examination: – Form(s) of assessment Project work – Components of final grade Project work (100%) – Form of module retake examination Oral examination		
Language: English		

MP 178	MP 178 Empirical Research Methods for Natural Resource Analysis	6 CP
	Empirical Research Methods for Natural Resource Analysis	
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement	1.-4. Sem.;
	Offered for the first time: SS 2019	
	Intake capacity: 30	
Frequency and Duration: SS (Block), 1 Semester		
Module Coordinator: Landschaftsökologie und Landschaftsplanung		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None (Basic knowledge of statistics/empirical research methods recommended)		
Learning Outcomes: The students <ul style="list-style-type: none"> • Will know best practice examples of empirical research designs • Know how to analyse and interpret multivariate statistics (ordination methods) • Know how to classify data (cluster analysis) • Handle data in the R environment to analyse their own data • Will be able to write a scientific research report 		
Module Content: <ul style="list-style-type: none"> • Tutorials in small groups working on exemplary data of empirical research on natural resources • Developing own sampling strategy for field research • Own data collection • Multivariate analysis of data • Writing a research report 		

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

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Presentation and written assignment
- Components of final grade Presentation (30 %), written assignment (70 %)
- Form of module retake examination Written assignment

Language: English

MP 179	MP 179 Natural Resources and Ecosystem Services		6 CP
	Natural Resources and Ecosystem Services		
Optional Module	Agrarwissenschaften, Ökotoxikologie und Umweltmanagement / Institut für Landschaftsökologie und Ressourcenmanagement		1.-4. Sem.;
	Offered for the first time: SS 2019		
	Intake capacity: 30		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Landschafts-, Wasser- und Stoffhaushalt			
Applies to the Study Programmes: Profil, Master (1.-4.);			
Prerequisites for Participation: None (Basic knowledge of environmental processes and GIS recommended)			
Learning Outcomes: The students <ul style="list-style-type: none"> • Understand the concept of ecosystem services • Know how to estimate ecosystem services using InVEST • Are able to assess and evaluate natural resources with regard to multiple ecosystem services for an individual project 			
Module Content: <ul style="list-style-type: none"> • Introduction to the concept of supporting, regulating, provisioning and cultural ecosystem services • Identification and understanding of multiple ecosystem services provided by different ecosystems • Repetition of GIS using ArcGIS software • Learning how to use and analyse spatial datasets with InVEST • Evaluate and use results in the frame of a decision support analysis 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	20	40	
Seminar			
Practical training			
Exercises	40	80	
Excursion			
Total:		180	
Prerequisites for Examination: ...			
Module Examination: – Form(s) of assessment Seminar paper and presentation – Components of final grade Seminar paper (70 %), presentation (30 %) – Form of module retake examination Failed individual projects will be re-examined after 4 weeks			
Language: English			

MP 181	MP 181 Gender and Development	6 CP
	Gender and Development	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Dekanat	1.-4. Sem.;
	Offered for the first time: SS 2019	
	Intake capacity: 30	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Studiendekanat		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • have profound knowledge of the covered subject areas • are able to identify, organize and analyze specialist literature about the topic/research question and can summarize and present the current state of research • are capable to prepare a selected topic independently, can write a paper about it and are able to present it • are able to take part in scientific discussions on the subject • are able to critically evaluate special research issues and take a substantiated position 		
Module Content: <ul style="list-style-type: none"> • Main definitions: Gender, (sustainable) development, diversity, intersectionality, human rights based approach, Gender Justice, Empowerment • Historical development of discourse (WID, GAD, Gender mainstreaming, MDG, SDG) • Personal experiences (considering the life cycle), Gender competence • Understanding gender dynamics: The power of Analysis • Gender analysis frameworks • Participatory approaches as a means to reflection and empowerment • Care economy, featuring time as a resource (UNRISD) • Heterodox feminist economics: Economic literacy and the 5 sector model by Louise Gubitzer as an analytical tool of the economy • Developing strategies, plans and monitoring systems to enhance gender justice at different levels (Global (UN), National, At local level) • Civil Society, Empowerment Movements, led by diverse women and men, • Identification of topics to be covered in the reader 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture		
Seminar	60	120
Practical training		
Exercises		
Excursion		
Total:		180

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Seminar paper or presentation and seminar paper
- Components of final grade Seminar paper (100 %) or presentation (40 - 60 %) and seminar paper (40 - 60 %)
- Form of module retake examination Revision of the seminar paper within 4 weeks

Language: German or english

MP 185	MP 185 Renewable Energy Transition	6 CP
	Renewable Energy Transition	
Optional Module	Mathematik und Informatik, Physik, Geographie / Physik	1.-4. Sem.;
	Offered for the first time: SS 2018	
	Intake capacity: 30	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Physik		
Applies to the Study Programmes: Profil Transition Management, Master (1.-4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students acquire <ul style="list-style-type: none"> • basic physics knowledge about energy production, transport, storage and consumption using fossil, nuclear and renewable sources • understanding of the options and problems of various energy systems, including their impact on global climate and the global carbon and water cycles • in-depth knowledge of renewable energy systems and their elements • ability to identify and address challenges in the transition phase of energy systems that are related to socio-economic and cultural factors 		
Module Content: <ul style="list-style-type: none"> • energy usage and conversion • fossil and nuclear power plants • climate change and acidification of oceans • potential of wind, solar, hydro and geothermal energies • energy transport and storage • interference of energy sectors for industrial, residential, thermal and mobility applications • socio-economic and cultural aspects and challenges related to energy scarcity and energy system transitions 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	36	72
Seminar	24	48
Practical training		
Exercises		
Excursion		
Total:		180

Prerequisites for Examination: ...

Module Examination:

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

Language: English

MP 187	MP 187 Climate Change and Development		6 CP
	Climate Change and Development		
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Agrarpolitik und Marktforschung		1.-4. Sem.;
	Offered for the first time: WS 2019/20		
	Intake capacity: 30		
Frequency and Duration: WS, 1 Semester			
Module Coordinator: Agrar-, Ernährungs- und Umweltpolitik			
Applies to the Study Programmes: Profil, Master (1.-4.); Profil Transition Management, Master (1.-4.);			
Prerequisites for Participation: None			
Learning Outcomes: Students will <ul style="list-style-type: none"> • be aware of the international challenges in dealing with climate change, • understand the climate change risks in different developing regions, • be able to discuss the potential of climate change mitigation and adaptation strategies and ways to implement and finance them. 			
Module Content: <ul style="list-style-type: none"> • Coastal regions and islands under risk of flooding. • Migration and conflicts as possible consequences. • The potential for emissions reductions in emerging and developing countries. • The role of emerging economies like China and India. • Climate change and economic development in low income countries. 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	10	20	
Seminar	50	100	
Practical training			
Exercises			
Excursion			
Total:		180	
Prerequisite for Examination: ...			
Module Examination: – Form(s) of assessment Seminar paper or seminar paper and presentation or presentation – Components of final grade Seminar paper (100 %) or seminar paper (60 %) and presentation (40 %) or presentation (100 %) – Form of module retake examination Seminar paper or seminar paper and presentation or presentation			
Language: English			

MP 189	MP 189 Clinical Nutrition in Gastrointestinal Disease	6 CP
	Clinical Nutrition in Gastrointestinal Disease	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Ernährungswissenschaft	1.-4. Sem.;
	Offered for the first time: SS 2020	
	Intake capacity: 40	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Molekulare Ernährungsforschung		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None (recommended: Ernährungsphysiologie and Ernährung des Menschen)		
Learning Outcomes: The students <ul style="list-style-type: none"> • be able to explain physiological and morphological functions of gastrointestinal system and relation with nutrition • learn gastrointestinal diseases and relation with nutrition • be able to understand pathological changes of organs of gastrointestinal system and be capable of applying medical nutrition therapy according to pathological changes • be able to evaluate nutritional problems of patients with gastrointestinal disease and develop solution ways • be able to review research article about nutritional care of the patient with gastrointestinal disease 		
Module Content: <ul style="list-style-type: none"> • Nutritional assessment • Malnutrition and disease outcomes • General aspects of enteral and parenteral nutrition, indications and contraindications • Nutrition therapy in irritable bowel syndrome • Nutrition therapy in celiac disease • Nutrition therapy in inflammatory bowel disease (ulcerative colitis) • Nutrition therapy in inflammatory bowel disease (crohn's disease) • Nutrition therapy in short bowel syndrome • Nutrition therapy in acute pancreatitis • Nutrition therapy in chronic pancreatitis • Nutrition therapy in chronic liver disease • Nutrition therapy in dumping syndrome • Nutrition therapy in gastrointestinal cancers • General discussion 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture		
Seminar	7	52
Practical training	21	100
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

MP 190	MP 190 Clinical Nutrition in Paediatric Disease	6 CP
	Clinical Nutrition in Paediatric Disease	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Ernährungswissenschaft	1.-4. Sem.;
	Offered for the first time: WS 2019/20	
	Intake capacity: 40	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Molekulare Ernährungsforschung		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None (recommended: Ernährungsphysiologie and Ernährung des Menschen)		
Learning Outcomes: The students <ul style="list-style-type: none"> • be able to define the acute and chronic disorders in infancy and childhood • be able to determine the nutritional needs of these infants and children • be able to discuss the current dietary treatments of these disorders with practical hours • be able to investigate and search for special formulas and products related to these disorders • be able to evaluate clinical cases in the hospital in terms of their diseases and nutritional status 		
Module Content: <ul style="list-style-type: none"> • Importance of childhood nutrition, case follow up rules in the clinic, nutritional assessment • General aspects of enteral and parenteral nutrition, indications and contraindications • Nutrition Therapy in Prematurity • Nutrition therapy in acute and chronic gastroenteritis • Nutrition therapy in malnutrition • Nutrition therapy in carbohydrate malabsorption (lactose intolerance) • Nutrition therapy in protein malabsorption (celiac disease) • Nutrition therapy in fat malabsorption (cystic fibrosis) • Nutrition therapy in childhood obesity, metabolic syndrome and diabetes mellitus • Nutrition therapy in type 1 diabetes mellitus • Nutrition therapy in kidney diseases • Nutrition therapy in food Intolerances/allergies • Nutrition therapy in eating disorders • General aspects of inborn errors of metabolism 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture		
Seminar	7	52
Practical training	21	100
Exercises		
Excursion		
Total:		180

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Written examination and project work
- Components of final grade Written examination (50 %), project work (50 %)
- Form of module retake examination Written examination

Language: English

MP 196	MP 196 Internship	12 CP
	Internship	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Dekanat	1. - 4. Sem.;
	Offered for the first time: WS 2019/20	
	Intake capacity: unlimited	
Frequency and Duration: WS and SS, 1 Semester		
Module Coordinator: Dean's Office		
Applies to the Study Programmes: Profil, Master (1. - 4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • gain in-depth experience as interns in future fields of activity and professions • have practical knowledge and skills from their internship companies and understand the connection between study and practice • concretise their personal career perspectives (career planning) 		
Module Content: <ul style="list-style-type: none"> • Development of future occupational fields • Practical experience in companies in the fields of agricultural sciences, environmental sciences, ecotrophology and nutritional sciences • Reflection on one's own practical professional activity 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture		
Seminar		
Practical training	360	
Exercises		
Excursion		
Total:		360

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment: Internship report (tasks, activities, acquired knowledge and skills, reflection). The report must be assessed as "passed".
- Components of final grade: ungraded performance
- Form of module retake examination: Revision of the internship report (within 4 weeks)

Language: German or English

MP 199	MP 199 Farming Systems in the Tropics	6 CP
	Farming Systems in the Tropics	
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Pflanzenbau und Pflanzenzüchtung II	1.-4. Sem.;
	Offered for the first time: SS 2019	
	Intake capacity: 40	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Ökologischer Landbau mit dem Schwerpunkt nachhaltige Bodennutzung		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • Get insight knowledge about tropical geographical environment and the challenges associated with tropical farming. • Should know and understand the common well-define systems of crop classification, and the agronomic requirement influencing crop selection. • Define and identified the main farming systems in sub Saharan Africa (SSA), and to design a farming system model that will ensure optional utilization and conservation of available resources and effective recycling of farm residues within the system. • Distinguish farming systems from production systems, outline their advantages and disadvantages and apply the principle of organic agriculture, conservation agriculture, permaculture, agroforestry and integrated agriculture. • To know the need for farming system research, how is farming research is undertaken and issues and problems in farming system research • Know the different methods use in nutrient and water use efficiency analysis as well as their advantages and disadvantages 		
Module Content: <ul style="list-style-type: none"> • Tropical geographical environmental (climate, soil and biological features). • Challenges of tropical farming (soil fertility, risks and uncertainty, seasonality, labour, etc.). • Classification of agricultural crops (descriptive classification of crops, ecological classification, agronomic classification, horticultural classification, ornamental and plantation classification), and agronomic requirement influencing crop selection. • Farming systems in the tropics (definition of farming systems, dynamics of tropical farming systems, and main farming systems in the tropics). • Production systems in sub Saharan Africa (traditional agriculture, organic agriculture, conventional agriculture, integrated agriculture, conservation agriculture, agroforestry, and permaculture)- Principles, advantages and disadvantages. • Soil resource (nitrogen, phosphorous, water) recovery and use efficiency in organic and conventional farming systems. • Farming system research and development (agricultural ecology and farming systems research; characteristics of farming system research; principles guiding designing of farming system research; elements of system research i.e. disciplinarity, multi-displinary, inter-displinary and trans-displinary; participatory on farm trial methods and analysis). • Practical work 1- Reflect on one of the farming systems in your country and formulate a farming system model involving main and allied enterprises that will sustain production system without damaging resources/environment. • Practical work 2-Term paper on water conservation and use efficiency in conventional organic farming systems 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture		
Seminar		
Practical training		
Exercises		
Excursion		
Total:		0

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Project work and oral examination
- Components of final grade Project work (75 %), oral examination (25 %)
- Form of module retake examination Oral examination

Language: English

MP 208	MP 208 Concepts of Ecological Economics	6 CP
	Concepts of Ecological Economics	
Optional Module	Agrarwissenschaften, Ökotropologie und Umweltmanagement / Institut für Agrarpolitik und Marktforschung	1.-4. Sem.;
	Offered for the first time: SS 2020	
	Intake capacity: 30	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Agrar-, Ernährungs- und Umweltpolitik		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • know about ecological economics and political ecology as analytical concepts to assess challenges in the sustainable use of natural resources in the world, and especially natural resource use conflicts between different agents. • understand the difference between neo-classical economic models, environmental economics and ecological economics. • can explain the basic assumptions held in ecological economics • can identify work domain in which ecological economics is appropriate and formulation questions which can be answered by using approaches rooted in ecological economics. • know by name and by basic concept several different analytical methods used in ecological economics • know in-depth about one analytical methods and are in a position to convey their knowledge to peers 		
Module Content: <ul style="list-style-type: none"> • Introduction to ecological economics and position with regard to other neo-classical economics of natural resources • Context of use of ecological economics and history of development: conflicts in natural resource use • Main assumptions underlying ecological economics • Different methods and approaches used in ecological economics studies • Role of political aspects in the use of natural resources 		

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

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Presentation with written assignment
- Components of final grade Presentation with written assignment (100 %)
- Form of module retake examination Revision of the written assignment or oral examination

Language: English

MP 209	MP 209 Field Work in Agricultural and Environmental Economics	6 CP
	Field Work in Agricultural and Environmental Economics	
Optional Module	Agrarwissenschaften, Ökotrophologie und Umweltmanagement / Institut für Agrarpolitik und Marktforschung	1.-4. Sem.;
	Offered for the first time: WS 2019/20	
	Intake capacity: 30	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Agrar-, Ernährungs- und Umweltpolitik		
Applies to the Study Programmes: Profil, Master (1.-4.);		
Prerequisites for Participation: None		
<p>Learning Outcomes:</p> <p>The students</p> <ul style="list-style-type: none"> • are informed about the usual proposal structure • learn evaluation criteria for the quality of the proposal • are comfortable with the terms, research questions, empirical questions, main research hypothesis/claim, and research design. • practice in operationalizing the concepts in their own work and the work of others for the planning of research activities • learn about mixed methods and plan a research design for their proposal • reflect on writing for an audience • are introduced to thinking about the art of conducting research • practice peer-reviewing. • learn about good scientific practices regarding their field work in aspects of: <ul style="list-style-type: none"> ○ Organization ○ Ethics and data protection ○ Digital data collection for questionnaires. • can recognize ethical dilemmas in the conduction of research. 		
<p>Module Content:</p> <p>The course has a discipline-overarching character and intends to strengthen the good scientific practices of the participants in the practice of empirical research.</p> <p>Writing a research proposal is the most difficult task in research. Yet, it is seldom institutionalized. A good research proposal contributes greatly to the success of the research by providing a road map and anticipating eventual risks. This workshop complements the research methods course offered in English in the Transition Management MSc program. It shall stimulate a reflection on what a 'good' research proposal is by looking at quality criteria for a good proposal and by offering the chance of peer reviewing among PhD candidates.</p> <p>The second focus is on the organization of a field work for the collection of primary socio-economic data. It is not a methodological course; rather it is a course that aims to help MSc and PhD candidates to make informed choices about their data collection strategy. Such a strategy should take into consideration their financial, temporal and topical constraints, as well as the conditions in situ. Values that should be strived for, such as the quality of the data collected and the no-harm principle will be discussed.</p> <p>The doctoral candidate is supported in the design of appropriate and reliable data collection campaign, while minimizing the impact on the interviewed people, securing legitimacy in his/her endeavor and ensuring the quality and reliability of the data collected.</p>		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	30	60
Seminar		
Practical training		
Exercises	30	60
Excursion		
Total:		180

Prerequisites for Examination: ...

Module Examination:

- Form(s) of assessment Project work
- Components of final grade Project work (100 %)
- Form of module retake examination Revision of project work or oral exam

Language: English

THM 01	THM 01* Pharmaceutical Basics	6 CP
	Pharmaceutical Basics	
Core Module/ Optional Module	Fachbereich/Institut	1./3. Sem.;
	Offered for the first time: WS 2017/18	
	Intake capacity: 16	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: ...		
Applies to the Study Programmes: Profil Insect Biotechnology and Bioresources, Master (1./3.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • have a basic knowledge in different dosage forms (solid, liquid, semi-solid) • can name properties, characterization and testing of dosage forms • can describe the requirements for medicinal product test according to Pharmacopeia • have an overview of rules and guidelines in the pharmaceutical industry • can name excipients and packing materials • apply to Pharmacopeia und pharmaceutical terms • can interpret laws, Rich lines and standards • designate the fundamentals of quality management 		
Module Content: <ul style="list-style-type: none"> • Fundamentals of drug morphology • Pharmacopeia and other standard work • Drug forms by Pharmacopeia • Excipients and active ingredients • Preparations of medical forms • Testing of the pharmaceutical quality • Fundamentals of quality management • Legal framework: DIN ISO, GMP-guideline • Cycle of quality control • Quality assurance program • Lab: making and testing of several dosage forms 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	40	40
Seminar	20	10
Practical training	40	30
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		

*Only students of the master degree course Insect Biotechnology and Bioresources

THM 02	THM 02* Quality Management	6 CP
	Quality Management	
Core Module/ Optional Module	Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie	2./4. Sem.;
	Offered for the first time: SS 2019	
	Intake capacity: 30	
Frequency and Duration: SS, 1 Semester		
Module Coordinator: Biopharmazeutische Technologie und Biopharmazie		
Applies to the Study Programmes: Profil Insect Biotechnology and Bioresources, Master (2./4.);		
Prerequisites for Participation: None		
Learning Outcomes: The students <ul style="list-style-type: none"> • can safely deal with the concepts and definitions of quality management • understand the meaning and importance of quality management • can perform and analyze risk assessments • know how to identify critical process steps • can accompany qualifications and validations in companies • can develop steps for risk reduction 		
Module Content: <ul style="list-style-type: none"> • Basic concepts for risk and quality management • Quality management systems (DIN ISO) • Strategies for handling and managing risks in manufacturing companies • Risk assessment by FMEA, HACCP, Kepner-Tregoe, FTA • Quality-related strategies (TQM, EFQM, TPM, KVP) • Further qualification and validation phases • Internal / external quality audits • certification 		

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

*Only students of the master degree course Insect Biotechnology and Bioresources

THM 03	THM 03* Bioprocess Engineering II – Advanced	6 CP
	Bioprocess Engineering II – Advanced	
Core Module/ Optional Module	Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie	3. Sem.;
	Offered for the first time: WS 2017/18	
	Intake capacity: 12	
Frequency and Duration: WS, 1 Semester		
Module Coordinator: Bioverfahrenstechnik, Membrantechnologie und Zellkulturtechnik		
Applies to the Study Programmes: Profil Insect Biotechnology and Bioresources, Master (3.);		
Prerequisites for Participation: Bioprocess Engineering I (MK 093)		
<p>Learning Outcomes:</p> <p>The students</p> <p>show knowledge in upstream processing: successful strategies for expression, expansion and product formation in different bioreaction-systems can be developed and ideally combined based on the competences gained in the core module concepts, possibilities,</p> <p>show knowledge in downstream processing: successful strategies for cell separation and product purification can be developed and ideally combined based on the competences gained in the core module</p> <p>know how to analyze, characterize and optimize developed processes, also in combination with mathematical operations</p> <p>know how to transfer, verify and optimize designed process steps into experiments and integrate them into the overall process concept</p>		
<p>Module Content:</p> <ul style="list-style-type: none"> • Bioprocesses for the production of recombinant products with different expression systems • Advanced process analysis of bioreactor systems including system balances • Process description – kinetics, mass- and heat transfer • Downstream processing- advanced tools, concepts, choice, requirements • Application of modern software for design, development, modelling and simulation of complex bioreactor systems and biosynthesis for specific topics regarding the overall process including up- and downstream • Conceptual development of downstream processing for a certain topic • Transfer of the specific topics of up- and downstream processing based on the seminar into lab experiments • Presentation and discussion of the results within the seminar 		

Forms of Instruction:	Contact hours	Preparation and follow-up work
Lecture	15	30
Seminar	30	60
Practical training	15	30
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		

*Only students of the master degree course Insect Biotechnology and Bioresources

THM 04	THM 04* Selected Chapters of Pharmaceutical & Industrial Biotechnology		6 CP
	Selected Chapters of Pharmaceutical & Industrial Biotechnology		
Core Module/ Optional Module	Technische Hochschule Mittelhessen / Institut für Bioverfahrenstechnik und Pharmazeutische Technologie		2./4. Sem.;
	Offered for the first time: SS 2019		
	Intake capacity: 15		
Frequency and Duration: SS, 1 Semester			
Module Coordinator: Bioverfahrenstechnik, Membrantechnologie und Zellkulturtechnik			
Applies to the Study Programmes: Profil Insect Biotechnology and Bioresources, Master (2./4.);			
Prerequisites for Participation: None			
Learning Outcomes: The students <ul style="list-style-type: none"> • have an overview of currently discussed relevant topics in science and industry in the field of biotechnology • know how to research and present current relevant publications and discuss them within the context of the lecture, classification of potential industrial and social relevance 			
Module Content: <ul style="list-style-type: none"> • currently important topics in pharmaceutical and industrial biotechnology • literature research and presentation of currently relevant topics in pharmaceutical and industrial biotechnology based on publications 			
Forms of Instruction:	Contact hours	Preparation and follow-up work	
Lecture	30	75	
Seminar	15	60	
Practical training			
Exercises			
Excursion			
Total:		180	
Prerequisite 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			

*Only students of the master degree course Insect Biotechnology and Bioresources