



UNIVERSITÄT
HOHENHEIM

Modulhandbuch

für den Studiengang

Master of Science

Bioeconomy

Stand Oktober 2019

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I. Pflichtmodule

Modul: Farm Economics and Strategic Management in the Bioeconomy (4101-430)

Modulverantwortung	Prof. Dr. Christian Lippert
Teilnahmevoraussetzungen	See admission regulations for the Master Programme Bioeconomy. Knowledge of basic concepts in Economics as taught in the module "Economics and Management". This module may be attended by other students in MSc programmes at Hohenheim in agreement with the responsible module coordinator.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Pflicht
Modulprüfung	Written exam
Arbeitsaufwand	160 h workload = 56 h presence + 104 h preparation at home + exam
Fachkompetenzen / Lern- und Qualifikationsziele	<p>In the first part of the module students learn to evaluate internal and external costs and benefits of renewable resources for (new) biobased products and processes. Various methods of investment appraisal will be applied to optimise cultivation and harvest of permanent crops by means of adequate bioeconomic models.</p> <p>in the second part of the module students learn how companies can position themselves adequately on the markets and find a suitable business model, in order to be successful in the dynamic sector of the bioeconomy. This encompasses a value proposition stemming from key resources, channels, and partners to reach customers and which builds upon a viable cost and revenue structure. Based upon this premise, the lecture covers key tools from strategic management which help analyzing the respective issues internal and external to the company. It tackles different business model approaches which are relevant for the bioeconomy industry. As a guiding theme, sustainability is introduced and covered with its basic propositions and strategic relevance for business.</p>
Schlüsselkompetenzen	Critical analytical thinking; communication and oral presentation.
Anmerkungen	This module is compulsory for all students of the Bioeconomy Master programme.
Resource Use Optimisation for Permanent Crops and Forests (4101-431)	
Person(en) verantwortlich	Prof. Dr. Christian Lippert

Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	Biological growth of permanent crops and woodland resources will be modelled. These models will be combined with investment appraisals (e.g. calculating net present values and land rent) to derive optimised single and infinite rotations for different kinds of plantations. In addition, the optimum use of natural forests will be analysed taking all external and internal net benefits into account. The lectures deal with adequate bioeconomic concepts. The accompanying, in-class computer exercises enable the students to apply introduced theoretical concepts to real-world problems by means of spreadsheet modelling.
Literatur	Perman, R., Yue, M., McGilvray, J. and M. Common (2003): Natural Resource and Environmental Economics; Third Edition. Munich, Pearson.
Strategic Management in the Bioeconomy (4101-432)	
Person(en) verantwortlich	Jan Endrikat
Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	To be successful in a dynamic sector such as the bioeconomy, companies need to position themselves adequately on the markets and find a suitable business model. This encompasses a value proposition stemming from key resources, channels, and partners to reach customers and which builds upon a viable cost and revenue structure. Based upon this premise, the lecture covers key tools from strategic management which help analyzing the respective issues internal and external to the company. It tackles different business model approaches which are relevant for the bioeconomy industry. As a guiding theme, sustainability is introduced and covered with its basic propositions and strategic relevance for business models in the bioeconomy.
Literatur	Up to date literature will be introduced in the lecture.

Modul: Inter- and Transdisciplinary Research Approaches in Bioeconomy (4301-420)

Modulverantwortung	Jun.-Prof. Dr. Andrea Knierim
Bezug zu anderen Modulen	"Projects in Bioeconomic Research"
Teilnahmevoraussetzungen	See admission regulations for the Master Programme Bioeconomy. This module may be attended by other students in MSc programmes at Hohenheim in agreement with the responsible module coordinator.
Sprache	englisch
ECTS	6

Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Pflicht
Studienleistung	Compulsory attendance at the two seminars
Prüfungsleistung	Written paper in groups (50 %), written paper in the form of a review of a paper (50 %)
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After completing this module, students have developed an understanding of system concepts and methodological approaches to trans- and interdisciplinary research. They are able to conduct systemic problem and multiple-actor analyses and are familiar with key concepts such as participation, stakeholder involvement, cooperation and networking in social groups and with approaches and methods for integrative project management. They are finally able to apply concepts to a specific case/example.
Schlüsselkompetenzen	Students acquire group communication and cooperation skills through learning by doing in the seminars. They gain competence in time management, self-reliance, team project planning, group facilitation, implementation and evaluation. Students learn to critically and analytically review scientific papers (on an inter- or transdisciplinary case), while writing essays enhances their scientific articulateness. Finally, they acquire reflection methods during the seminars.
Anmerkungen	This module is compulsory for all students of the Bioeconomy Master programme. The two written papers to be submitted refer to the identification of a practice-related research question (1) and a review of a paper on transdisciplinary research (2).
Inter- and transdisciplinary approaches in Bioeconomy (4301-421)	
Person(en) verantwortlich	Jun.-Prof. Dr. Andrea Knierim
Person(en) begleitend	Dr. rer. soc. Maria Gerster-Bentaya
Lehrform	Vorlesung mit Seminar
SWS	2
Inhalt	System concepts and approaches for inter- and transdisciplinary research (hard - soft systems; ecological and social systems; constructivism and positivism etc.) Analysis and understanding of innovative biobased production processes from different disciplinary angles and in an integrative way Inter- and transdisciplinary research - how to conceptualize and organize a problem-oriented research approach in an interdisciplinary team; knowledge types, design of and principles and methods for inter- and transdisciplinary research; research project planning, management, monitoring and evaluation

	Actor analyses and involvement - how to address, understand and interact with practitioners Concepts and methods for participation, cooperation and networking in multi-actor innovation processes.
Literatur	Darnhofer et al (2012); Knierim et al. (2017); Ison (2008); Pohl and Hirsch Hadorn (2008)
Anmerkungen	7 units à 4 h (dates to be announced) Non-tiered seminar room with moveable tables

Teamwork in interdisciplinary research groups (Seminar) (4301-422)

Person(en) verantwortlich	Jun.-Prof. Dr. Andrea Knierim
Lehrform	Seminar
SWS	1
Inhalt	Focused team work, systematic project planning, group communication and cooperation, actor/stakeholder analysis, monitoring and evaluation; feedback and reflection processes.
Literatur	Schulz v. Thun; Will be provided by beginning of module.
Anmerkungen	Several neighbouring rooms are required; students split into groups of max. 8 - 12.

Facilitation of mixed working groups (Seminar) (4301-423)

Person(en) verantwortlich	Jun.-Prof. Dr. Andrea Knierim
Person(en) begleitend	Dr. rer. soc. Maria Gerster-Bentaya
Lehrform	Seminar
SWS	1
Inhalt	Role and functions of a facilitator, design, execution and evaluation of a group working process, phases and modes of facilitation, facilitation principles, methods and tools, dealing with difficult situations.
Literatur	Bolliger E, Zellweger T. 2007: The art of making your meetings and workshops purposeful and time-efficient. Agridea, Lindau.
Anmerkungen	Non-tiered seminar room with moveable tables.

Modul: Markets, Innovation and Social Acceptance of Biobased Products (5000-510)

Modulverantwortung	Prof. Dr. Michael Ahlheim
Bezug zu anderen Modulen	Based on the module "Economics and Management" (1st semester)

Teilnahmevoraussetzungen	See admission regulations for the Master Programme Bioeconomy. Basic knowledge of microeconomic theory, in particular New Institutional Economics as well as Game and Decision Theory. This knowledge is acquired from the module "Economics and Management" (1st semester). This module may be attended by other students in MSc programmes at Hohenheim in agreement with the responsible module coordinator.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Pflicht
Modulprüfung	Exam
Prüfungsdauer	120 Minuten
Arbeitsaufwand	160 h = 56 h presence + 104 h preparation at home + exam
Fachkompetenzen / Lern- und Qualifikationsziele	<p>The module consists of two lecture courses: "Economic Aspects of the Bio-Economy" and "Business models, strategic management, and sustainability in the bioeconomy".</p> <p>In "Economic Aspects of the Bio-Economy" students acquire knowledge on the optimal use of non-renewable resources such as crude oil and natural gas and address the need to look for alternatives in time. They become acquainted with intertemporal models of resource economics. The course also deals with the welfare economic aspects of market failure in the environmental sector of the economy and (pareto-)optimal government policies to deal with the resulting problems. Here students learn to apply nonlinear optimization techniques to the government problem of maximizing social welfare with imperfect markets. In addition students learn techniques of preference assessment in order to analyze the social acceptance of biobased products as well the implications of their production, like for example land-use change.</p> <p>In "Business models, strategic management, and sustainability in the bioeconomy" students learn to differentiate various business models and conduct internal and external analysis relevant for strategic management in the bioeconomic industry. They will be able to describe the relevance of sustainability for companies and relate the topic to strategic approaches and business models.</p>
Schlüsselkompetenzen	Since both lecture courses will be held in small groups they will be interactive. Discussion with and among students will play an important role. In addition, in the exercise part of the lecture course students work together on exercise sheets and are encouraged to discuss their solutions in groups and present these to the whole class. This framework helps students to develop their communicative skills in scientific discourse. Although both lecture

	courses focus on economic topics, inter- and transdisciplinary aspects of the bio-economy (natural science, agricultural science and technical aspects) will be specifically highlighted.
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Economic Aspects of the Bioeconomy (5000-511)

Person(en) verantwortlich	Prof. Dr. Michael Ahlheim
Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	In this lecture course students explore the specific problems of the optimal use of non-renewable resources such as crude oil and natural gas and the development of backup technologies to substitute these non-renewable resources. The course also deals with optimal government policies to cope with market failure in the environmental sector of the economy. These policies focus on an overall efficient use of these scarce resources of an economy including the encouragement of R&D and innovation in the bioeconomic sector. The last part of this lecture course focuses on different techniques of preference assessment. These are necessary to analyze the future acceptance of new biobased products by consumers and of the consequences of their production (e.g. land-use change) by society as a whole in advance.
Literatur	to be announced

Modelling and Simulation (5000-512)

Person(en) verantwortlich	Prof. Dr. Stefan Kirn
Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	Students acquire knowledge of methods for modelling and simulation of value systems from the perspective of microeconomic theories. They begin by learning the basics of modelling and simulation (including a brief consideration of epistemological issues) and are then introduced to different modelling methods and languages. On this basis, the models are coded in simulation software. The students gain the necessary tool competence and learn to apply it in the exercises accompanying the lectures. Finally, students become acquainted with statistical techniques to analyze and interpret data obtained through the simulation. Students learn all the steps of a simulation study and to apply them to a practical example.
Literatur	to be announced

Modul: Master's Thesis Bioeconomy (3000-430)

Modulverantwortung	Prof. Dr. agr. Iris Lewandowski
Teilnahmevoraussetzungen	-
Sprache	englisch

ECTS	30
Angebotshäufigkeit	jedes Semester
Semesterlage	4. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Pflicht
Modulprüfung	Bound Master's thesis and, if required by the supervisor
Arbeitsaufwand	900 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	Upon completion of the Master's thesis students are able to conduct independent research in the field of bioeconomy according to given instructions on an assigned topic and record their findings. Depending on the topic, research may include laboratory work, field experiments or case studies. Students have extensive knowledge and expertise in the topic of their Master's thesis. They are able to employ scientific methods in the field of bioeconomy and adjoining.
Schlüsselkompetenzen	Upon completion of the Master's thesis students are able to conduct independent scientific work. They have demonstrated their capacity for critical and analytical thinking. In addition, they know how to write a scientific research paper and, if applicable, can present their research orally.
Anmerkungen	Please read the information on writing your Master's thesis on the webpage of the Examinations Office at uhoh.de/mastersthesisbioeconomy .
Master's Thesis Bioeconomy (3000-431)	
Person(en) verantwortlich	Prof. Dr. agr. Iris Lewandowski
Lehrform	Abschlussarbeit
Inhalt	-
Anmerkungen	The defense takes approximately 20 minutes.

Modul: Projects in Bioeconomic Research - Group Project (1505-410)

Modulverantwortung	Prof. Dr.-Ing. habil. Jörg Hinrichs, Dr. rer. nat. Zeynep Atamer, Myriam Löffler, Prof. Dr. Regina Birner
Bezug zu anderen Modulen	All compulsory modules of the Master's programme in Bioeconomy.
Teilnahmevoraussetzungen	Student of the Master's programme in Bioeconomy.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester

Dauer des Moduls	1 Semester
Verbindlichkeit	Pflicht
Modulprüfung	Exposé (70%) and presentation (30%)
Arbeitsaufwand	160 h workload = 56 h attendance + 104 h independent study
Fachkompetenzen / Lern- und Qualifikationsziele	In this module students have the opportunity to apply the methods and skills learned in the compulsory modules. They perform a system analysis of a whole biogenic value chain from an inter- and transdisciplinary perspective. They gain practical knowledge and skills by applying the methods of value stream mapping, life-cycle and impact assessment as well as continuous improvement techniques. This enables students to identify gaps and lacks of knowledge to be addressed in various disciplines of (bioeconomic) research and development. This allows managing projects independently.
Schlüsselkompetenzen	Students acquire inter- and transdisciplinary skills to analyze biogenic value chains from interrelated agricultural, natural science, engineering as well as social and economical perspectives. Key competencies developed range from independent working and analytical thinking to teamwork, communication and cooperation skills.
Projects in Bioeconomic Research - Group Project (1505-411)	
Person(en) verantwortlich	Prof. Dr. Dirk Hachmeister, Prof. Dr.-Ing. habil. Jörg Hinrichs, Prof. Dr. Regina Birner
Person(en) begleitend	Dr. rer. nat. Zeynep Atamer, Myriam Löffler
Lehrform	Projekt/Projektarbeit
SWS	4
Inhalt	<p>In this module a set of tools and skills are provided to identify, describe, evaluate, and improve the sustainability of the value chain of a (new) biobased product.</p> <p>The students analyze a whole biogenic value chain currently on the agenda of the bioeconomy transformation process to develop a deeper understanding of biobased industrial and commercial activities.</p> <p>With support from supervisors and in communication with partners from industry, students first identify a value chain related to food, feed, fibre or fuel production. They then describe, analyse and identify gaps in the value chain from biomass production to conversion and market introduction of the product.</p> <p>The following methods and tools can be used for the system analysis:</p> <ul style="list-style-type: none"> • “energy and mass flows”, and “thermodynamic considerations” • supply chain management based on “value stream mapping” and “continuous improvement techniques”. • “life-cycle assessment”,

	<ul style="list-style-type: none"> • “environmental and social impact assessment”. <p>These methods and tools are introduced to demonstrate how to carry out an internet-based case study using a step-by-step approach. Particular emphasis is placed on the selection of green materials, the design of factory operations and the management of market introduction of (new) bio-based products. Environmental and social impacts of the value chain will be assessed and approaches for waste reduction and energy saving will be elaborated in order to optimize production.</p> <p>Finally, based on their analysis, students develop a concept to improve an existing biogenic value chain or scientific and engineering pre-studies can be carried out to fill identified gaps or create new products. The results as well as the pros and cons of the applied methods are presented and discussed in class.</p>
Literatur	<p>Linton, J./Klassen, R./Jayaraman, V.: „Sustainable supply chains: An introduction”, in: Journal of Operations Management, 25. Jahrgang (2007), Heft 6, S. 1075 – 1085.</p> <p>Guinée, Jeroen (Ed.) (2002): Handbook on Life Cycle Assessment - Operational Guide to the ISO Standards Series: Eco-Efficiency in Industry and Science, Vol. 7, Kluwer Academic Publishers, New York.</p> <p>Tallaksen, Joel (2011): Guidelines for Developing a Sustainable Biomass Supply Chain Biomass in: Biomass Gasification: A Comprehensive Demonstration of a Community Scale Biomass Energy System Final Report: 2011 USDA, West Central Research and Outreach Center, University of Minnesota.</p>

Modul: Properties of Biobased Resources and Products (3701-470)

Modulverantwortung	Prof. Dr. Christian Zörb
Bezug zu anderen Modulen	“Sustainable industrial processes”
Teilnahmevoraussetzungen	See admission regulations for the Master Programme Bioeconomy. This module may be attended by other students in MSc programmes at Hohenheim in agreement with the responsible module coordinator.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester
Dauer des Moduls	1 Semester

Verbindlichkeit	Pflicht
Studienleistung	All students prepare and hold a presentation.
Modulprüfung	Written exam
Prüfungsdauer	120 Minuten
Arbeitsaufwand	160 h workload = 56h presence + 104 h preparation at home + exam
Fachkompetenzen / Lern- und Qualifikationsziele	Students are able to describe the diversity of biobased resources and decide which are best suited for different uses (material or chemical) in the context of food, feed, fuel and fibre. They are familiar with the properties of biobased resources and intermediate products. Students learn to develop concepts for quality optimization of biobased resources in the biomass production and supply phase (up to the factory gate). This module is related to “Sustainable industrial processes” and deals with the composition and properties of raw biomass. In addition it addresses pre-treatment and primary conversion to intermediate products such as sugar, starch and fibre for further processing to biobased products.
Schlüsselkompetenzen	Students acquire the multidisciplinary skills and concepts necessary to determine the complex factors influencing biomass properties, composition and quality. Critical, analytical thinking as well as creativity are encouraged in the identification of innovative ways of utilizing biobased resources.
Anmerkungen	A mandatory registration for the module is required within the first two weeks per ILIAS. In the introductory session a password is distributed. This module is compulsory for all students of the Bioeconomy Master programme.
Properties of Biobased Resources and Products (3701-471)	
Person(en) verantwortlich	Prof. Dr. Jan Frank, Prof. Dr. agr. Iris Lewandowski, Prof. Dr. Christian Zörb, Prof. Dr. W. Florian Fricke
Lehrform	Vorlesung
SWS	4
Inhalt	<p>Students gain knowledge of properties and characteristics of biobased resources and their intermediate products, learn to characterize the quality specifications for different uses (food, feed, fuel, fibre) for the bioeconomy and to become acquainted with technical methods for the optimization of resource quality. The module contents include:</p> <p>A) Characteristics of biobased resources</p> <ul style="list-style-type: none"> • Composition and properties of biobased resources including biomass from crops, animals, algae, yeasts, organic wastes and residues • Characterization of intermediate biobased products occurring in the supply chain • Methods for qualitative analysis

	<p>B) Quality demands of different use options for biobased resources</p> <ul style="list-style-type: none"> • Description of use options for biobased resources (food, feed, fibre, fuel) • Quality and hygiene demands of food and feed products • Chemical and mechanical properties required for material, chemical and energetic uses of biomass • Competition for biobased resources <p>C) Optimization of the properties of biobased resources</p> <ul style="list-style-type: none"> • Measures that can be applied during the production of biobased resources, for example in crop production, to support the optimization of biomass properties for different uses. • Measures that can be applied in the biomass supply chain to support the optimization of biomass qualities for different uses. • Agricultural processes of pre-treatment and conversion, such as ensiling and fermentation in biogas plants, and their influences on biomass properties.
Literatur	to be announced
Anmerkungen	to be announced

Modul: Sustainable Industrial Processes (1510-410)

Modulverantwortung	Prof. Dr.-Ing. Rudolf Hausmann
Bezug zu anderen Modulen	“Properties of biobased Resources and Products”
Teilnahmevoraussetzungen	See admission regulations for the Master Programme Bioeconomy. This module may be attended by other students in MSc programmes at Hohenheim in agreement with the responsible module coordinator.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Pflicht
Studienleistung	Active participation
Modulprüfung	Written exam (75%) + oral presentation (25%)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56h presence + 104 h independent study + exam = 160 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	Learning objectives for the module. After the course participants should be able to:

	<ul style="list-style-type: none"> • identify thermochemical and biotechnological routes for the conversion of renewable resources. • identify the relevant properties of renewable resources and discuss the differences in comparison to petrochemical-based resources. • name examples and list categories of processed products derived from the conversion of primary agricultural products. • name the required process steps and the specific unit operations utilized for the conversion. • reflect qualitatively on the thermochemical and biochemical steps used in the conversion of renewable resources. • explain the concept of industrial conversion of renewable resources with examples of products, both for thermochemical and biochemical conversion. • assess which products are best produced by thermochemical or biochemical conversion.
Schlüsselkompetenzen	Critical, analytical thinking; communicative skills in scientific discourse; fundamental technical knowledge allowing for a competent solution problems.
Biochemical Conversion of Renewable Resources (1510-411)	
Person(en) verantwortlich	Prof. Dr.-Ing. Rudolf Hausmann
Lehrform	Vorlesung
SWS	2
Inhalt	<p>The module focuses on the manufacture of products of industrial biotechnology which are currently the most important.</p> <p>Emphasis will be placed on aspects of biorefinery concepts relevant to biotechnology. In addition possibilities of knowledge-based biotechnology for the production of new biobased products will be discussed.</p> <p>This module deals with further processing steps of intermediate biobased products such as sugars and starch. (The initial conversion steps are covered in the module "Properties of biobased resources and products").</p>
Thermochemical Conversion of Renewable Resources (1510-412)	
Person(en) verantwortlich	Prof. Dr. Andrea Kruse
Lehrform	Vorlesung
SWS	2
Inhalt	<p>The focus is on chemical and thermochemical and conversion of biomass. The module introduces the pretreatment of biomass and the production of sugars as precursors for biochemical processes. In addition it presents the production of chemical energy carriers / fuels as well as the production of platform chemicals. This will cover state-of-the-art techniques as well as processes currently under development. The concepts of biorefineries and the role of the different processes involved will also be discussed.</p>

II. Wahlpflichtmodule

Modul: Agricultural Production of Biobased Resources (3403-430)

Modulverantwortung	Prof. Dr. agr. Iris Lewandowski
Bezug zu anderen Modulen	This module provides the basic knowledge on agricultural production of biobased resources that is needed to accomplish the Master Programme in Bioeconomy.
Teilnahmevoraussetzungen	See admission regulations for the Master Programme Bioeconomy.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahlpflicht
Studienleistung	All students prepare and hold a presentation.
Modulprüfung	50% written exam, 50% presentation including discussion
Prüfungsdauer	60 Minuten
Arbeitsaufwand	160 h = 56h presence + 104 h preparation at home + exam
Fachkompetenzen / Lern- und Qualifikationsziele	Students have a sound knowledge of crop and livestock production in various agro-ecological zones and production systems. They are able to understand the conditions of agricultural production for biomass under different ecological and socio-economic settings. They investigate the natural resource base of agricultural production and have the skills to characterize material flows in agricultural systems, including agricultural products. On this basis, they are able to develop concepts for the sustainable production of biomass for the biobased economy.
Schlüsselkompetenzen	Students are able to deal with complex natural systems. They understand the implications of this complexity on the agricultural production stage of biobased value chains. They gain the analytical skills and practice the critical thinking necessary to engage in the discussion on sustainable land-use systems and the implications of competing uses of biomass on food security. They are able to explain the role of agricultural production in the bioeconomy. They also gain skills in oral presentation, team work and interdisciplinary collaboration.
Anmerkungen	Maximum number of participants (due to limited number of places on excursion): 45 Priority will be given to students for whom the module is compulsory.

Agricultural Production of Biobased Resources (3403-431)

Person(en) verantwortlich	Prof. Dr. agr. Iris Lewandowski, Prof. Dr. Regina Birner, Prof. Dr. Uta Dickhöfer
Person(en) begleitend	Dr. agr. Thomas H. Hilger, Prof. Dr. rer. nat. Andreas Fangmeier, Prof. Dr. rer. nat. Volker Wulfmeyer, PD Dr. Ludger Herrmann, Prof. Dr. sc. agr. Hans W. Griepentrog
Lehrform	Vorlesung mit Seminar und Exkursion
SWS	4
Inhalt	<p>The overall objective of the module is to provide fundamental knowledge on the functioning of agricultural systems in different climatic zones for the production of biobased resources for the bioeconomy.</p> <p>Contents of the module include:</p> <p>A) Agro-eco systems in different climatic zones</p> <ul style="list-style-type: none"> • Description, systematics and functioning of agro-ecosystems; • Provision of ecosystem services; • Bio-physical principles of agricultural production; • Role of climate in agricultural production and impact of climate change. <p>B) Agricultural production systems</p> <ul style="list-style-type: none"> • Systematics, description and analysis of agricultural production systems in different agro-ecological regions; • Case studies in crop and animal production; • In- and outputs and material flows in agricultural production systems; • Yields and quality of products from agricultural production; • Biomass supply systems; • Logistic aspects of biomass supply; • Biomass supply in the context of food security.
Literatur	to be announced

Modul: Economics and Management (5205-410)

Modulverantwortung	Prof. Dr. Benjamin Jung
Bezug zu anderen Modulen	This module introduces to basic concepts used in Economics and Management required to accomplish the MSc Bioeconomy. It doing so, it (i) complements the semi-elective modules imparting basic knowledge in the agricultural and natural science, and (ii) forms the basis for the more advanced compulsory modules "Internal and External Costs & Benefits of Biobased Products" and "Markets, Innovation and Social Acceptance of Biobased Products", and for elective modules from the fields of Economics and Management.
Teilnahmevoraussetzungen	keine

Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahlpflicht
Modulprüfung	Written exam (60 Minutes) and case study with oral presentation in class
Arbeitsaufwand	56 h presence + 104 h preparation at home + exam = 160 h
Fachkompetenzen / Lern- und Qualifikationsziele	Students have a sound knowledge of basic ideas and concepts of economics and corporate finance. They can communicate these ideas and concepts in interdisciplinary teams. They are able to employ methods used in economics and corporate finance to construct solutions to real-world problems that arise in the context of organizing the bio-based economy. On this basis, they are prepared to follow more advanced Economics and Management courses.
Schlüsselkompetenzen	Students are able to communicate and to work in interdisciplinary and international teams. They can think analytically and critically and employ quantitative methods to solve economic, business, and social issues. They are able to carve out important and to abstract from less important channels.
Basic Economic Concepts for Bioeconomists (5205-413)	
Person(en) verantwortlich	Prof. Dr. Benjamin Jung
Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	This course enables students to understand the operations of value chains in the national and the global context. In order to make the interdependencies of value chains transparent, this course introduces students to the functioning of markets and the role of governments. While the economic concepts we deal with apply more generally, we have a special eye on applications to the bioeconomy. We will use quantitative methods, but economic math tends to be simpler than Math taught to undergraduates at universities. The course paves the ground for subsequent semi-selective Economics modules.
Literatur	To be announced in the lecture.
Corporate Finance (5205-414)	
Person(en) verantwortlich	Dr. Niklas Lampenius
Lehrform	Vorlesung
SWS	2

Inhalt	<p>The overall objective of the module „Corporate Finance“ is to provide a basic understanding of corporate finance and managerial responsibilities. The lectures cover qualitative as well as quantitative aspects of decision making with a focus on sustainability.</p> <p>Contents of the module include:</p> <ul style="list-style-type: none"> • Capital budgeting • Cash management • Performance management • Risk management (financial as well as operational risks) • Resulting consequences for managerial decision making
Literatur	Stephen Ross, Randolph Westerfield, Jeffrey Jaffe (latest edition), Corporate Finance, Mcgraw-Hill/Irwin.
Anmerkungen	The lectures take place in the first half of the semester (4 hours per week).

Modul: Natural Science Concepts (1507-400)

Modulverantwortung	Prof. Dr. Jochen Weiss
Bezug zu anderen Modulen	This module provides the basic knowledge on natural science concepts that is needed to accomplish the Master Program in Bioeconomy. It is a prerequisite for the Module „Sustainable Industrial Processes“
Teilnahmevoraussetzungen	See admission regulations for the Master Programme Bioeconomy.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahlpflicht
Prüfungsleistung	Written exam (100%)
Prüfungsdauer	90 Minuten
Arbeitsaufwand	56 h presence + 104 h independent study + exam = 160 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>After completion of the module, students are able to understand fundamental natural science concepts and have the ability to apply these concepts to Bioeconomy-related challenges.</p> <p>The students are able to define and explain key elements of natural sciences and to communicate their findings to colleagues and professionals from other disciplines.</p>

Schlüsselkompetenzen	Students improve their communicative skills in scientific discourses and are able to understand and transfer fundamental natural science concepts.
Anmerkungen	Maximum number of participants: 45
Natural Science Concepts, Lecture (1507-401)	
Person(en) verantwortlich	Prof. Dr. Herbert Schmidt, Prof. Dr.-Ing. habil. Jörg Hinrichs, Prof. Dr. Walter Vetter, Prof. Dr. rer. nat. Lutz Fischer, Prof. Dr. rer. nat. Uwe Beifuß, Prof. Dr. Jochen Weiss, Prof. Dr.-Ing. Reinhard Kohlus
Person(en) begleitend	Dr. rer. nat. Sabine Lutz-Wahl, Dr. rer. nat. Zeynep Atamer, Myriam Löffler, Dr. rer. nat. Maike Schwidder
Lehrform	Vorlesung
SWS	4
Inhalt	The module introduces fundamental concepts of “Natural Sciences” and aims to deliver basic knowledge in Chemistry, Microbiology, Biotechnology, (Food) Engineering, and Material Science. A case study, for instance on ‘Time Temperature Indicators”, fosters knowledge transfer and enables the students to apply the different concepts to one concrete example of application. Lecture-accompanying experiments and guided tours through the laboratories and pilot plants of the Institute of Food Science and Biotechnology are part of the course schedule. Moreover, 2 industry – hosted lectures further highlight the importance of natural Sciences as one of the key disciplines in Bioeconomy.

III. Wahlmodule: Bereich Agrarwissenschaften

Modul: Agricultural Economics Seminar (4904-410)

Modulverantwortung	Prof. Dr. Thomas Berger
Bezug zu anderen Modulen	The seminar is targeted at Master students majoring in Agricultural Economics, who can choose it as one of their semi-elective modules.
Teilnahmevoraussetzungen	n/a
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Modulprüfung	Written (70%), Presentation (30%)
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload

Fachkompetenzen / Lern- und Qualifikationsziele	Apart from learning methodologies and facts related to the agricultural and food sector, Agricultural Economics Master students should also train the skills of proper academic writing and presentation. Effective communication of ideas and research results is key for professional success at higher levels. This module provides an opportunity to improve such skills. Furthermore, it constitutes a forum for the discussion of topical issues in agricultural economics across sub-disciplines.
Schlüsselkompetenzen	Analytical thinking, scientific writing and different skills of scientific presentations (oral presentation, poster design, etc.).
Anmerkungen	Limited number of participants - students must register in ILIAS before the module starts

Agricultural Economics Seminar - Lecture (4904-411)

Person(en) verantwortlich	Prof. Dr. Thomas Berger, Prof. Dr. Manfred Zeller, Prof. Dr. agr. Volker Hoffmann
Lehrform	Vorlesung
SWS	2
Inhalt	Each participating student will be assigned a seminar topic and a tutor at the beginning of the semester, whereby own fields of interest will be taken into account. Participants will have 6-8 weeks to prepare a short paper on the topic (maximum 15 pages) under the supervision of the tutor. Seminar topics can include literature reviews about current issues, book reviews, small empirical analyses, research proposals, and other tasks. In the second half of the semester, the papers will have to be presented orally (15-20 minutes), followed by a critical discussion.
Anmerkungen	Overall grading will be based on the tutor's assessment of the submitted written paper (70%) and the oral presentation (30%). Apart from contents, presentation style and effectiveness will be considered.

Agricultural Economics Seminar - Paper and Presentation (4904-412)

Person(en) verantwortlich	Prof. Dr. Thomas Berger, Prof. Dr. Manfred Zeller, Prof. Dr. agr. Volker Hoffmann, Prof. Dr. Harald Grethe, Prof. Dr. Martina Brockmeier
Lehrform	Übung
SWS	2
Inhalt	In the second half of the semester, the papers will have to be presented orally (15-20 minutes), followed by a critical discussion.

Modul: Applied Econometrics (4201-430)

Modulverantwortung	Prof. Dr. Christine Wieck
Bezug zu anderen Modulen	This module is important for all students who want to carry out empirical economic research and policy analysis.

Teilnahmevoraussetzungen	For this module you must have a solid background in statistics and a good understanding of microeconomics. Successfully completed courses in both of these subjects at the undergraduate level are essential and assumed. Please take this seriously. You will not have the opportunity during the blocked module to review and improve your basic knowledge.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Modulprüfung	written test and homework assignment
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Students are familiar with multiple regression models and selected topics in econometrics. They know how to handle data sets and carry out standard econometric analyses in the agricultural and food sector, using modern statistical software.
Schlüsselkompetenzen	Students will acquire a competency in econometrics as it is applied to agricultural economics. Specifically, students will learn how to use econometric models and make assumptions for real life situations. They will be able to reach empirically based conclusions and communicate them effectively using statistical and econometric tools. Students will be trained in critical and analytical econometric thinking, enabling them to competently use their technical knowledge
Applied Econometrics (Übung) (4201-432)	
Person(en) verantwortlich	Prof. Dr. Christine Wieck
Lehrform	Übung
SWS	2
Inhalt	<p>This is the description for the practical class which accompanies the lecture "Introductory Econometrics".</p> <p>The aim of the lecture together with the practical class is to make students acquainted with econometric techniques frequently used in applied economic research. It provides a modern treatment of methods and models suitable for the analysis of cross-section, time series and panel data.</p> <p>The aim of the weekly practical class is to repeat important concepts discussed in the lecture and demonstrate their practical application using real world data sets with the help of STATA, a statistical software package. STATA is a commercial software which is available in all PC labs of the university.</p>

	<p>After successfully attending this module, consisting of the lectures "Introductory Econometrics" and the "Applied Econometrics" practical classes, students are expected to be able to select a proper statistical method for investigating an economic problem and to meaningfully interpret the results obtained by using a statistical software package.</p> <p>For this module you must have a solid background in statistics and a good understanding of microeconomics. Successfully completed courses in both of the subjects at the undergraduate level are essential and assumed.</p>
Literatur	<p>Stock, J.H. and Watson, M.M. (2012) Introduction to Econometrics, Pearson (3rd ed.)</p> <p>Asteriou, D. and Hall, S.G. (2007) Applied Econometrics, Palgrave (rev. ed.)</p> <p>Kmenta, J. (1986) Elements of Econometrics, MacMillan (2nd ed.)</p> <p>Verbeek, M. (2012) A Guide to Modern Econometrics, Wiley (4th ed.)</p> <p>Wooldridge, J. (2013) Introductory Econometrics. A Modern Approach, Cengage Learning (4th ed.)</p>
Anmerkungen	Lectures in classroom and computer lab, computer exercises, discussion of recent empirical articles.
Introductory Econometrics (Vorlesung) (5202-411)	
Person(en) verantwortlich	Prof. Dr. Robert Jung, Prof. Dr. Aderonke Osikominu, Prof. Dr. Christine Wieck
Lehrform	Vorlesung
SWS	2
Inhalt	The aim of the course is to make students acquainted with econometric techniques frequently used in applied economic research. It provides a modern treatment of methods and models suitable for the analysis of cross-section, time series, and panel data. After successfully attending this class students are expected to be able to select a proper statistical method for investigating an economic problem and to meaningfully interpret the results obtained by using a statistical software package.
Literatur	Stock, J.H. and Watson, M.M. (2012) Introduction to Econometrics, Pearson (3rd ed.).

Modul: Bioeconomy Discourses (3403-480)

Modulverantwortung	Prof. Dr. agr. Iris Lewandowski
Bezug zu anderen Modulen	Dieses Modul nimmt Bezug auf und dient zur Kontextualisierung aller Pflichtmodule im Master Bioeconomy
Teilnahmevoraussetzungen	keine
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester, 3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	schriftliche Ausarbeitung eines Diskussionspapiers (Working Paper)
Prüfungsleistung	schriftliche Ausarbeitung eines Diskussionspapiers (Working Paper), einschließlich eines Diskussionsprotokolls, sowie Moderation einer Diskussion zu dessen Inhalten (50%) und schriftliche Prüfung (Klausur) (50%)
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden kennen die unterschiedlichen Konzepte, Aspekte und Strategien der Bioökonomie und können diese kritisch diskutieren bzw. hinterfragen. Sie haben eine eigene Perspektive auf die Inhalte und Potentiale der Bioökonomie sowie die Mechanismen einer gesellschaftlichen Transformation zu einer biobasierten und nachhaltigen Wirtschaftsweise entwickelt. Sie können die Relevanz und Beiträge unterschiedlicher Sektoren und Interessensgruppen (Stakeholder) in der Bioökonomie beschreiben. Die Studierenden verfügen über eine reflektierte Haltung im Hinblick auf Ihre eigene Rolle als zukünftige Bioökonom:innen.
Schlüsselkompetenzen	Durch die Erstellung von Diskussionspapieren (zu einem konzeptionellen oder kontroversen Thema aus dem Bereich Bioökonomie) in Gruppen bauen die Studierenden ihre Teamfähigkeiten aus und trainieren die Fähigkeit zum selbstständigen Arbeiten. Bei der Erstellung und Diskussion der Papiere lernen und üben die Studierenden kritisches, analytisches Denken. Schriftliche Ausdrucksfähigkeit erlernen und trainieren sie durch das Schreiben des Berichts sowie die mündliche Ausdrucksfähigkeit durch die Präsentation der Arbeitsergebnisse. Durch das Moderieren der Diskussionsrunden, in welchen die von ihnen erstellten Diskussionspapiere vorgestellt und auch mit externen Experten besprochen werden, erlernen die Studierende Kommunikationsfähigkeiten.
Anmerkungen	50% der zu benoteten Leistungen werden durch die in den Übungen zu erarbeitenden und vorzustellenden Diskussionspapiere erbracht. Arbeitsmaterialien werden in ILIAS unter dem Fachgebiet „Nachwachsende Rohstoffe und Bioenergiepflanzen (340b)“ und der Modulnummer zur Verfügung gestellt.

Bioeconomy Discourses (3403-481)	
Person(en) verantwortlich	Prof. Dr. agr. Iris Lewandowski
Lehrform	Seminar mit Übung
SWS	4
Inhalt	*

Modul: Biological Pest Control (3603-490)

Modulverantwortung	Prof. Dr. Dr. Claus P. W. Zebitz
Bezug zu anderen Modulen	This module is a good combination with the module "Exercises in Biological Pest Control" (3603-500) (limited number of participants!)
Teilnahmevoraussetzungen	Vorkenntnisse allgemeiner Pflanzenschutz einschließlich Grundlagen des biologischen Pflanzenschutzes (Modul "Pflanzenschutz" 3603-210 oder äquivalente Veranstaltung(en) anderer Universitäten)
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Written paper in groups (30 %)
Prüfungsleistung	Written exam (70 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After completing this module, students understand in depth the potential of the respective antagonist groups, the biology of antagonists and their use in practice. Students are able to identify biocontrol relevant processes in ecosystems, to analyse their interactions and to estimate positive and negative consequences of biological pest control. They are proficient in drawing the necessary information for benefit-risk-analyses from the available literature and integrate this information into strategy models. Students are finally aware of the limits and risks of biological pest control.
Schlüsselkompetenzen	During preparation for the exam, while preparing and following up on lectures and with the compilation of a written scientific paper (in groups), students practice self-reliance, time management and team work. They practice both critical and analytical thinking and reading of scientific literature and they improve their capability of exploring and articulating a scientific issue. In case studies they learn to define scientific problems and design consistent research and development plans in biological pest control.

Anmerkungen	Das Modul deckt ausschließlich die biologische Bekämpfung von Schadinsekten und -milben ab.
Biological Pest Control (3603-491)	
Person(en) verantwortlich	Prof. Dr. Dr. Claus P. W. Zebitz
Lehrform	Vorlesung
SWS	4
Inhalt	<p>1. Introduction Aims, scopes and target groups of biological pest control, suitable natural antagonists; strategies of biological pest control, short and long-term effects.</p> <p>2. Biology of natural antagonists of pest arthropods</p> <p>Entomopathogenic Viruses: Overview on entomopathogenic viruses; pathogenesis and specificity; persistence in the environment; formulation and synergisation of viruses; production of viruses; application and application technique; examples of successful control using viruses, limitation of entomopathogenic viruses</p> <p>Entomopathogenic Bacteria: Overview on entomopathogenic bacteria with emphasis on <i>Bacillus thuringiensis</i>, <i>B. popilliae</i>, <i>B. sphaericus</i>; pathogenesis and specificity of entomopathogenic bacteria; persistence in the environment formulation and synergisation of bacteria, application and application technique; examples of successful control and limitations of using entomopathogenic bacteria.</p> <p>Protozoans: Short overview on successful control, risks and limitations of entomopathogenic protozoans</p> <p>Entomopathogenic fungi: Overview on entomopathogenic fungi; infection biology, pathogenesis and specificity of entomopathogenic fungi; morphological and mol.-biol. characterisation of specific strains of selected fungal species (e.g. <i>Metarhizium anisopliae</i>, <i>Beauveria brongniartii</i>, <i>B. bassiana</i>, <i>Verticillium lecanii</i>, <i>Paecilomyces fumosoroseus</i>); persistence in the environment; application and application technique and specific uses; examples of successful control and limitations of using entomopathogenic fungi.</p> <p>Nematodes: Overview on entomopathogenic nematodes; infection biology; production, application and use.</p> <p>Arthropods: Short overview of predacious and parasitoid life forms; antagonist spectrum of a (pest)species; selection of suitable antagonists (type, species, adaptation to prey or host, resp., ecotypes, specificity, prey/host preferences); importance of additional (pollen, carbohydrates) and alternative food; describing antagonistic performance under controlled conditions and in practice; impact of other crop protection measures; lab-to-land-transfer of results (i), into different crops (ii); into different agroecosystems (iii) (climate,</p>

	<p>crop, frame conditions); successful and failing biocontrol using predators and parasitoids with causal analysis; risks of biocontrol using arthropods.</p> <p>3. Economical importance of biological pest control.</p> <p>4. Perspectives of biological pest control.</p>
Literatur	Das Skript ist auf der ILIAS-Plattform erhältlich und umfasst die Vorlesungspräsentationen, ergänzende und weiterführende Original-Literatur.

Modul: Conservation Agriculture (3401-450)

Modulverantwortung	Prof. Dr. Wilhelm Claupein
Bezug zu anderen Modulen	Link to module
Teilnahmevoraussetzungen	Basic knowledge in agronomy, agricultural engineering, and weed control
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Written paper in publication format (25 %); presentation (6 %) with handout (4 %)
Prüfungsleistung	Oral exam (65 %)
Prüfungsdauer	20 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After successfully completing the module, students are able to define conservation agriculture. They have profound knowledge of and understanding for its methods and the role of conservation agriculture in the context of given (different) ecological and socio-economic conditions.
Schlüsselkompetenzen	Students enhance their organizational skills, self-reliance, time management, communication and cooperation skills during preparation for the exam, while preparing and following up on lectures and during the exercises. They are trained in structuring their knowledge and information and enhance their written articulateness by compiling the written paper and while preparing a case study presentation. They practice critical and analytical thinking during the lectures and exercises, while generally improving their ability of exploring a scientific subject. The presentation on the

	case study finally improves their presentation and oral communication skills.
Conservation Agriculture (3401-451)	
Person(en) verantwortlich	Prof. Dr. Roland Gerhards, Prof. Dr. Wilhelm Claupein, Prof. Dr. Dr. h.c. mult. Karlheinz Köller
Person(en) begleitend	Prof. Dr. sc. agr. Hans W. Griepentrog
Lehrform	Vorlesung mit E-Learning
SWS	4
Inhalt	<p>1. Introduction: Definition and objectives of conservation agriculture, i.e. What should be conserved in agricultural areas and why?, Overview and illustration of conservation agriculture using examples of modern and traditional systems all over the world.</p> <p>2. Conservation soil tillage: Definition: Mulch till, ridge-till, strip-till, no-till, Machinery: design and function, Improvement of soil properties and effects on non-favourable soil properties and biodiversity, Energy , labour and costs</p> <p>3. Effects of tillage on soil and plant in conservation agriculture: Possible reduction of soil erosion and run-off, Enhancement of biological soil activity, e.g. earthworms, Water and nutrient availability and resource use efficiency by the crop, Soil tillage and weed development</p> <p>4. Crop rotation and plant nutrition in conservation agriculture: Methodical differences with conventional farming systems, Impact on nutrient dynamics and crop performance, Chemical input requirements compared to conventional systems, Further conservation benefits</p> <p>5. Conservation agriculture farming practises and systems: Mixed cropping systems: intercropping, agroforestry, permaculture benefits and disadvantages, Design and management aspects for optimisation of yields and conservation of the system (environment), Effect on CO2 emission and sequestration</p> <p>6. Examples of conservation agriculture farming systems: Traditional systems in Europe, Modern conservation systems in USA, Brazil and Canada, Development of conservation agriculture in Germany, Effective conservation systems depending on agro-climatic zones, soil condition, socio-economic context, farmers skill and interests</p> <p>7. Landscape management and bio-energy in conservation agriculture: Biodiversity, Conservation of cultural and semi-natural landscapes, Energy trees and crops with conservation and landscape value, Overview of multifunctional land-use options</p> <p>8. Weed control and pest management in conservation agriculture: Biology of selected weed species and their distribution methods, No-tillage and herbicide resistant crops, Controlling weeds by managing their environment and germination pattern, Mechanical versus</p>

	<p>chemical weed control, Eco-toxicology of pesticides, Biological control of pests and weeds</p> <p>9. Precision farming in conservation agriculture: Spatial and temporal distribution pattern, Concept of site specific management, Technologies of precision agriculture, Selected examples for site-specific tillage, seeding fertilisation, weed and pest management and harvest</p> <p>Structure of Module: 14 units including 9 lectures, 2 seminars and 3 excursions + field tutorials</p> <p>Teaching methods : Lectures: Slide presentation (laptop and beamer), blackboard, hand outs Seminars: Publications provided by the lecturer will be summarised and explained in short presentations by the students Practical work: Supervised practical work in small groups Excursion: Field demonstration</p>
Literatur	<p>García-Torres, L.; Benites, J.; Martínez-Vilela, A.; Holgado-Cabrera, A. (Eds.), 2003. Conservation Agriculture.Environment, Farmers Experiences, Innovations, Socio-Economy, Policy. ISBN: 1-4020-1106-7516 p.Jones, A.J.R. Lal, and D.R. Huggins. 1997. Soil erosion and productivity research. 5-A regional approach. Am J of Alter agri (12); 185-192. McCormack, D.E., K.K. Young, and L.W. Kimberlin, 1981. Technical and societal implications of soil loss tolerance. In R.P.C. Morgan [ed.] Soil Conservation, Problems and Prospects, John Wiley & Sons, New York, NY. Schertz, D.L., W.C. Moldenhauer, S.J. Livingston, G.A. Weesiers, and E.A. Hintz. 1989. Effect of past soil erosion on crop productivity in Indiana. J. Soil and Water Conserv. 44 (6): 604-608. Weesies, G.A.,S.J. Livingston, W.D. Hosteler, and D.L. Schertz. 1994. Effect of soil erosion on crop yield in Indiana: results of a 10-year study. J. Soil and Water Conserv. 49(6):597-600. Young, A. 1997. Agroforestry for soil management. Cab International, Wallingford, UK, 320 pp.</p>

Modul: Conservation Biology (3201-580)

Modulverantwortung	Prof. Dr. Martin Dieterich
Bezug zu anderen Modulen	Guide to the application of fundamental ecological principles taught in other landscape ecology modules Introduction to nature conservation with a particular focus on Central European agricultural landscapes for other students in the agricultural sciences.
Teilnahmevoraussetzungen	Please register online via ILIAS
Sprache	englisch
ECTS	7,5
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester

Dauer des Moduls	4 Wochen (Block 3)
Verbindlichkeit	Wahl
Arbeitsaufwand	70 h Präsenz + 130 h Eigenanteil + Prüfung = 200 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>This mandatory module of the MSc Landscape Ecology includes lectures, seminars and excursions. Lectures cover the theoretical basics of conservation biology and illustrate current conservation issues using examples from central and western European habitats and cultural landscapes. Seminars will cover current issues of conservation biology. Topics will consider specific wishes from students. Excursions will include visits to county, district and state conservation administrations, applied research institutions and NGOs.</p> <p>This module aims to provide a sound knowledge on current conservation issues. This includes conservation issues in southern Germany that are placed in the context of global, EU and federal frameworks. Basics of conservation planning will also be part of the lectures.</p> <p>Emphasis will be on active student participation and student input (mainly during seminars and excursions). Protocols from excursions and to a limited extent presentations can be accomplished as group work strengthening competencies in producing joint output.</p> <p>The course is considered a pre-requisite for professional activities in conservation administrations, conservation organizations and consultancies.</p>
Schlüsselkompetenzen	Multidisciplinary is a key competence. Students will be able to address complex problems and develop multi-scale solutions guiding the co-operation of different stakeholders (leadership qualities).
Anmerkungen	Due to space constraints in the course room and during excursions the number of participants in this module is limited to 20. Registration via ILIAS is thus compulsory. Dieses Modul entspricht für Studierende, die im SS 14 das Studium der Agrarbiologie, Fachrichtung Landschaftsökologie, aufgenommen haben, dem Modul 3201-500 Vegetation Mitteleuropas I
Conservation Biology (3201-581)	
Person(en) verantwortlich	Prof. Dr. Martin Dieterich, Prof. Dr. Frank Schurr
Person(en) begleitend	Dr. Christine S. Sheppard
Lehrform	Vorlesung mit Seminar und Exkursion
SWS	5
Inhalt	This mandatory module of the MSc Landscape Ecology includes lectures, seminars and excursions. Lectures cover the theoretical basics of conservation biology and are tailored to questions and problems characterizing central or western European habitats and

	<p>cultural landscapes. Seminars will cover current issues of conservation biology. Topics will consider specific requests from students. Excursions will include visits to counties, district and state conservation administrations, applied research institutions and NGOs.</p> <p>This module aims to provide a sound knowledge on conservation problems characterizing the situation in southern Germany. This includes knowledge on global, EU and federal frameworks. Basics of conservation planning will also be part of the lectures.</p> <p>Emphasis is given to active student participation and student input (mainly seminars and excursions). Protocols from excursions and to a limited extent presentations can be accomplished as group work strengthening competencies in producing joint output.</p> <p>The course is considered a pre-requisite for professional activities in conservation administrations, conservation organizations and consultancies.</p>
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Modul: Crop Production Systems (4905-420)

Modulverantwortung	Prof. Dr. Georg Cadisch
Bezug zu anderen Modulen	Module is of importance for improving sustainability in crop production, resource protection and food security
Teilnahmevoraussetzungen	B.Sc or equivalent degree, basic knowledge of plant production
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Presentation in groups (20 %) with discussion (5 %); compulsory attendance at exercises and the seminar
Prüfungsleistung	Written exam (75%)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After successfully completing the module, students can define the constraints and potentials of enhancing crop production in tropical farming systems to support the need of a growing food demand. They can illustrate and discuss the relationships between crop management and yield in tropical cropping systems mainly using rice and cassava as examples. They are able to assess under which conditions tropical legumes fix atmospheric nitrogen and

	enhance soil fertility for subsequent crops. They can develop the potential of traditional and innovative techniques to increase crop yield, to improve quality and resistance to environmental stress and pest problems. The students can apply advanced agricultural crop production techniques to improve productivity by means of adequate soil, nutrient and water management. The students are further able to define alternative and future cropping scenarios and apply and judge them in an integrated dynamic modelling environment.
Schlüsselkompetenzen	Students have acquired an ability to critically assess the validity and potential of proposed alternative solutions based on their enhanced scientific understanding and the gained practical experience in simulations. They have enhanced communication and team building skills based on interdisciplinary group work experiences and joint presentations. They have acquired further software skills including linking different software tools.
Anmerkungen	The contents of the lectures are available at ILIAS under agrar institute <Plant Production in the Tropics and Subtropics (380a)> and the corresponding module number. Access to the materials is provided upon request via ILIAS.
Crop Production Systems (4905-421)	
Person(en) verantwortlich	Prof. Dr. Georg Cadisch
Person(en) begleitend	Dr. agr. Thomas H. Hilger
Lehrform	Vorlesung mit Übung und Seminar
SWS	4
Inhalt	<p>Introduction: potentials and constraints of intensification in world food production, principles of plant production in the tropics. Crops and Nutrition: importance of cereals and root crops for human nutrition, importance of minor crops and plant genetic resources for a sustainable development. Plant Growth and Resource Use: Eco-physiology of rice and cassava. Practical Course: Methods of quantifying plant growth. Plant Improvement: Genetic improvement - current and future approaches (GM crops); Plant adaptation mechanisms to stress. Crop Modelling: Concepts; Application in crop production. Tools for evaluating integrated Systems: Integrated modelling approaches - FALLOW; FALLOW - Case studies; Modelling exercises. Cropping Systems: Crop rotation and mixed cropping; Interactions in multiple plant component systems. Crop Protection: Pests and weed management; Principles of biological pest control. Soil Fertility and Conservation Systems: Principles of soil fertility and degradation; Legumes - source of food security and sustainability; Nutrient management and environmental services; Resource protection on sloping land. Alternative Plant Production Systems: Fibers; Biofuel and industrial applications. Interdisciplinary case studies: Students seminar.</p> <p>Slides and overhead transparencies.</p>

Literatur	<p>Webster, C.C. & N. Wilson (1998): Agriculture in the Tropics. 3rd edition. Blackwell Science, UK; Huxley, P. 1999. Tropical Agroforestry. Blackwell Science, Oxford; Rehm, S. and G. Espig (1991): The cultivated plants of the Tropics and Subtropics. Verlag Josef Margraf, Weikersheim, Germany; Alvim, de T, P. and T.T. Kozlowski (1977): Eco-physiology of Tropical Crops. Academic Press, New York; Booth, V. (1993): Communicating in science - Writing a scientific paper and speaking at scientific meetings, 2 nd Ed., Cambridge University Press; Lal, R. (1990): Soil erosion in the tropics - principles and management. McGraw - Hill, New York; Lal, R. (1994): Soil Erosion Research Methods. Soil and Water Conservation Society, Ankeny; Rehm, S. (1986. Grundlagen des Pflanzenbaus in den Tropen und Subtropen. Band 3. Verlag Eugen Ulmer, Stuttgart, Germany; Rehm, S. (1989): Spezieller Pflanzenbau in den Tropen und Subtropen. Band 4. Verlag Eugen Ulmer, Stuttgart, Germany; Sinclair, T.R. 1998. Principles of Ecology in Plant Production. CAB International, UK; Smartt, J. and N.W. Simmonds (1995): Evolution of crop plants. 2nd edition: Longman Scientific & Technical, Harlow; Thornley, J.H.M. and I.R. Johnson (1990): Plant and crop modelling - a mathematical approach to plant and crop physiology. Clarendon Press, Oxford;</p>
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Modul: Ecotoxicology and Environmental Analytics (3202-410)

Modulverantwortung	Prof. Dr. rer. nat. Andreas Fangmeier
Bezug zu anderen Modulen	The module is mandatory in the Mastercourse Envirofood and semi-elective or elective in other courses. The module is necessary to gain a basic understanding of the occurrence and impact of pollutants on targets such as organisms, ecosystems and materia, and on legislation and measures to mitigate adverse effects.
Teilnahmevoraussetzungen	For students taking 3202-410 as a semi-elective or elective module, sound knowledge in biology, ecology, chemistry and physics at Bachelor level is required.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	written exam
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	The aim of the module is to give a solid understanding of the most important anthropogenic pollutants in soil, water and air, their sources and their effects, and provide the knowledge and analytical

	<p>tools for research and implementation of mitigation options. After completing the course the student should be able to:</p> <p>Knowledge:</p> <p>The students know the relevant pollutants, their sources, emission, transport pathways, secondary chemistry as well as the analytical tools to estimate their abundance and their environmental impact. They can illustrate environmental quality guidelines and the respective legislation.</p> <p>The students know about access to pollutant data and inventories and they are able to analyse and compile such data. They are aware about data quality requirements.</p> <p>Skills:</p> <p>The students can apply analytical procedures and data evaluation techniques to analyse the abundance of environmental pollutants and their ecotoxicological effects. They can combine data and environmental quality regulations and judge about the pollution level at local, regional, national and global scale.</p> <p>The students are able to acquire, read and summarize scientific literature and combine information from different resources to a new topic and prepare and give a scientific presentation.</p>
Schlüsselkompetenzen	<p>The structure of the modul provides the following competences: The students are able to discuss ecological, social and economic aspects of environmental pollution and mitigation and prevention. They are able to co-operate and work independently to device strategies to handle pollutants and their adverse effects and to evaluate regulatory measures and suggest improvements. The students acquire intercultural competence by working in groups with international students. They are able to communicate ecotoxicological knowledge and problem solutions to stakeholders and policy makers.</p>
Anmerkungen	Module is expected to be offered again in WS 2020/21
Ecotoxicology and Environmental Analytics (3202-411)	
Person(en) verantwortlich	Prof. Dr. rer. nat. Andreas Fangmeier
Person(en) begleitend	Dr. rer. nat. Andreas Klumpp, Dr. Iris Schmid, Dr. Olga-Christina Calvo-Weimar
Lehrform	Vorlesung
SWS	1
Inhalt	<p>Emission and deposition of the most important pollutants; pollutants from livestock operations; ecotoxicology of pollutants; mechanisms of effects; pollutant effects at the different biological scales from molecular up to the ecosystem; exposure-response relationships; thresholds and methodological approaches to estimate thresholds; strategies for pollution reduction; bioindication.</p> <p>Lecture content:</p> <ul style="list-style-type: none"> - Definitions in ecotoxicology

	<ul style="list-style-type: none"> - Ecotoxicology of acidifying and eutrophying pollutants (SO₂, NO_x, NH_y) - Photooxidants - UV-B - Heavy metals - Organic pollutants - Forest decline <p>Lecture with time for questions and discussions; beamer-presentations and slides; script and other material is distributed via the e-learning platform ILIAS</p>
Literatur	<p>Connell, D., Lam, P., Richardson, B., Wu, R. (1999): Introduction to Ecotoxicology. Blackwell, 170 pp. ISBN0-632-03852-7.</p> <p>Jorgensen, Halling-Sorensen, Mahler (1997): Handbook of estimation methods in ecotoxicology and environmental chemistry. Lewis Publishing, Boca Raton.</p> <p>Moriarty (1999): Ecotoxicology. Academic Press, San Diego, 3rd ed.</p> <p>Newman (1998): Fundamentals of Ecotoxicology. Lewis Publishing, Boca Raton.</p> <p>Schüürmann, G., Markert, B. (eds.) (1998): Ecological Fundamentals, Chemical exposure and Biological Effects. Environmental Science and Technology. A Wiley Intersciences Series of Texts and Monographs, 900 pp. ISBN 0-471-17644-3.</p> <p>Walker, C.H., Hopkin, S.P., Sibly, R.M., Peakall, D.B. (2006): Principles of Ecotoxicology. Third edition, Taylor & Francis, 315 pp. ISBN 0-8493-3635-X.</p>
Anmerkungen	Course material is provided via the ILIAS e-learning platform.
Methods in Ecotoxicology and Environmental Analytics (3202-412)	
Person(en) verantwortlich	Prof. Dr. rer. nat. Andreas Fangmeier
Person(en) begleitend	Dr. rer. nat. Andreas Klumpp, PD Dr. rer. nat. Petra Högy
Lehrform	Vorlesung
SWS	1
Inhalt	<p>This lecture deals with the methodology to assess xenobiotics and their effects on targets such as organisms and ecosystems. Lecture contents cover:</p> <ul style="list-style-type: none"> - Analytics of pollutants (separation techniques, concentration measurements for different chemical groups of xenobiotics) - Physiological effects of xenobiotics (responses of organisms from molecular to vitality) - Exposure methods (instrumentation and equipment to establish dose-response functions from lab conditions to field manipulation of pollutants) - Biomonitoring / bioindication (standard methods involving organisms in different spheres)

Literatur	as indicated in lecture 320411
Anmerkungen	all necessary material is provided via the e-learning platform ILIAS
Practical in Ecotoxicology and Environmental Analytics (3202-413)	
Person(en) begleitend	Dr. Olga-Christina Calvo-Weimar
Lehrform	Praktikum
SWS	1
Inhalt	The students are performing ecotoxicological tests according to standard OECD guidelines to establish dose-response functions for several xenobiotics. They apply the Luminescent Bacteria Test and the Lemna Growth Inhibition Test, perform all the measurements and data evaluation and write a report.
Literatur	Literature on the course and methodology is supplied at the beginning of the module via the e-learning platform ILIAS
Seminar on Ecotoxicology and Environmental Analytics (3202-414)	
Person(en) begleitend	PD Dr. rer. nat. Petra Högy, Dr. Iris Schmid, Dr. Olga-Christina Calvo-Weimar
Lehrform	Seminar
SWS	1
Inhalt	In the Seminar on Ecotoxicology and Environmental Analytics, the students present knowledge on selected issues in the framework of xenobiotics and their effects. The contributions cover both, accidents that happened in the past and have contributed to more sophisticated handling of xenobiotics, guidelines and environmental legislation, and less well-known cases with more regional or local impacts. The students are provided with access to data and information sources, they are also encouraged to establish their strategies to assess information.
Literatur	Literature for the seminar is changing from year to year according to the cases dealt with. Students are provided with sources of information via the ILIAS e-learning platform

Modul: Environmental and Resource Economics (4101-410)

Modulverantwortung	Prof. Dr. Christian Lippert
Teilnahmevoraussetzungen	Knowledge of basic concepts from economic theory (e.g. demand function and its determinants), from investment appraisal (e.g. calculating net present values) and from Environmental Economics (e.g. externalities) as taught in the module Economics and Environmental Policy (4201-440)
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS

Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	in-class presentation and short seminar paper (25%)
Modulprüfung	written (75%)
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Applying the relevant microeconomic theory students should be enabled to analyse current problems of resource use and agricultural production.
Schlüsselkompetenzen	Critical analytical thinking; communication and oral presentation; applying economic reasoning
Environmental and Resource Economics (4101-411)	
Person(en) verantwortlich	Prof. Dr. Christian Lippert
Person(en) begleitend	Dr. Tatjana Krimly, M.Sc. Manuel Narjes
Lehrform	Seminar
SWS	4
Inhalt	Fundamental concepts of Environmental and Natural Resource Economics are introduced and broadly discussed; In the light of applied microeconomic theory current problems of resource use and agricultural production will be analysed; special attention is given to combined economic and ecological models.
Literatur	Perman, R., Yue, M., McGilvray, J. and M. Common (2003): Natural Resource and Environmental Economics; Third Edition. Munich, Pearson.
Anmerkungen	Seminar and accompanying computer exercises; contributions by the students; lecture notes are available at the 'AStA Skriptenverkauf'. Further course material will be uploaded during the course to https://ilias.uni-hohenheim.de .

Modul: Ethical Reflection on Food and Agriculture (4302-420)

Modulverantwortung	Prof. Dr. Claudia Bieling
Bezug zu anderen Modulen	Sustainability Discourses and Environmental Sociology; Global Agri-food Systems; Gender, Nutrition and Right to Food; and other modules that deal with interdisciplinary aspects of food and agriculture

Teilnahmevoraussetzungen	Since the number of participants is limited to 20, students are asked to submit a short letter of motivation to participate in the module. Applications for participation in WS 2019/20 should be submitted from September 30 to October 13, 2019. Please send your letter of motivation to claudia.bieling@uni-hohenheim.de stating the following: 1. Your name 2. Your nationality 3. Your study programme 4. Study programme level (M.Sc./B.Sc./Ph.D.) 5. Statement of motivation: I want to take the course 'Ethical Reflection on Food and Agriculture' because... (max. 150 words) The decision about participation will be communicated to applicants by October 14, 2019.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Presentation in groups (40 %), participation in class (10 %)
Prüfungsleistung	Written paper in the form of an individual learner's journal (50 %)
Arbeitsaufwand	56 h presence + 104 h preparation (individually and in groups) = 160 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>After completing this module, students have basic knowledge of ethical theory and frameworks for ethical analysis, as well as of their application to the field of contemporary food and agricultural research and practice. Furthermore, course participants are familiar with identifying ethical issues and their underlying moral principles, and with ethical reasoning and evidence-based argumentation with respect to the multi-functionality of agriculture.</p> <p>Drawing on teaching methods that combine theory and on-the-ground experiences from lecturers and guest speakers, this module creates a space to critically discuss current ethical issues related to food and agriculture.</p> <p>Following an interactive didactic approach, students learn to identify the impact of concurrent global challenges on the different members of society (small and large scale farmers, consumers, civil society organizations, industry and retailers, the public sector, and scientists) and the environment, as well as define the roles and responsibilities of the various actors in meeting these challenges.</p>
Schlüsselkompetenzen	Engaging participants in discussions with lecturers and guest speakers, and comprising a group work assignment that includes independent literature research, classification/prioritization of evidence and information, oral presentations and argumentation in plenary debates, as well as an individual journal exercise, this module enables students to further develop the following soft skills: - communication skills - logical and analytical abilities - critical and analytical reading of scientific literature - evidence-based argumentation - teamwork capacity - intercultural competence -

	scientific journal-based literature research - scientific writing skills - (media-supported) presentation skills - organization and time management skills
Anmerkungen	Please note that the number of participants is limited to 20 (we will give priority to Master level students). Therefore, students are asked to submit a short letter of motivation to participate in the module (see above). Applications can be submitted from September 30 to October 13, 2019. Registration in ILIAS will only be possible after the selection process.
Ethical Reflection on Food and Agriculture (4302-421)	
Person(en) verantwortlich	Prof. Dr. Claudia Bieling
Lehrform	Seminar mit Übung
SWS	4
Inhalt	<p>The module is broadly structured in two parts:</p> <p>Part I is dedicated to the theoretical foundations of ethical thinking. Under the guidance of an ethicist from the International Center of Ethics in the Sciences and Humanities (IZEW, University of Tübingen), students will become acquainted with basic knowledge of ethical theory and tools for ethical analysis and argumentation, including:</p> <ul style="list-style-type: none"> - prudence, justice and the good life as principles for ethical assessment - from fact to values and norms: how to build an argument - the role of emotions in public discourses and conflicts. <p>In parallel to the lectures of the first part, students will practice the application of these theories and tools by elaborating case studies (group work) on an ethical issue of their choice (e.g. animal welfare, GMOs, biofuels).</p> <p>In Part II, students will further enhance their capacity to identify ethical issues related to the field of food and agriculture and critically reflect on them. For this, guest speakers are invited to share their experiences and perspectives, e.g. as an ethicist working in science or on providing food aid to developing countries. A particular emphasis will be on “solutions” or ways forward for reducing ethical problems and conflicts. As part of this, we will for instance explore the potential of taxation as a means for including ethical concerns in policy as well as alternative economic models that call for a more just economic order.</p>
Literatur	Readings will be provided via ILIAS.
Anmerkungen	Please note that this module is limited to 20 students and can be taken only after applying with a motivation letter! See module description for further information.

Modul: Fallstudien biogene Produkte (4408-450)

Modulverantwortung	Prof. Dr. Andrea Kruse
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Bezug zu anderen Modulen	Separationstechniken und Konversionstechnologien nachwachsender Rohstoffe (4408-410), Stoffstromanalyse und Life Cycle Assessment (3403-470)
Teilnahmevoraussetzungen	Grundkenntnisse im Bereich Konversionstechnologie, i.R. erbracht durch die Pflichtveranstaltungen im Master "Nachwachsende Rohstoffe und Bioenergie" oder "Bioeconomy"
Sprache	deutsch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	4 Präsentationen der Zwischenergebnisse mit Diskussion (nicht benotet, für die Zulassung zur Modulprüfung notwendig)
Prüfungsleistung	Schriftliche Ausarbeitung in Form eines Berichts (70%) mit Abschlusspräsentation (30%)
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Eine Fragestellung im Bereich der Entwicklung von Bioraffinerien wird interdisziplinär bearbeitet. Dabei erlernen die Studierenden, vermittelte Inhalte anzuwenden, um konkrete Fragestellungen zu beantworten. Dies beinhaltet wissenschaftliches Arbeiten inklusive Literatursuche.
Schlüsselkompetenzen	Die Studierenden erarbeiten sich Lösungswege selbst und erlernen daher Handlungswissen für konkrete Problemlösungen. Außerdem werden selbstständiges Arbeiten, kritisches analytisches Denken, Kooperations- und Kommunikationsfähigkeit vermittelt. Lesen und Verstehen von Literatur in Englisch gehört auch dazu. Durch den Bericht und die Präsentation werden die schriftliche und mündliche Ausdrucksfähigkeit geübt. Dabei liegt der Fokus auf zielgruppenorientierter Darstellung (Industrie, Wissenschaft, Gesellschaft).
Anmerkungen	Dieses Modul ist auf 20 TeilnehmerInnen beschränkt. Anmeldung über Ilias mit üblichen Fristen. Studierende des Master-Studiengangs "Nachwachsende Rohstoffe und Bioenergie" haben Vorrang. Ansonsten Aufnahme nach Datum.
Fallstudien biogene Produkte (4408-451)	
Person(en) verantwortlich	Prof. Dr. Andrea Kruse
Person(en) begleitend	M.Sc. Gero Becker, M.Sc. Manuel Bauer, M.Sc. Catalina Rodriguez Correa, M.Sc. Paul Körner
Lehrform	Vorlesung mit Diskussion
SWS	4

Inhalt	<p>Konkrete Fragestellungen aus der aktuellen Forschung oder von der Industrie werden in der Gruppe erarbeitet und im Plenum präsentiert und diskutiert. Die Fragestellungen sind aktuell und in jedem Semester unterschiedlich.</p> <p>Die Fragestellungen sind interdisziplinär und umfassen jeweils mindestens zwei folgender Bereiche:</p> <ul style="list-style-type: none"> - Pflanzenproduktion - Düngung, Stoffkreislauf Boden - Chemische Synthese in Hinblick auf Polymere oder andere Produkte - Materialwissenschaften, i.R. in Hinblick auf spezielle Kohlenstoffmaterialien - Chemische Verfahrenstechnik in Blick auf Entwicklung neuer oder verbesserter Trennoperationen - Reaktionstechnik: Technische Umsetzung von chemischen Umwandlungen zur Realisierung in der Industrie. <p>Zusätzlich werden i.R. Bewertungen in Hinblick auf Nachhaltigkeit und Kosten durchgeführt.</p> <p>Am Ende werden die Ergebnisse den Fragestellern aus Forschung und Industrie vor Ort präsentiert und diskutiert.</p>
Literatur	Wird in der Lehrveranstaltung bereitgestellt
Anmerkungen	Innerhalb der Lehrveranstaltung erfolgt eine betreute Gruppenarbeit. Computer und Materialien sollten daher mitgebracht werden. Die Anwesenheit ist erforderlich, da sonst die Studienleistung nicht erbracht werden kann.

Modul: Farm and Project Evaluation (4904-450)

Modulverantwortung	Prof. Dr. Thomas Berger, Prof. Dr. Manfred Zeller
Bezug zu anderen Modulen	n/a
Teilnahmevoraussetzungen	Proficiency in using spreadsheet applications (MS-Excel)
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Component examinations for 4904-451 and 4904-452
Modulprüfung	Component examinations

Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>The objective of the farm level part of this module is to provide the necessary tools to conduct detailed farm business analyses. Students will be taught the basic accounting concepts such as depreciation, balance sheet, income statement and the various forms of budgeting, such as partial, enterprise, whole farm and cash flow budgets. The specific goal is to enable students to analyze the liquidity, solvency and investments in farm businesses, the financial feasibility of investments, as well as understand the basic economics of credit use.</p> <p>The project part of the course focuses on project evaluation on an economic basis, taking into account the values for revenues and resources allocated in the project. These values are adjusted, as compared to market values, for market and policy distortions. Further, methods are discussed on how to value other than economic project outcomes, in particular in the social and environmental context.</p>
Schlüsselkompetenzen	Analytical thinking, oral presentation, scientific reading
Anmerkungen	Laptop required for computer exercises in class Limited number of participants - students must register in ILIAS before the module starts
Farm Level Methods (4904-451)	
Person(en) verantwortlich	Prof. Dr. Thomas Berger
Lehrform	Vorlesung
SWS	2
Inhalt	<p>The general objective of the farm-level part is to provide the necessary tools to conduct detailed farm business analyses. The student should become familiar with basic accounting concepts like depreciation, balance sheet, income statement (and their interpretation), and the different forms of budgeting, such as partial, enterprise, whole farm and cash flow budgets.</p> <p>The specific goals are to enable the participants to analyze (a) liquidity and solvency in farm businesses, (b) financial feasibility of investments; and to understand (c) the basic economics of credit use.</p>
Anmerkungen	1st half of semester.
Project Level Methods (4904-452)	
Person(en) verantwortlich	Prof. Dr. Manfred Zeller
Lehrform	Vorlesung
SWS	2
Inhalt	The project part of the module focuses on project evaluation on an economic basis, taking into account the values for revenues and

	resources allocated in the project. These values are adjusted, as compared to market values, for market and policy distortions. Further, methods are discussed how to value other than economic project outcomes, in particular in the social and environmental context
Anmerkungen	2nd half of semester.
Exercise for Project Monitoring and Evaluation (freiwillig) (4904-453)	
Person(en) verantwortlich	Prof. Dr. Manfred Zeller
Lehrform	Übung
SWS	2
Inhalt	The exercise will present case studies and practical examples on how to value and calculate shadow prices for non-tradeables and tradeable goods, domestic resource cost, cost-effectiveness ratios, and other indicators of economic appraisal of agricultural and rural development projects. The second part of the exercise is devoted to the design of monitoring and evaluation systems for rural and agricultural development projects. Both parts use case studies from projects, e.g. implemented with the support by World Bank, GIZ or IFAD. Individual and group work, short presentations by students, as well as home work are the methods of instruction.
Anmerkungen	2nd half of semester

Modul: Farm System Modelling (4904-460)

Modulverantwortung	Prof. Dr. Thomas Berger
Bezug zu anderen Modulen	n/a
Teilnahmevoraussetzungen	Proficiency in using spreadsheet applications (MS-Excel)
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1. Semesterhälfte
Verbindlichkeit	Wahl
Modulprüfung	written
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Students are able to analyze farm systems and to solve decision problems by applying appropriate decision models and planning methods such as: - Mathematical Programming - Farm investment analysis

	- Advanced farm LP modeling The acquired methods can be utilized for manifold planning purposes
Schlüsselkompetenzen	Analytical thinking, oral presentation, scientific reading, data handling, processing and analysis
Anmerkungen	Laptop required for computer exercises in class
Farm System Modelling (4904-461)	
Person(en) verantwortlich	Prof. Dr. Thomas Berger
Lehrform	Vorlesung
SWS	2
Inhalt	Introduction to farm management and modeling Theory of agricultural production Mathematical Programming Farm investment analysis Advanced farm system modeling.
Modelling of Land Use Decisions with Mathematical Programming (4904-462)	
Person(en) verantwortlich	Prof. Dr. Thomas Berger
Lehrform	Übung
SWS	2
Inhalt	Modelling of land use decisions with mathematical programming.
Introduction to Excel Spreadsheet Models (freiwillig) (4904-463)	
Person(en) verantwortlich	Prof. Dr. Thomas Berger
Lehrform	Übung
SWS	2
Inhalt	Introduction to Excel Spreadsheet Models.

Modul: Fertilisation and Soil Fertility Management in the Tropics and Subtropics (Fernlehrmodul) (3301-480)

Modulverantwortung	Prof. Dr. Torsten Müller
Teilnahmevoraussetzungen	Basic knowledge in agriculture under tropical/subtropical conditions. Good knowledge in biology and chemistry. Access to the Internet and to the e-learning platform ILIAS at the University of Hohenheim. Max. two days of physical presence at the University of Hohenheim are required (one day for the seminar and one day for the examination. Dates by arrangement).
Sprache	englisch

ECTS	7,5
Angebotshäufigkeit	jedes Semester
Semesterlage	2. Semester, 3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	(1) Writing of five essays or participation in five meetings of the scientific reading courses (pass/fail). (2) Presentation with handout (25%). The successful completion of the "Compulsory assignment" (passing grade) is a prerequisite for participating in the final examination.
Prüfungsleistung	Oral exam (75 %). A failing grade in the final examination results in failing the module.
Prüfungsdauer	30 Minuten
Arbeitsaufwand	200 h Eigenanteil + Prüfung = 200 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Students are proficient in developing sustainable fertilisation systems under tropical and subtropical conditions in both low and high input systems. With respect to tropical and subtropical conditions, they will be able to apply profound knowledge in soil chemical processes and natural soil fertility, nutrient availability, nutrients in plants and adaptation of plants to various adverse soil conditions, organic and mineral fertilisation for sustainable land use.
Schlüsselkompetenzen	During preparation for exams and while preparing and following up on lectures, students learn to cooperate and work independently. They learn and practice both critical and analytical thinking and reading of scientific literature, while writing essays or participation in scientific reading courses enhances their scientific articulateness. Through the seminar presentation, students practice and improve their capability of exploring a scientific issue and of presenting a limited scientific subject.
Anmerkungen	E-learning will be mainly performed using the platform ILIAS. Registration via ILIAS is required. Students may enter the course at the beginning of the summer or winter term. Registration details will be announced in the course catalogue before the beginning of the semester. Do not forget to also register at the examination office of the University of Hohenheim.
Fertilisation and Soil Fertility Management in the Tropics and Subtropics (ILIAS Fernlehrmodul) (3301-481)	
Person(en) verantwortlich	Prof. Dr. Torsten Müller
Lehrform	E-Learning
SWS	5
Inhalt	General aspects of soil chemistry under tropical and subtropical conditions. Specific soil chemical aspects in highly weathered soils under tropical humid conditions, saline and sodic soils under semi-

	<p>arid conditions including remediation, submerged paddy rice soil. Turnover of nutrients and importance of organic matter in soils under tropical and subtropical conditions.</p> <p>Nutritional constraints to crop growth and adaptation of plants to adverse soil conditions. Organic and mineral fertilisation including functions, acquisition, uptake and fertilization of the various plant nutrients. Site specific consideration such as various case studies for acid, drought, saline, calcareous and waterlogged sites.</p> <p>E-learning with ILIAS, essay writing, seminar presentations, supervised reading of scientific literature, presentation by the students.</p>
Literatur	Literature will be announced in ILIAS.

Modul: Food and Nutrition Security (4902-430)

Modulverantwortung	Dr. Kirsten Boysen-Urban
Bezug zu anderen Modulen	This module will be of particular interest for students with a specialization in development economics and policy.
Teilnahmevoraussetzungen	Students should be familiar with the basics in microeconomics and macroeconomics. Furthermore, some previous exposure to aspects related to poverty and economic development is assumed.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Modulprüfung	written test
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Students will become familiar with the multidimensional problems of hunger and malnutrition, including global trends, measurement concepts, causes, and economic implications. Furthermore, policies to improve food and nutrition security will be analyzed and discussed.
Schlüsselkompetenzen	Students will acquire communication and cooperation skills within a multicultural framework. They will be instructed to think critically and analytically about the multidimensionality of hunger and malnutrition. Students will be able to effectively evaluate and communicate the problems and challenges of food security.
Food and Nutrition Security (4902-431)	

Person(en) verantwortlich	Prof. Dr. Manfred Zeller, Dr. Kirsten Boysen-Urban
Lehrform	Vorlesung
SWS	4
Inhalt	<p>This module mostly focuses on socioeconomic aspects of hunger and malnutrition, including causes, consequences, and remedial policies. Furthermore, some basic aspects of nutritional sciences are discussed. For this you should be familiar with the basics in microeconomics and macroeconomics. Furthermore, some previous exposure to aspects related to poverty and economic development is assumed.</p> <p>Overview of main topics covered:</p> <ul style="list-style-type: none"> - Global Perspective on Hunger and Food Insecurity - Concepts of Hunger and Malnutrition: Measurement Approaches and Nutrition-Health Linkages - The Economic Cost of Malnutrition - The World Food Equation: Factors of Global Food Supply and Demand - Multidimensionality of Hunger and Poverty: Food Security-Poverty Linkages - Access to Rural Finance: Empowerment, Participation and Gender - Targeting of Rural Development Policies - Food Demand Analysis: Empirical Approaches and Data Collection - Food and Nutrition Policies - Multidimensionality of Hunger and Poverty: Risk and Vulnerability - Institutional Change: Access to Land and Water Resources - Trade Policies in Developing Countries; Poverty and Trade - The Challenge of Food Security <p>Through the lectures and discussion of case studies you will become familiar with the multidimensional problems of hunger and malnutrition, including global trends, measurement concepts, causes, and economic implications.</p>
Literatur	<p>Leathers, H.D., and P. Foster (2009): The World Food Problem: Towards Ending Undernutrition in the Third World. 4th edition. Lynne Rienner Publishers, Boulder.</p> <p>Leathers, H.D., and P. Foster (2004): The World Food Problem: Tackling the Causes of Undernutrition in the Third World, 3rd edition, Lynne Rienner Publishers, Boulder.</p> <p>Southgate, D., D.H. Graham and L. Tweeten (2010): The World Food Economy. Oxford, Blackwell Publishing.</p>

	<p>Thirlwall, A.P. (2006): Growth and Development. With Special References to Developing Economies. 8th edition. Palgrave Macmillian, New York.</p> <p>Todaro, M. P. and S. C. Smith (2009): Economic Development. 10th edition. Pearson, London.</p>
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Modul: Food Tech Transition - Summer School 2019 (4302-490)

Modulverantwortung	Prof. Dr. Claudia Bieling
Teilnahmevoraussetzungen	Acceptance into one of the above programs or basic knowledge and/or strong interest in social sciences and crop science. Interested students need to apply for participation via ILIAS. The application must include the curriculum attended so far and a one page motivation letter.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	geblockt (n. V.)
Verbindlichkeit	Wahl
Prüfungsleistung	Scientific presentation with discussion of about 20 min (50%) and written report of 10 to 15 pages (50%)
Arbeitsaufwand	60 h presence + 100 h home work+ exam = 160 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	This summer school has been designed to provide a comprehensive overview on food technology transitions and paradigmatic shifts within the agrifood branch. It will integrate knowledge about the production side with social sciences and a wider social perspective. It focuses on the impact of food technology implies, the disruption potential of production and consumption logics; nutrition patterns; agronomic practices; available raw materials and human as well as environmental and animal ethics associated. At the end of the summer school, students will have a thorough understanding of food technology transitions. The summer school sections provides for many competences development: in the introduction section, a socio-historical overview allows student to understand the factors that enhance or restraint transitions and what costs or benefits; in the sustainability section, a theory-based assessment of sustainability allows students to position the current socio-technical challenges in a wider context; in the crop-science section, a natural science perspective allows student to specify and understand issues related to the production side, what resources and materials are currently and will be in the future available that allows or constraint transitions, and trends in nutrition and food waste; in the management section, a practical perspective on everyday practice allows students to develop

	management perspectives on food technology and develop strategies for corporate responsibility and regulation; in the business section, an empirical approach allows students to develop business models that address impact and sustainability evaluation, and communication strategy with industry partners and tech investors.
Schlüsselkompetenzen	At the end of the summer school, students will acquire multiple and interactive skills. Thanks to the summer school format, both oral and written skills are developed. During preparation for the written report and while preparing and following up on lectures, students practice critical thinking, self-reliance, time management, interpersonal communication and cooperation.
Anmerkungen	Block (29.07.-09.08.2019) with a further period of home work from 09.08.2019 to 23.08.2019. Because of limited space available, interested students must apply to this module by registering in the ILIAS course (https://openilias.uni-hohenheim.de/goto.php?target=cat_35230&client_id=UHOH2). Registration is open from 15 April to 13 May 2019. Students will be then selected based on the curriculum attended so far and the motivation letter. The written exam is a report. The deadline for the submission of the report is 23.08.2019. Only offered in summer 2019! Any inquire should be addressed to Dr. Cinzia Piatti.
Food Tech Transition - Summer School 2019 (4302-491)	
Person(en) verantwortlich	Prof. Dr. agr. Simone Graeff-Hönninger
Person(en) begleitend	Forough Khajehei, Dr. Cinzia Piatti
Lehrform	Vorlesung mit Übung und Exkursion
SWS	4
Inhalt	<p>There are four main sections in this course:</p> <ul style="list-style-type: none"> • Introduction section: food systems (brief historical overview, current configuration, main actors, consumption politics and trends); food tech (food technologies and the industry, related and residual issues for adoption, transition); sustainability and transition (basics of sustainability, basics of transition and transition theories; socio-cultural issues related to sustainability). • Crop science section: crop science and food tech in the age of transition (resources and material currently available and in the next future, issues related to the production-in the field issues); superfoods, small grains and food waste (trends in nutrition and in nutrition consumption; focus on food waste and role of technology to avoid it). • Management section: Nutrition and safety concerns in the use of food technology; management perspectives on food technology and future challenges; corporate responsibility and regulation. • Business section: Business Model Development; impact and sustainability evaluation; Communication strategy with industry partners and investors.

Modul: From Genes to Transgenic Plants and Edited Genomes (3411-420)

Modulverantwortung	Jun. Prof. Dr. Sandra M. Schmöckel
Teilnahmevoraussetzungen	-
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Written exam (100 %)
Prüfungsdauer	90 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After successfully completing this module, students are able to specify the organization and function of genes and genomes. They can describe plant tissue culture and differentiate plant tissues. Students are able to illustrate sequencing technologies and are proficient in the corresponding bioinformatics. They can outline gene isolation and transgenic applications, while being familiar with mutations and mutants and genome-wide data generation and its use. Finally, students are able to competently extract and use genetic information and critically evaluate transgene technology.
Schlüsselkompetenzen	During preparation for the exam and while preparing and following up on lectures, students practice self-reliance, time management, interpersonal communication and cooperation. Challenged with scientific problems, they practice critical and analytical thinking.
From Genes to Transgenic Plants and Edited Genomes (3411-421)	
Person(en) verantwortlich	Jun. Prof. Dr. Sandra M. Schmöckel
Person(en) begleitend	Prof. Dr. Uwe Ludewig, Dr. rer. nat. Robert Boehm
Lehrform	Vorlesung mit Seminar und Exkursion
SWS	4
Inhalt	The lecture provides knowledge on the following topics: - Organization and function of genes and genomes. - Plant tissue culture and tissue differentiation - Sequencing technologies - Bioinformatics - Gene isolation and transgenic applications - Mutations and mutants - Genome-wide data generation and use
Literatur	References to suitable literature will be provided during the module.

Modul: From Waste to Worth – Use of Plant Residues (3702-420)

Modulverantwortung	Dr. sc. agr. Judit Pfenning
Bezug zu anderen Modulen	3401-500 Bioactive Compounds of Food Crops; 3702-220 Gemüsebau
Teilnahmevoraussetzungen	- Bewerbung durch Motivationsschreiben
Sprache	deutsch/englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Datenerfassungen in Praxis und Labor mit Hausarbeit als Beitrag einer Datensammlung
Prüfungsleistung	Benotung von praktischen Teil der Datenerfassung (50%) und der Hausarbeit (50%)
Arbeitsaufwand	6 credits: 56 h Präsenz + 104 h Eigenanteil = 160 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	Studierende, die dieses Modul erfolgreich absolviert haben, sind in der Lage, anwendbares Handlungswissen zielorientiert einzusetzen, um Lösungssätze zu formulieren und zu prüfen. Die Studierenden erwerben Kenntnisse in internationaler Teamarbeit und im wissenschaftlichen Austausch.
Schlüsselkompetenzen	Bei den Probenahmen sowie bei den Datenerfassungen trainieren und erlernen die Studierenden Organisation, Teamarbeit und Anwendung von erlerntem Wissen Durch die internationale Zusammenarbeit. Werden Zusammenarbeit in Projekten und interkulturelle Kommunikation geübt und gestärkt.
Anmerkungen	Bewerbung mit Motivationsschreiben bis 31.3.2019. Begrenzt auf 5 Hohenheimer Studierende, da die Teilnehmerzahl durch internationale Kooperation auf 20 Studierende begrenzt ist.

From Waste to Worth – Use of Plant Residues (3702-421)

Person(en) verantwortlich	Prof. Dr. agr. Simone Graeff-Hönninger, Dr. sc. agr. Judit Pfenning
Lehrform	Vorlesung mit Seminar und Übung
SWS	4
Inhalt	Vorlesung: Beschreibung und Vorkommen pflanzlicher Inhaltsstoffe, Anleitung das Potential von Abfallstoffen hinsichtlich der Gewinnung wertgebenden Inhaltsstoffe zu erkennen.

	(Die Vorlesung ist die gleiche wie im im Modul 3401-500 Bioactive Compounds of Food Crops!) Seminar und Übung: Datenerfassung in der Praxis und Erstellung einer Datensammlung im Rahmen eines internationalen Austauschs und als Möglichkeit für Entrepreneurship.
Literatur	Wird in Rahmen der Vorlesung vorgestellt

Modul: GIS and Remote Sensing in Landscape Ecology (3201-630)

Modulverantwortung	Prof. Dr. Klaus Schmieder
Teilnahmevoraussetzungen	-
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Modulprüfung	schriftlich
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden erwerben theoretische und praktische Kenntnisse im Umgang mit Fernerkundungs- und GIS-Systemen, der Erfassung und Verarbeitung räumlicher Daten sowie der Präsentation der Ergebnisse in Form von Karten und Grafiken.
Schlüsselkompetenzen	In Form eines Abschlussprojektes werden Schlüsselkompetenzen wie Arbeiten im Team, selbständige Organisation von Projekten, selbständige und kritische Auseinandersetzung mit wissenschaftlichen Fragestellungen, eigenständige Problemlösungskompetenzen sowie schriftliche und mündliche Ausdrucksfähigkeit bei der Präsentation der Projektergebnisse erworben.
Anmerkungen	In MSc Agrarbiologie - Landschaftsökologie elective only for students who started in SS 14.

GIS and Remote Sensing in Landscape Ecology (3201-631)

Person(en) verantwortlich	Prof. Dr. Klaus Schmieder
Lehrform	Vorlesung
SWS	2

Inhalt	Die Vorlesung vermittelt das theoretische Wissen zur quantitativen Landschaftsanalyse mittels Landschaftsmaßen sowie eine Übersicht über verschiedene Fernerkundungsverfahren und deren theoretische Grundlagen.
Anmerkungen	Die Veranstaltung setzt die Teilnahme an der Veranstaltung "Einführung in GIS" 3201-250 oder vergleichbares Wissen voraus.
Practicals in GIS and Remote Sensing (3201-632)	
Person(en) verantwortlich	Prof. Dr. Klaus Schmieder
Lehrform	Übung
SWS	2
Inhalt	Die Veranstaltung enthält Übungen zur quantitativen Landschaftsanalyse mittels Landschaftsmaßen. Weiterhin sind Übungen zur Vegetations- und Landnutzungsklassifikation mittels verschiedener Fernerkundungsverfahren enthalten, von der klassischen Luftbildinterpretation über analoge und digitale photogrammetrische Auswerteverfahren und klassische, pixelbasierte Klassifikation von Multispektralscannerdaten bis hin zu objekt- und wissensbasierten Klassifikationsverfahren. Folgende Software findet dabei Verwendung: Esri ArcGIS, Leica Photogrammetry Suite, Erdas IMAGINE, Ecognition Developer.
Literatur	Lang & Blaschke (2007): Landschaftsanalyse mit GIS. Albertz (2001): Einführung in die Fernerkundung
Anmerkungen	Der Kurs setzt die Veranstaltung "Einführung in GIS" (3201-250) oder vergleichbare Kenntnisse voraus.

Modul: Global Agri-food Systems: Conventional, Organic, and Beyond (4302-460)

Modulverantwortung	Prof. Dr. Claudia Bieling
Bezug zu anderen Modulen	This module is of particular interest for students who intend to choose the modules "Ethical Reflection on Food and Agriculture" and "Gender, Nutrition and Right to Food".
Teilnahmevoraussetzungen	Acceptance into the above programme or basic knowledge and/or strong interest in social sciences
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl

Studienleistung	Written paper (50 %)
Prüfungsleistung	Oral exam (50 %)
Prüfungsdauer	20 Minuten
Arbeitsaufwand	56 h presence + 104 h preparation at home + exam = 160 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>After completing this course, students have a comprehensive understanding of agri-food systems and the paradigmatic shifts within. Students are in particular able to specify the diverse motivations and politics that have led farmers, consumers, and policy makers toward (or away from) more sustainable agri-food systems. They are familiar with the geographical, sociological, historical, political, legal, and economic aspects of how and why individuals, groups, and industries make (or are involved in) certain choices about food throughout the food chain (production, processing, trade, consumption).</p> <p>To make sense of global agri-food systems, students are introduced to a theoretical framework that helps understand changes in food provisioning: In the 19th century, the bases of contemporary agri-food systems were established, but it is in the 20th century that they changed again; agri-food systems underwent a further period of transformation as the industrial processing of food, the emergence of large food transnational corporations and the integration of ever widening portions of the globe into the world food system restructured world food relationships. These series of changes have had dramatic consequences on agriculture and land use; it is from this that alternative forms of agriculture emerged and the organic movement blossomed, for instance. Factoring in an increasing array of ecological shocks and threats like climate change and peak oil, and dramatically changing cultural and political dynamics around food, agriculture and land use, the next turn to "local" and "traditional" gives a perspective of the big changes food systems underwent. Students are hereafter aware of the possible outcomes of the current developments in organic and sustainable agriculture. In this course, students are provided with the conceptual tools to understand the sociological bases around which a future world of agriculture, food and land use will possibly take shape. Students have an insight into the political and social importance of food and agriculture and are able to identify different kinds of politics around agriculture and food production and consumption. Finally, they are able to explain basic concepts and theories related to organic agriculture and sustainability and have an understanding for the complexity of agriculture and food as it relates –among others– to the politics of resources, the environment and social justice.</p>
Schlüsselkompetenzen	<p>During preparation for the exam, while writing their essay (written paper) and preparing and following up on the seminar, students practice self-reliance, time management and team work. They learn and practice both critical and analytical thinking and reading of scientific literature. Writing the essay enhances their scientific articulateness. During discussions in class, students practice and improve their capability of exploring a scientific issue and of orally presenting an academic argument. With the help of dedicated</p>

	tutorials, students are further supported with creating an essay plan and essay writing, quoting, referencing, and using academic and non-academic sources (therefore avoiding plagiarism).
Anmerkungen	The written paper (compulsory assignment) comprises an essay on topics related to course contents, to be submitted during the course. This course is taught by Dr. Cinzia Piatti.
Global Agri-food Systems: Conventional, Organic, and Beyond (4302-461)	
Person(en) verantwortlich	Prof. Dr. Claudia Bieling
Person(en) begleitend	Dr. Cinzia Piatti
Lehrform	Seminar
SWS	4
Inhalt	<p>This course has been designed to provide a comprehensive understanding of agri-food systems and make sense of paradigmatic shifts within.</p> <p>There are four main sections in this course:</p> <ul style="list-style-type: none"> • Understanding the background • Understanding the contemporary paradigm • Understanding the emergence of alternatives • Adapting to transition <p>These sections will unfold in order to make sense of the global agri-food systems and make sense of the social conditions that permitted the emergence of organic and sustainable agriculture, exploring the background and explaining the relationships between developed and developing countries, and conversely between global and local.</p> <p>Specific case studies relating to the course contents and from various geographic regions reinforce the learning process through enhanced discussions and critical reflection. Preparatory reading of selected literature and introduction to academic journal-based literature research and scientific writing complete the academic picture.</p>
Literatur	Course-relevant readings will be made available or uploaded in ILIAS if possible.
Anmerkungen	Because of limited space available (70 students), students must register via ILIAS; registration is open from 25 September to 30 October 2017. A waiting list will be available if the number of registrations will exceed expectations. This course is taught by Dr. Cinzia Piatti.
Tutorial Global Agri-food Systems: Conventional, Organic, and Beyond (freiwillig) (4302-462)	
Person(en) verantwortlich	Prof. Dr. Claudia Bieling
Person(en) begleitend	Dr. Cinzia Piatti

Lehrform	Tutorium
SWS	2
Inhalt	-

Modul: Global Change Issues (3202-420)

Modulverantwortung	Prof. Dr. rer. nat. Andreas Fangmeier
Teilnahmevoraussetzungen	Extremely important: you have to be present on the first day of the module (i.e. 18 October 2018 at 14:00 in lecture hall 20) in order to be enrolled for the module. This is mandatory because of organisational reasons. We will not accept any student for the module who is not present on 18 October 2018. General requirements: Ability to think in an interdisciplinary way, background knowledge in natural sciences at least at Bachelor level, basic knowledge and interest in social sciences and economy, readiness for active contribution of knowledge from the students home countries.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	written exam
Prüfungsdauer	90 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>The aim of the module is to give a solid understanding of global change with focus on global climate change, its impacts on ecosystems and ecosystem services, and the consequences for the human society. We would like to emphasize that this module deals with the natural science aspect of global change and global climate change rather than with economic issues related to climate change. Nevertheless, mitigation and adaptation strategies as well as current approaches in international treaties are taught. After completing the course the student should be able to:</p> <p>Knowledge:</p> <p>The students know the drivers of global change, in particular global climate change. They understand the perturbations of the global carbon, nitrogen, and water cycles and can distinguish between natural and human impact. The students understand the effects of climate change on natural and anthropogenic (mainly agricultural) ecosystems and the most important feedbacks between ecosystem traits and climatic conditions and the threat to ecosystem services and the potential impacts on the human society. The students know</p>

	<p>the international treaties to combat climate change and understand mitigation and adaptation options to climate change. The students are aware about the methodological tools in investigate global change and its impacts and feedbacks.</p> <p>Skills:</p> <p>The students can combine knowledge from different disciplines to analyse the extent and the consequences of climate change. They can think across scales both in time and space to valuate global change issues. They can judge about the severity of climate change and its effects compared to other drivers of ecosystem performance and services.</p> <p>The students are able to perform experimental research on climate change impacts. They are able to acquire, evaluate and summarize information from scientific literature and to combine information from different sources, they can prepare and give scientific presentations.</p>
Schlüsselkompetenzen	<p>The structure of the module provides the following competences: The students are able to discuss ecological, social, political and economic aspects of global change. They are able to develop and communicate mitigation and adaptation strategies. They are able to co-operate and to work independently. They can evaluate regulatory measures and treaties and suggest improvements. The students acquire intercultural competence by working in groups with international students.</p>
Anmerkungen	Module is expected to be offered again in WS 2020/21
Introduction to Global Change (3202-421)	
Person(en) verantwortlich	Prof. Dr. rer. nat. Andreas Fangmeier
Person(en) begleitend	Dr. Jürgen Franzaring, Dr. rer. nat. Andreas Klumpp, PD Dr. rer. nat. Petra Högy, Dr. Iris Schmid, Dr. Olga-Christina Calvo-Weimar
Lehrform	Vorlesung
SWS	2
Inhalt	<p>Introduction to Global Change is a lecture introducing to the students the most important current knowledge on global change. The focus is on global climate change, its causes and consequences with more emphasis on natural science than on social science and economy.</p> <p>Contents of the lectures cover:</p> <ul style="list-style-type: none"> - Introduction and structure of the module - Human population - Land-use change - Greenhouse gas emissions - The concept of radiative forcing - Global warming !? - Sea level rise - Global water cycling and future projections - Effects on ecosystems

	<ul style="list-style-type: none"> - Effects on agriculture - Health impacts - Mitigation options - International legislation - Emission trading
Literatur	Literature on global change is numerous and almost immediately outdated when recommendations are written down somewhere. Nevertheless, as basic literature for understanding the current state of the art in science and recommendations to policy makers the latest reports of the IPCC are recommended (download at http://ipcc.ch/). Further literature is provided on the ILIAS e-learning platform
Anmerkungen	Course material is provided via the ILIAS e-learning platform.
Seminar on Global Change (3202-422)	
Person(en) verantwortlich	Prof. Dr. rer. nat. Andreas Fangmeier
Person(en) begleitend	Dr. Jürgen Franzaring, PD Dr. rer. nat. Petra Högy, Dr. Iris Schmid, Dr. Olga-Christina Calvo-Weimar
Lehrform	Seminar
SWS	1
Inhalt	<p>This seminar is thought to complement the lecture "Introduction to Global Change" with some most recent findings from current publications in the scientific literature. The actual content will vary from year to year but may cover issues such as the latest findings on disturbance of the global carbon cycle and its implications for climate, ecological footprints, state of international negotiations, case studies on climate change effects on selected ecosystems, ecosystem services, habitats etc.</p> <p>The students will prepare a powerpoint presentation including a handout on one topic, they will present and discuss it and get feedback not only on the scientific content but also on the didactics of their presentation.</p>
Literatur	ever changing and updated; students are assisted to find relevant literature and other sources; sources will be made available via the ILIAS e-learning platform.
Anmerkungen	Course material is provided via the ILIAS e-learning platform.
Experiments on Global Change (3202-423)	
Person(en) verantwortlich	Prof. Dr. rer. nat. Andreas Fangmeier
Person(en) begleitend	Dr. Jürgen Franzaring, PD Dr. rer. nat. Petra Högy, Dr. Iris Schmid
Lehrform	Praktikum
SWS	1

Inhalt	Experiments on Global Change is covered by a small but nice greenhouse experiment in which one of the most important resources to plant growth - water - is manipulated. At the same time, water shortage is one of the major expected side effects of climate change in many areas and therefore represents a nice example to study climate change effects. The students will analyse the response of C3 and C4 species to water shortage and learn about water cycling, water use efficiency and physiological adaptation of vegetation to resource deficiency. Furthermore, they will do cuvette experiments with increasing atmospheric CO2 concentrations to evaluate primary plant responses to elevated CO2.
Anmerkungen	Information, manuals, and the results of the experiments (students' presentations) are made available via the e-learning platform ILIAS

Modul: Governance, Institutions and Organisational Development (4903-480)

Modulverantwortung	Prof. Dr. Regina Birner
Bezug zu anderen Modulen	Good completion to Rural Communication and Extension
Teilnahmevoraussetzungen	none
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Modulprüfung	written
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Students are able to use concepts of organizational theory, new institutional economics, and administrative sciences to analyze the governance challenges of public, private and community-based institutions and organizations in the agricultural sector. They have a sound knowledge of the strategies that can be used to promote institutional change, improve organizational efficiency and address the governance challenges inherent in agricultural development.
Anmerkungen	(voher: 4301-420)

Governance, Institutions and Organisational Development (4903-481)

Person(en) verantwortlich	Dr. Simone Helmlle, Dr. rer. soc. Maria Gerster-Bentaya, Prof. Dr. Regina Birner
Lehrform	Vorlesung mit Übung
SWS	4

Inhalt	The module will focus on institutions and organizations that are essential for small-holder-based agriculture, such as organizations that provide public goods and services for crop and livestock development, institutions that link smallholder farmers to markets, institutions that enable sustainable natural resource management, and regulatory institutions that address market failures. The module will also address cross-cutting governance issues, such as voice and accountability, and control of corruption in the agricultural sector.
Literatur	Module reader. The module reader will be shortly available at the ASTA!
Anmerkungen	Lecture with short demonstrations and exercises. OHP, video-projector, interactive exercises, short inputs, alternating working forms (individual, partner, group work, plenary sessions), feedback. Handouts, pinboards, flipchart, "metaplan" material. Willingness to participate in the various activities/exercises determine the extent to which knowledge and specifically additional skills can be acquired and deepened. This module is open to external participants.

Modul: Innovations in Agriculture (4903-450)

Modulverantwortung	Prof. Dr. Regina Birner
Bezug zu anderen Modulen	Die Vorlesungsinhalte ermöglichen den Innovationsprozess in der Landwirtschaft zu verstehen.
Teilnahmevoraussetzungen	Grundmodule des BSc.-Grundstudiums insbesondere Grundlagen der Agrartechnik. Deutsche UND englische Sprachkenntnisse sind erforderlich.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Präsentation
Modulprüfung	mündlich (70%), Präsentation (30%)
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden kennen die wichtigsten Beweggründe und Treiber für Innovationen: wachsende Nachfrage nach landwirtschaftlichen Produkten, begrenzte natürliche Ressourcen, Umweltprobleme (Boden, Wasser, Atmosphäre), demographischer Wandel, Landflucht etc. Auf dem Weg von der Idee zur Innovation lernen sie unterschiedliche Innovationstypen kennen, sowie die Besonderheiten von Innovationen in der Landwirtschaft. Beispielhafte Innovationen aus verschiedenen Bereichen der

	Landwirtschaft, wie Precision Farming, Biotechnologie, Automatisierung, und ihre ökonomischen, ökologischen und sozialen Auswirkungen charakterisieren das Spannungsfeld zwischen Idee und nachhaltigem Fortschritt.
Schlüsselkompetenzen	<ul style="list-style-type: none"> • organizational skills • self-reliance • critical and analytical thinking • foreign language skills • written and oral expression • communication and cooperation skills
Innovations in Agriculture (4903-451)	
Person(en) verantwortlich	Prof. Dr. Regina Birner, Prof. Dr. Dr. h.c. mult. Karlheinz Köller
Lehrform	Vorlesung mit Exkursion
SWS	4
Inhalt	Definition von Innovation und Unterscheidung von Innovationstypen, Beweggründe und Ziele von Innovation, Besonderheiten von Innovationen in der Landwirtschaft, was treibt Innovationen an und wie werden sie umgesetzt, untermauert mit vielen anschaulichen Beispielen aus der Landwirtschaft.

Modul: International Food and Agricultural Trade (4902-420)

Modulverantwortung	Dr. Kirsten Boysen-Urban
Bezug zu anderen Modulen	This module is particularly important for students who see their career in national and international organizations dealing with issues of agricultural trade.
Teilnahmevoraussetzungen	Students must have a solid background in microeconomics and some macroeconomics is required as well. Successfully completed courses in both of these subjects at the undergraduate level are essential and assumed. If these requirements are not met, any undergraduate textbook in microeconomics can be consulted as a preparation for this module and / or the participation in the module "Economics and Environmental Policy" (4201-440) is recommended.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Presentation in groups (25%)
Prüfungsleistung	Written exam (75 %)
Prüfungsdauer	90 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload

<p>Fachkompetenzen / Lern- und Qualifikationsziele</p>	<p>After successfully completing this module students should be able to perform the following:</p> <p>Students...</p> <ul style="list-style-type: none"> · explain, differentiate between and qualify the key concepts of the theory of international economics with focus on international trade theory. · apply core models of international trade to determine the patterns of trade, interpret the effects, generalize the results and thus understand standard theorems using graphical representations and/ or equation systems. · discuss and reason why countries engage in international trade of goods and services and comment on actual trade pattern. · describe and classify the effects of trade policy instruments and apply methods to assess and evaluate their effects. · exemplify linkages of international trade with macroeconomic theory using key concepts of international economics · characterize the development of international trade negotiations and explain their contribution to the development of world trade. · discuss and evaluate topics currently on the trade agenda.
<p>Schlüsselkompetenzen</p>	<p>During the module, students learn to work self-reliantly through preparation for and recapitulation of the lectures as well as for the exam and participating in the group work. They regularly solve and submit homework exercises, write group work assignments and/or prepare presentations within given time periods thereby improving their time management skills. Within the group work, students develop a common work approach, distribute individual tasks, as well as discuss and present the results of their group work improving their ability to work in teams. Students read and understand scientific articles and use online databases. In so doing, they improve in identifying and extracting relevant information. Regularly students understand, analyze and interpret models' results thereby training their analytical thinking skills. Based on analysis results, they practice deriving economically reasoned conclusions. Through presentations of results students practice preparing clear figures and tables that support their argumentation and precisely communicate crucial information. This way they improve their presentation skills.</p>
<p>International Food and Agricultural Trade (4902-421)</p>	
<p>Person(en) verantwortlich</p>	<p>Dr. Kirsten Boysen-Urban</p>
<p>Lehrform</p>	<p>Vorlesung mit Übung</p>
<p>SWS</p>	<p>4</p>
<p>Inhalt</p>	<p>Aim of this module is to introduce students into economic theory of international trade. Students will become acquainted with the theoretical concepts and understand why countries trade with each other. They will be able to use this framework for analyzing patterns of trade and addressing policy-oriented questions in the agricultural and food sectors. After successfully attending this module, students are expected to be able to comprehend details of current trade negotiations, including new topics on the trade agenda, and to be</p>

	<p>familiar with the analytical tools to assess the wider implications of international trade and trade policy reforms for different groups of countries and population segments.</p> <p>Course outline:</p> <p>Introduction: World Trade - an Overview</p> <p>Labor Productivity and Comparative Advantage: The Ricardian Model</p> <p>Specific Factors and Income Distribution</p> <p>Resources and Trade: The Heckscher –Ohlin Model</p> <p>The Standard Trade Model</p> <p>Economies of Scale and Imperfect Competition</p> <p>Firms in the global economy</p> <p>The Instruments of Trade Policy</p> <p>The Political Economy of Trade Policy</p> <p>Trade negotiations</p> <p>Regional Trade Agreements</p> <p>Trade Policy in Developing Countries</p> <p>National Income Accounting and the Balance of Payments</p> <p>Exchange Rates and the Foreign Exchange Market: An Asset Approach</p> <p>Money, Interest Rates, and Exchange Rates</p> <p>Group work/ case study</p> <p>Exercises</p>
Literatur	<p>International Economics:</p> <p>Krugman, P., Obstfeld, M. and M.J. Melitz (2014), International Economics. Theory and Policy. 10th Edition Pearson Publisher. (or back editions)</p> <p>Feenstra, R.C. and Taylor, A.M. (2011). International Economics. Worth Palgrave Macmillian. International Edition. Second Edition. New York.</p> <p>Mathematical Economics:</p> <p>Chiang, A.C. and Wainwright, K. (2005), Fundamental Methods of Mathematical Economics, 4th Edition, McGraw-Hill, New York.</p> <p>Microeconomics:</p> <p>Snyder, C. and Nicholson, W. (2007), Microeconomic Theory, Basic Principles and Extension. 7th Edition, Cengage Learning.</p>

	<p>GTAP: Brockmeier, M. (2001), A Graphical Exposition of the GTAP Model. GTAP Technical Paper No. 08. available at https://www.gtap.agecon.purdue.edu/resources/tech_papers.asp</p>
Anmerkungen	<p>Lecture with exercises;</p> <p>Group work (case study, database use, trade policies, specific tasks, preparation of handouts/ presentations, oral presentation of results by students and plenary discussion).</p> <p>Willingness to participate in group work and exercises determine the extent to which students can acquire and deepen knowledge and other skills.</p> <p>Power Point slides and additional course material will be uploaded during the course to ILIAS;</p>

Modul: Knowledge and Innovation Management (4301-410)

Modulverantwortung	Jun.-Prof. Dr. Andrea Knierim
Bezug zu anderen Modulen	Good completion to the modules "Rural Communication and Extension" or "Beratungslehre"
Teilnahmevoraussetzungen	none
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	30 % of the final score can be earned with a presentation
Prüfungsleistung	Written exam (100 % or 70 % respectively)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After completing this module, students are able to explain the process of knowledge creation, and the role of innovations in knowledge systems; they can explain the key terms (e.g. implicit, explicit knowledge, knowledge cycle, as well as innovation and

	different types and categories of innovations). Students deepen their understanding about the instruments and tools for knowledge and innovation management. They can distinguish between adoption and diffusion of innovation and can explain the underlying concepts (perception, behavior and behavior change, diffusion and adoption), and they are able to apply the concepts on concrete cases. Finally, students know the different types of intellectual property rights and understand its utility in the context of knowledge and innovation management.
Schlüsselkompetenzen	During lectures, students are able to critically view the role of science in knowledge creation, see different types of knowledge and innovations in a broader context. During preparation for the exam, while preparing and following up on lectures and during the seminar, students practice self-reliance, time management, interpersonal communication and cooperation. By preparing the presentation, students enhance their capability of exploring a scientific issue and (as in the group discussions) further practice their oral communication skills.
Anmerkungen	Students contributing the voluntary presentation (see above) get a shorter written exam (less questions and 60 minutes instead of 120).

Knowledge and Innovation Management (4301-411)

Person(en) verantwortlich	Dr. rer. soc. Maria Gerster-Bentaya, Jun.-Prof. Dr. Andrea Knierim
Lehrform	Vorlesung mit Seminar
SWS	4
Inhalt	types of knowledge (explicit, implicit, tacit) and generation of knowledge; role of science and farmers in knowledge production; knowledge cycle; types / classification of innovations, theories related to adoption and diffusion of innovation, (agricultural) knowledge and information / innovation systems, information systems vs knowledge systems and data banks, "pyramid of knowledge" and expertise; protection of knowledge / intellectual property rights, (political) frame conditions for knowledge / innovation production, diffusion and adoption.
Literatur	Module reader available at the ASTA or at the ILIAS platform.
Anmerkungen	Lecture with exercises, homework assignments, open to external participants.

Modul: Land Use Economics (4904-430)

Modulverantwortung	Prof. Dr. Thomas Berger
Bezug zu anderen Modulen	Dieses Modul vertieft Kenntnisse im Bereich Modellierung von Landnutzung und speziellen Multi-Agentensystemen
Teilnahmevoraussetzungen	Grundkenntnisse der Mathematischen Programmierung (Lehrbuch: Ragsdale, C.T., 2004. Spreadsheet Modeling & Decision Analysis, Kap. 1-4)

Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1. Semesterhälfte
Verbindlichkeit	Wahl
Modulprüfung	schriftlich
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden kennen die relevanten Größen und Prozesse der Landnutzungsökonomik und sind mit deren Abbildung durch räumlich explizite Modellansätze vertraut. Sie sind fähig, je nach Fragestellung geeignete Modellansätze zu spezifizieren, um angewandte Probleme der Landnutzung eigenständig zu bearbeiten. Sie kennen die Prinzipien der agentenbasierten Modellbildung und besitzen das grundlegende Verständnis komplexer Systeme, das benötigt wird, um Landnutzungsentscheidungen und damit zusammenhängende biophysikalische und sozioökonomische Prozesse zu modellieren. Des Weiteren verfügen sie über die Kompetenz, Modellergebnisse kritisch zu hinterfragen und Lösungsansätze für landnutzungsbezogene Fragen zu diskutieren.
Schlüsselkompetenzen	Analytical thinking, oral presentation, scientific reading, data handling, processing and analysis
Anmerkungen	Laptop wird für Computer-Übungen benötigt
Land Use Economics - Lecture (4904-431)	
Person(en) verantwortlich	Prof. Dr. Thomas Berger
Lehrform	Vorlesung
SWS	2
Inhalt	Land-use economics: basic concepts and research questions Land-use modeling: model classes and cases of application Irrigation as a special land-use problem Land-use modeling at watershed level (case study) Land-use modeling with CA and MAS
Land Use Economics - Case Study (4904-432)	
Person(en) verantwortlich	Prof. Dr. Thomas Berger
Lehrform	Praktikum
SWS	2
Inhalt	Cases of application for land-use modeling

Modul: Life-Cycle Sustainability Assessment (LCSA) of Biobased Value Chains (3403-490)

Modulverantwortung	Prof. Dr. agr. Iris Lewandowski
Bezug zu anderen Modulen	keine
Teilnahmevoraussetzungen	keine
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	schriftliche Ausarbeitung in Gruppen mit Präsentation
Prüfungsleistung	schriftliche Ausarbeitung Bericht (50%) und Präsentation der Ergebnisse (50%) (Beide Teilleistungen sind separat zu bestehen und innerhalb eines Semesters zu erbringen.)
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden wenden die Methoden der ökologischen (= Ökobilanz), ökonomischen und sozialen Lebenszyklusanalyse auf biobasierte Wertschöpfungsketten an. Die Ketten stammen aus den Bereichen Biomaterialien und -chemikalien, Bioenergie und Lebensmittel. Die Studierenden können diese hinsichtlich ihrer Stoffströme, Energieaufwendungen bzw.-erträge und der Umweltwirkung sowie der Lebenszykluskosten und sozialer Indikatoren beschreiben und analysieren. Die Ergebnisse dieser Analysen nutzen sie, um Handlungsempfehlungen für eine nachhaltige Optimierungen zu entwickeln.
Schlüsselkompetenzen	Durch die Übungen und die Erstellung von Berichten in Gruppen bauen die Studierenden ihre Teamfähigkeiten und ihre Kommunikationsfähigkeiten aus. Organisationsfähigkeit und selbstständiges Arbeiten werden durch die eigenständige Erstellung einer Life-Cycle Sustainability Analyse in Gruppenarbeit erlernt und trainiert. Bei der Erstellung des Berichts und der Diskussion der Ergebnisse lernen und üben die Studierenden kritisches, analytisches Denken durch die Betrachtung unterschiedlicher Dimensionen der Nachhaltigkeitsanalyse. Schriftliche Ausdrucksfähigkeit erlernen und trainieren die Studierenden durch das Schreiben des Berichts sowie die mündliche Ausdrucksfähigkeit durch die Präsentation der Arbeitsergebnisse.
Anmerkungen	Maximale Teilnehmeranzahl: 40 Die Inhalte der einzelnen Vorlesungen werden in ILIAS unter dem Fachgebiet „Nachwachsende Rohstoffe und Bioenergiepflanzen (340b)“ und der Modulnummer zur Verfügung gestellt. Erteilung der Zugangsberechtigung erfolgt auf Anfrage.

Life-Cycle Sustainability Assessment of Biobased Value Chains (3403-491)	
Person(en) verantwortlich	Prof. Dr. agr. Iris Lewandowski
Lehrform	Vorlesung mit Übung
SWS	4
Inhalt	*

Modul: Livestock Production Systems and Development (4908-440)

Modulverantwortung	Mizeck Chagunda
Bezug zu anderen Modulen	Compulsory for the master course Agricultural Sciences in the Tropics and Subtropics. Provides basic understanding of livestock production in tropical countries through a system-approach. Introductory for further modules of section 480a.
Teilnahmevoraussetzungen	Pflichtmodul für den Masterstudiengang "Agricultural Sciences in the Tropics and Subtropics". Einführungsmodul für weitere Module des Fg. 480a.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Presentation in groups (10 %) with discussion (5 %) and handout (5%)
Prüfungsleistung	written exam (80%)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Studierende werden mit der Tierproduktion in Entwicklungsländern in den Tropen und Subtropen vertraut gemacht, verstehen die Unterschiede zwischen intensiven und extensiven Produktionssystemen und erwerben Wissen über Optionen der Tierproduktionsentwicklung. Eine Einführung über Grunddisziplinen der Tierwissenschaften wird gegeben, um den technischen Hintergrund der Studierenden über Tierhaltung, Fütterung, Gesundheit und Zucht zu erweitern. Technische und systembezogene Faktoren werden berücksichtigt, wenn Entwicklungsoptionen für ausgewählte Fälle im Rahmen von Seminaren der Studierenden abgeleitet werden. Dies ermöglicht den Studierenden, Potentiale und Beschränkungen von anwendbaren Techniken zu beurteilen. Dadurch werden methodische und Präsentationsfertigkeiten der Studierenden verbessert.

Schlüsselkompetenzen	Die Struktur des Moduls fördert die Fähigkeit der Studierenden, selbständig zu arbeiten. Gleichzeitig wird die Fähigkeit der Studierenden, im Team zu arbeiten sowie ihre Kommunikations- und Kooperationsfähigkeit durch die Gruppenseminare gefördert. Kritisches und analytisches Denken wird durch interaktive Elemente in den Lehrveranstaltungen aktiv gefördert und in der Abschlussprüfung gefordert.
Anmerkungen	The module is also accessible for third year BSc students.
Genetic Resources and Animal Husbandry Systems in the Tropics and Subtropics (4908-411)	
Person(en) verantwortlich	Mizeck Chagunda
Person(en) begleitend	Dr. Christoph Reiber, Katja Schiller
Lehrform	Vorlesung mit Seminar und Exkursion
SWS	4
Inhalt	Die Studierenden erwerben Wissen über Produktionsaspekte verschiedener Tierarten und Tierhaltungssysteme. Sie lernen Charakteristika tropischer Tierhaltungssysteme und mögliche Interventionspunkte kennen und erwerben Grundkenntnisse, um vorhandene genetische Ressourcen und Züchtungsmethoden profitabel und nachhaltig zu nutzen. Das erworbene Wissen dient als Basis für Vertiefungsmodule und/oder eine Masterarbeit in den Bereichen Tierhaltung und Tierzucht sowie in den Tierwissenschaften in den Tropen und Subtropen.
Literatur	Pagot, J. (1992): Animal Production in the Tropics. Macmillan Education, London. Payne, W.J.A. and R.T. Wilson (1999): An Introduction to Animal Husbandry in the Tropics. Longman, New York. The learning material which will be handed out at the beginning of the module includes several compulsory articles.
Anmerkungen	Vorlesungen, Seminare zu speziellen Themen (vorbereitet und präsentiert von den Studierenden). Ergänzt wird die Vorlesung durch ausgewählte Literaturquellen, die im Selbststudium gelesen werden sollen und in der Vorlesung besprochen und diskutiert werden. In der Exkursion werden die Vorfahren unserer Nutztiere sowie unkonventionelle Haltungssysteme aufgezeigt. Während des Moduls stehen die Studierenden in enger Interaktion mit dem Fachgebiet. Dieses Modul ist auch für Studierende des Bachelorstudienganges im 3. Jahr geeignet.
Livestock Production Systems and Development (4908-441)	
Person(en) verantwortlich	Dr. Christoph Reiber, Mizeck Chagunda
Person(en) begleitend	Katja Schiller

Lehrform	Vorlesung mit Seminar und Exkursion
SWS	4
Inhalt	At first a framework for the understanding of livestock production is provided, beginning with the analysis of the state of livestock production in tropical and subtropical countries and classification of livestock production systems. Reproductive and productive characteristics of livestock species and socio-cultural and socio-economic roles and functions of livestock in different production systems are presented. In the second part a multi-disciplinary approach addresses different fields of animal science, including an introduction to husbandry, feeding (forage husbandry and conservation), animal health, and breeding (breeds and performances, breeding methods, organization of breeding programs). A field exercise provides insight in the organization of a cattle breeding program and illustrates dairy production at different intensity levels. Students are encouraged to deepen their knowledge by background reading and exercises, partly accessible via ILIAS. Options and perspectives for practical application of technologies in different production systems (pastoral, urban/peri-urban, smallholder crop-livestock) are discussed and relate to students' seminar contributions that are prepared using selected scientific literature under guidance of the institute's staff.
Literatur	Blakely, J. and D.H. Bade (1990): The Science of Animal Husbandry. 5th ed. Prentice Hall, Englewood Cliffs, New Jersey. Pagot, J. (1992): Animal Production in the Tropics. Macmillan, London. Payne, W.J.A. and R.T. Wilson (1999): An Introduction to Animal Husbandry in the Tropics. Blackwell Science, New York. Spedding, C.R.W. (1996): Agriculture and the Citizen. Chapman & Hall, London. Villavicencio, L.M. (2009): Urban agriculture as a livelihood strategy in Lima, Peru. In: Redwood, M. (Ed.) Agriculture in urban planning: generating livelihoods and food security. Earthscan and the International Development Research Centre (IDRC), UK.
Anmerkungen	This module is also suitable for third year BSc students.

Global Animal Genetic Biodiversity (4908-471)

Person(en) verantwortlich	Mizeck Chagunda
Person(en) begleitend	Dr. Christoph Reiber, Katja Schiller
Lehrform	Vorlesung mit Seminar und Exkursion
SWS	4
Inhalt	Die Studierenden erwerben Wissen über Produktionsaspekte verschiedener Tierarten und Tierhaltungssysteme. Sie lernen Charakteristika tropischer Tierhaltungssysteme und mögliche Interventionspunkte kennen und erwerben Grundkenntnisse, um vorhandene genetische Ressourcen und Züchtungsmethoden profitabel und nachhaltig zu nutzen. Das erworbene Wissen dient als Basis für Vertiefungsmodule und/oder eine Masterarbeit in den

	Bereichen Tierhaltung und Tierzucht sowie in den Tierwissenschaften in den Tropen und Subtropen.
Literatur	Pagot, J. (1992): Animal Production in the Tropics. Macmillan Education, London. Payne, W.J.A. and R.T. Wilson (1999): An Introduction to Animal Husbandry in the Tropics. Longman, New York. The learning material which will be handed out at the beginning of the module includes several compulsory articles.
Anmerkungen	Vorlesungen, Seminare zu speziellen Themen (vorbereitet und präsentiert von den Studierenden). Ergänzt wird die Vorlesung durch ausgewählte Literaturquellen, die im Selbststudium gelesen werden sollen und in der Vorlesung besprochen und diskutiert werden. In der Exkursion werden die Vorfahren unserer Nutztiere sowie unkonventionelle Haltungssysteme aufgezeigt. Während des Moduls stehen die Studierenden in enger Interaktion mit dem Fachgebiet. Dieses Modul ist auch für Studierende des Bachelorstudienganges im 3. Jahr geeignet.

Modul: Methods in Interdisciplinary Collaboration (4903-460)

Modulverantwortung	Prof. Dr. Regina Birner
Teilnahmevoraussetzungen	-
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Modulprüfung	Written seminar paper based on interdisciplinary group work (60%); assignments and presentations during the module (40%)
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Professionals in the field of agricultural development have to be able to collaborate with colleagues trained in different disciplines, including both natural and social sciences. The goal of this module is to provide the participants with knowledge and skills that will increase their effectiveness and professional success in such an interdisciplinary environment. The module will provide the knowledge and expertise needed to <ul style="list-style-type: none"> - interact with professionals trained in different disciplines, - work in an intercultural environment,

	<ul style="list-style-type: none"> - plan and manage interdisciplinary research and development projects, - attract funding for interdisciplinary work, - manage staff, even in challenging institutional environments, -interact with political decision-makers and stakeholders, - negotiate in organizational and business settings, and - communicate to a wide range of audiences.
Methods in Interdisciplinary Collaboration (4903-461)	
Person(en) verantwortlich	Prof. Dr. Regina Birner
Lehrform	Vorlesung mit Übung
SWS	4
Inhalt	Students have to present two papers (each counting 25%) based on interdisciplinary group work. One paper focuses on the design of an interdisciplinary research project, and one on the design of an interdisciplinary development project.

Modul: Natural Resource Use and Conservation in the Tropics and Subtropics (4907-410)

Modulverantwortung	Prof. Dr. Folkard Asch
Bezug zu anderen Modulen	This module is directly linked to all other compulsory modules in AgriTropics.
Teilnahmevoraussetzungen	.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Written exam (100 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h presence + 120 h preparation at home + exam = 1178 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	Students acquire basic knowledge on resource use, requirements, and conservation as linked to tropical agricultural production. They learn to define and evaluate the different abiotic and biotic resources and their relevance for sustainable agricultural production systems. They are able to recognize and define disciplinary and systemic interactions of resource use and conservation and can apply this knowledge in concepts of sustainable agricultural production.

Natural Resource Use and Conservation in the Tropics and Subtropics (4907-411)	
Person(en) verantwortlich	Prof. Dr. Folkard Asch, apl. Prof. Dr. Bettina Hausmann, Prof. Dr. Uta Dickhöfer
Person(en) begleitend	Dr. agr. Thomas H. Hilger, Dr. sc. agr. Willmar L. Leiser, PD Dr. Ludger Herrmann
Lehrform	Vorlesung
SWS	4
Inhalt	<p>1.) Introduction - module requirements - module links within the compulsory moduls - Ilias - exam mode and requirements - expectations</p> <p>2.) Systems thinking - multidisciplinary approaches - Resources - functions - links between resources - concepts of use and conservation</p> <p>3.) Weather - Climate - global circulation - wind systems - ocean currents - global energy distribution - precipitation patterns - agro-ecological zoning - agri-ecological zones -examples</p> <p>4.) Precipitation patterns - agro-ecological zoning - agri-ecological zones -definitions- Length of growing period - Köppen-Geiger-vegetation zones -examples</p> <p>5.) Global water cycle - precipitation - evaporation - transpiration - run-off - surface pools - kondensation - movement - immobilisation - water table recharge - drainage - percolation</p> <p>6.) Water as a resource - global water issues- virtual water - Green - Blue -Grey - Water Concepts - rain water harvesting - field water management - water and soil -soil degradation and withering - tropical soils = problem soils</p> <p>7.) General definitions, soil functions and global soil degradation</p> <p>8.) Soil description and systematics</p> <p>9.) Soil diversity at variable scales</p> <p>10.) Problem soils and their management</p> <p>11.) Exercise: Calculation of site characteristics</p> <p>12.) Soil management in Sahelian subsistence farming systems</p> <p>13.) Major land usetypes of the tropics and subtropics and ecosystems services</p>

	<p>14.) Crop production systems, crop management and resource use in the tropics and subtopics: Potentials and constraints</p> <p>15.) Land use change, LUC assessment: tools and approaches</p> <p>16.) Matter flows in landscapes, interconnectivity of landscapes</p> <p>17.) Land degradation: types, extent, human impact, consequences and mitigation options at landscape level</p> <p>18.) Global diversity of vascular plants, Role of the tropics and subtopics: origin of most food crops, Agricultural threats to biodiversity</p> <p>19.) Natural resource use in tropical livestock systems: - System classifications - Resource use by livestock - efficiency of nutrient and water conversion - examples</p> <p>20.) Tropical feed resources: - Feed evaluation systems - Nutritional value of tropical feed resources</p> <p>21.) Tropical feed resources: - Nutritional value of tropical feed resources (cont.) - Feed management and conservation - examples of livestock feeding in different production systems</p> <p>22.) Grassland-based livestock production: - Grassland ecotypes - Spatio-temporal availability in resource availability - Pastoral livestock systems</p> <p>23.) Grassland-based livestock production: - Grassland degradation processes -</p> <p>24.) Grassland-based livestock production: Rangeland concepts - Management strategies</p> <p>25.) Plant Genetic Resources (PGR), Roles and functions of crop and varietal diversity in the production system (including linkage with nutrition), PGR conservation (ex situ, in situ - farmer management of diversity), Use of PGR : legal framework (CBD, ITPGRFA, SMTA, benefit sharing)</p> <p>26.) Use of PGR and crop improvement targeting sustainable production systems and sustainable use of natural resources (P, N efficiency)</p> <p>27.) Use of PGR and crop improvement to cope with climate variability and change</p> <p>28.) Use and breeding of minor crops</p>
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Modul: Organic Farming in the Tropics and Subtropics (3405-410)

Modulverantwortung	Dr. agr. Sabine Zikeli
Bezug zu anderen Modulen	Having studied this module in combination with several other modules for organic farming the student will have a good basis for a profession in international marketing and consulting for organic farming, in certification or extension services for organic agriculture.
Teilnahmevoraussetzungen	This module requires basic knowledge in plant and animal production on the level of a Bachelor-degree in agriculture.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Written exam (100 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After completing this module, students understand the basic principles of Organic Farming and they are familiar with the specific challenges of its application in tropical and subtropical countries. The students comprehend the role of certification in organic farming and the specific systems that are implemented for smallholders in developing countries. In addition, the students are proficient in interdisciplinary and transdisciplinary approaches of organic farming systems, the interactions between animal husbandry and crop production, in particular for smallholder farms.
Schlüsselkompetenzen	During preparation for the exam and while preparing and following up on lectures, students practice time management and self-reliance. They learn and practice critical and analytical thinking, while writing essays and seminar papers enhances their scientific articulateness. Through the compilation and interpretation of information from stakeholder interviews during the excursions, students practice and improve their capability of exploring settings from agricultural practice and food processing and their link to science.
Organic Farming in the Tropics and Subtropics (3405-411)	
Person(en) verantwortlich	Prof. Dr. Joachim Sauerborn, Dr. agr. Sabine Zikeli, apl. Prof. Dr. Sabine Gruber, Prof. Dr. Dr. Claus P. W. Zebitz, Prof. Dr. Anne Valle Zárate, Prof. Dr. Uta Dickhöfer

Person(en) begleitend	Dr. Christoph Reiber, Dr. rer. nat. Natascha Selje-Aßmann
Lehrform	Vorlesung mit Seminar und Exkursion
SWS	4
Inhalt	<p>Introduction to organic farming world wide, organic farming as a farming system, organic plant production systems in the tropics and subtropics, plant protection and livestock husbandry in organic farming in the tropics and subtropics, certification in developing countries (lecture given by Dr. Neuendorff, CEO of the Gesellschaft für Ressourcenschutz, a certification body that is active world wide), long-term trials in the tropics and subtropics; organic farming and food security (workshop);</p> <p>In addition to the lecture, excursions to organic farms and processors are offered.</p> <p>Student tasks in the module: Seminars and excursion reports as group work of two or more students.</p>
Literatur	Selected journal contributions will be distributed during the lecture. Further study materials are available in ILIAS.
Anmerkungen	If you want to participate in the module, please log yourself in on the ILIAS-E-Learning-Platform!

Modul: Organic Food Systems and Concepts (3405-470)

Modulverantwortung	Dr. agr. Sabine Zikeli
Bezug zu anderen Modulen	The module gives an introduction into Organic Farming. It serves as a basis for a part of the modules in the M.Sc. Programme Organic Agriculture and Food Systems. The excursions give a real-life impression of several steps of the organic food chain.
Teilnahmevoraussetzungen	This module requires a basic understanding of agricultural production and environmental sciences.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Written exam (100 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload

Fachkompetenzen / Lern- und Qualifikationsziele	After completing this module, students understand the background, the principles and the history of Organic Farming and are therefore able to assess the current situation and future changes in the sector. Moreover, students comprehend the relationship between Organic Farming and society as well as between Organic Farming and the environment.
Schlüsselkompetenzen	During preparation for the exam and while preparing and following up on lectures, students practice time management and self-reliance. They learn and practice both critical and analytical thinking and reading of scientific literature, while writing essays enhances their scientific articulateness. Through the compilation and interpretation of information from stakeholder interviews during the excursions, students practice and improve their capability to explore settings from agricultural practice and food processing and their link to science.
Organic Food Systems and Concepts (3405-471)	
Person(en) verantwortlich	Prof. Dr. Torsten Müller, Dr. agr. Sabine Zikeli, Prof. Dr. sc. agr. Reiner Doluschitz, Dr. sc. agr. Christa Hoffmann
Lehrform	Vorlesung mit Seminar und Exkursion
SWS	4
Inhalt	<p>The module consists of four parts to introduce students to organic farming and to give them basic ideas on supply chain management. The module creates a common basis for all students on which the following modules in the M.Sc. programme "Organic Agriculture and Food Systems" will build up.</p> <p>Part 1: Introduction to organic farming including</p> <ul style="list-style-type: none"> - basic principles - history of organic farming <p>Part 2: Supply chain management including</p> <ul style="list-style-type: none"> - introduction to supply chain management - introduction to organic food chains <p>Excursions will illustrate how organic food chains are structured</p> <p>Part 3: Certification</p> <p>As certification is a major issue in organic farming, it is important to know how to deal with regulations and guidelines. Therefore, students learn how to handle the legal framework of organic farming (e.g. EU regulation 2092 on organic farming) by lectures and exercises provided from lecturer from a certification body</p> <p>Part 4: Organic farming and resource protection. As resource protection is a basic aim of organic farming, the lecture provides a thorough insight in the benefits and the areas of conflict of organic farming and resource protection.</p> <p>L(80%), E(20%)</p>

	<p>Lectures, excursions to organic farms, traders, processors</p> <p>Students have to prepare excursion reports (group work) and a wiki on the organic agricultural production and the organic processing of a specific product of their choice (group work).</p>
Literatur	<p>Conford, Philip (2001): The Origins of the Organic Movement. Floris Books, Glasgow, p. 287</p> <p>El-Hage Scialabala, Nadia and Caroline Hattam (2002): Organic agriculture, environment and food security. Environment and Natural Resources Service Sustainable Development Department, FAO, Rome, p. 252</p> <p>Lampkin, Nicolas (1999): Organic farming. Farming Press</p> <p>Stolze, Matthias, et al. (2000): The environmental impacts of organic farming in Europe. Organic Farming in Europe: Economics and Policy. Volume 6. Stuttgart-Hohenheim, p. 125</p> <p>Up-to-date web pages (e.g. IFOAM, FAO, EU) and journal articles will be given during the module</p>
Anmerkungen	<p>If you want to participate in the module, it is essential that you have access to the E-learning platform ILIAS.</p> <p>Please be aware that the module comprises group work, student seminars, the wiki, excursion reports and other study assignments as well as the participation in the excursions!</p>

Modul: Organic Livestock Farming and Products (4908-450)

Modulverantwortung	Mizeck Chagunda
Bezug zu anderen Modulen	Having studied this module in combination with several other modules for organic farming the student will have a good basis for a profession in international marketing and consulting for organic farming, in certification or extension services with a focus on organic livestock farming and products.
Teilnahmevoraussetzungen	Basic knowledge in livestock breeding and husbandry and organic agriculture on BSc level
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Presentation in groups (10 %) with discussion (5 %) and handout (5%), compulsory attendance at the excursion

Prüfungsleistung	Written exam (80 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After completing this module, students understand ethical concepts (man-animal relationship in different cultural contexts) and the role of livestock as a system component in organic farming. They are proficient in international regulations of organic livestock farming and the principles of husbandry, breeding, nutrition and health in organic livestock farming for different species. Students are able to apply these principles in solving problems drawn from concrete examples in temperate, tropical and subtropical countries.
Schlüsselkompetenzen	During active participation in lectures, preparation for the exam, while preparing and following up on lectures and while preparing the group seminar, students practice self-reliance, time management and team work. They learn and practice both critical and analytical thinking and reading of scientific literature in the seminar and through interactive elements in the lectures, while generally improving their ability to explore a scientific issue. Through the seminar presentation, students improve their oral articulateness and their ability to discuss scientific matters.
Organic Livestock Farming and Products (4908-451)	
Person(en) verantwortlich	Dr. Christoph Reiber, Mizeck Chagunda
Person(en) begleitend	Katja Schiller
Lehrform	Vorlesung mit Seminar und Exkursion
SWS	4
Inhalt	<ol style="list-style-type: none"> 1. Ethical concepts of animal-man relationship from different cultural perspectives 2. Animal welfare concepts and implications for organic livestock farming 3. Livestock as a system component in organic farming: contributions and constraints in different farming systems 4. International regulations for organic livestock farming 5. Principles of husbandry, breeding, nutrition and health management in organic livestock farming for different livestock species 6. Quality of organic livestock products: measurable and non-measurable traits, specific risks, quality control systems, matching specific consumer attitudes towards products from organic livestock farming 7. Examples for regional production, processing and marketing from organic livestock farming in subtropical and tropical countries. 8. Examples for international trade of products from organic livestock farming in subtropical and tropical countries: <ul style="list-style-type: none"> - Organic milk production and processing - Integration of organic livestock farming with landscape management

	<p>- Quality assurance systems for commodities from organic livestock farming from developing countries for international markets (meat, eggs, cheese)</p> <p>- Constraints for organic livestock farming: failure analysis of projects, competency and compatibility with other brands (denomination of origin, animal welfare, kosher)</p> <p>Scheduled lectures with incorporation of internationally renowned guest lecturers transmit basic knowledge. Interaction with the lecturers from the institute is encouraged during the whole module period.</p> <p>Seminars on specific case studies reinforce the learning process through a combination of preparatory reading of the script and selected literature, active presentation of acquired knowledge and enhanced discussions.</p> <p>Excursions demonstrate various organic farming systems and may include organic farms with milk and meat processing, farmers' organisation promoting local breeds with slaughter house and selling point, organic egg production, integrated and social farms with own selling points.</p>
Literatur	<p>Hülsebusch C. (2007) Organic agriculture in the tropics and subtropics: current status and perspectives. Journal of agriculture and rural development in the tropics and subtropics, Beiheft 89. Kassel Univ. Pr., Kassel.</p> <p>Gold, M. V. (2004) Organic livestock production: a bibliography. Special reference briefs; NAL call no. as21.D27 S64 no. 2004-05. Full text: http://www.nal.usda.gov/afsic/AFSIC_pubs/srb0405.htm.</p> <p>IFOAM (2006): The IFOAM norms for organic production and processing ? Version 2005, Bonn, Germany.</p> <p>Köpke U. (2008) Organic Agriculture in the Tropics and Subtropics. Köster Verlag, Berlin. 176 p.</p> <p>Rahman, G. (2002): The standards, regulations and legislation required for organic ruminant keeping in the European Union. EAAP publication No. 106, 15-26.</p> <p>Willer H. and Kilcher L. (2011) The World of Organic Agriculture. Statistics and Emerging Trends 2011. FiBL-IFOAM Report. IFOAM, Bonn and FiBL, Frick.</p>

Modul: Organic Plant Production (3401-460)

Modulverantwortung	Dr. agr. Sabine Zikeli
Bezug zu anderen Modulen	The module imparts fundamental knowledge of organic plant production, and is particularly linked to modules M9103, M9104 and M9108.
Teilnahmevoraussetzungen	Degree in agricultural studies or in a related field.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS

Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	written exam
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After successfully completing the module, students are able to define, understand and assess processes that drive or control crop growth and development on the level of plant communities in a field, in interaction with the environment. Students are able to specify important crops with focus on organic farming, and how they are produced organically. Students are able to optimize organic crop production based on selected examples, considering biotic and abiotic impacts and agricultural practices in order to achieve and maintain a sustainable and environmentally friendly crop production on a global scale.
Schlüsselkompetenzen	Students practice self-reliance, structuring of knowledge and information, time management and team work while following up on lectures, during exercises and during the preparation for the exam. They learn and practice both critical and analytical thinking while generally improving their ability of abstract and joint-up thinking. Through the seminar presentation, students can improve their oral communication skills, presentation techniques and discourse capacities.
Organic Plant Production (3401-461)	
Person(en) verantwortlich	apl. Prof. Dr. Sabine Gruber, Prof. Dr. Wilhelm Claupein
Lehrform	Vorlesung mit Seminar, Praktikum und Exkursion
SWS	4
Inhalt	<p>Functions of the soil in Organic Plant Production</p> <ul style="list-style-type: none"> - Physical soil properties: texture, structure, temperature - Water supply - Biological soil properties: earthworms, micro-organisms, humus - Soil-plant interactions: soil fertility, rooting, tillage, effects of soil properties on seeding, irrigation, erosion and timing of tillage <p>Organic cropping systems</p> <ul style="list-style-type: none"> - Crop rotations, rotation design, relevance of animal husbandry, clover-grass, cover crops, catch crops, green manure, cash crops, forage crops - Comparison of organic vs. conventional crop rotations - Intercropping in various climates: types, sustainability - Effects of cropping systems on weeds, pests, diseases, nutrients <p>Soil tillage</p> <ul style="list-style-type: none"> - Intensity of tillage systems: reduced tillage, ploughing vs. non-inversion, mulch - Effects of tillage on soil properties

	<ul style="list-style-type: none"> - Effects of tillage on weeds, pests and diseases - Typical tillage systems and implements for organic farming <p>Plant nutrition</p> <ul style="list-style-type: none"> - Nutrient cycling and nutrient budgets - Organic fertilization: legumes, manure, compost, plant residues, humus - Nutrient supply: mineralization, micro-organisms, mycorrhiza, earthworms, <p>N-fixation, subsequent delivery of nutrients</p> <ul style="list-style-type: none"> - Nitrate and groundwater <p>Organic plant protection</p> <ul style="list-style-type: none"> - Weed management: ecology of weeds, direct and indirect control strategies, <p>soil seed bank</p> <ul style="list-style-type: none"> - Control of pests and diseases: preparations, cropping system - Specific problems in organic plant protection - Organic plant breeding: ideotyping, local varieties, resistance <p>Practice in the field and excursion</p> <ul style="list-style-type: none"> - Crops: development stages, yield assessment - Weed, pest and disease diagnosis in the field - Visual soil assessment by spade diagnosis - Biological activity <p>Selected current topics and problems, e.g.</p> <ul style="list-style-type: none"> - Stockless organic farming - Conservation tillage - Organic farming and co-existence with GMO's - Organic oil crops <p>Lecture: beamer and slide presentation, blackboard; hand-outs Seminar: self-study and preparation of short talks by the students based e.g. on publications; supported by lecturer Practices: supervised practical work in small groups of students Excursion: demonstrations in the field .</p>
Literatur	Lampkin, N. (1999): Organic Farming. Farming Press.

Modul: Physiology and Biochemistry of Crops (3302-440)

Modulverantwortung	Prof. Dr. Uwe Ludewig
Bezug zu anderen Modulen	From Genes to transgenic plants (3503-450) Molecular plant nutrition (3302-480) Molecular Phytopathology (3601-460) Molecular Plant Genetics (3503-480) Stressphysiologie: Anpassungen der Pflanzen an biotischen und abiotischen Stress (2601-210)
Teilnahmevoraussetzungen	Grundlagen Biochemie und Physiologie, Genetik
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS

Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Written exam (100 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>After successfully completing the module, students have profound knowledge in basic and special selected aspects of the molecular biochemistry and physiology.</p> <p>Particularly, they are able to illustrate the energy metabolism and plant metabolism. Further, students know the analogies and similarities to animal systems and biochemical principles and molecules of the primary and secondary metabolism and their structure. They are familiar with experimental methods and their significance. Students are acquainted with e.g.</p> <ul style="list-style-type: none"> - Energy metabolism - Redox metabolism - Signal transduction, light perception and use - Regulation of flowering - Molecular and physiological aspects of plant mineral nutrition - Structure and function of plant immune system - Molecular components of biotic and abiotic stress responses - Molecular regulation of phytohormone regulation - Biochemical basis of stress tolerance <p>In the accompanying training lectures, students are enabled to apply their knowledge in research questions and train to answer exam questions.</p>
Schlüsselkompetenzen	During preparation for the exam and while preparing and following up on lectures, students enhance their organizational skills, self-reliance and time management. They learn and practice critical and analytical thinking during the lecture and exercise lessons, while discussing about science improves their scientific articulateness.
Physiology and Biochemistry of Crops (3302-441)	
Person(en) verantwortlich	Prof. Dr. Uwe Ludewig
Lehrform	Vorlesung mit Übung
SWS	4
Inhalt	Die Vorlesung behandelt genetische molekulare und physiologische Grundlagen der Wahrnehmung und Reaktion auf Licht, Mechanismen des Blühens, Pathogenwahrnehmung, Transport, Energiestoffwechsel, Photosynthese, Sekundärstoffwechsel, Phytohormone Perzeption, Synthese, Regulation und Wachstumsantworten.

	In der begleitenden Übung werden Anträge auf Forschungsförderung geschrieben und beurteilt.
Literatur	Taiz, L., Zeiger, E.: Pflanzenphysiologie, Sinauer, Sunderland, Mass.

Modul: Plant Ecology (3202-440)

Modulverantwortung	PD Dr. rer. nat. Petra Högy, N.N.
Bezug zu anderen Modulen	The module "Plant Ecology" ist mandatory in the M.Sc. Program Landscape Ecology. The module provides knowledge on vegetation and the interaction between vegetation and habitats. Special emphasis is laid on plant ecology in habitats with harsh conditions driving adaptation. In addition, seminars are held that vary in focus from year to year depending on most recent problems and findings in plant ecology.
Teilnahmevoraussetzungen	Knowledge at Bachelor level in plant ecology, plant ecophysiology, zonobiomes, ecology and ecosystem functioning
Sprache	englisch
ECTS	7,5
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	4 Wochen (Block 4)
Verbindlichkeit	Wahl
Prüfungsleistung	Poster mit Präsentation (100%)
Arbeitsaufwand	80 h presence + 110 h preparation at home + exam = 210 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>The module aims to provide the students with a solid knowledge base on plant ecology, in particular on plant ecology in habitats with harsh and demanding conditions, and on the interactions and ecological relations in such habitats and their vegetation. This is implemented by means of a lecture on "Plant Ecology in selected ecosystems" and a "Seminar in Plant Ecology" that involves student elaborations and presentations on selected tasks within an overall frame dealing with recent problems and findings in plant ecology.</p> <p>Knowledge:</p> <p>The students know about the ecology of vegetation in selected habitats. They understand adaptation of plants for survival in adverse conditions and know about anthropogenic influence on vegetation and resulting feed-backs in ecosystems.</p> <p>In the seminar, the students jointly deepen and broaden their understanding in recent tasks related to plant ecology. This might involve tasks such as "biodiversity" or "forest ecosystems and human perturbation".</p>

	<p>Skills:</p> <p>The students are able to analyse adaptation of plants species and vegetation to specific habitat conditions. They have the ability to join different disciplines (such as plant science, plant ecology, ecosystem functioning) in order to understand the interactions between vegetation and habitat and potential human disturbances.</p> <p>The students manage to find relevant scientific literature and other relevant sources, to evaluate these and to extract the relevant information and combining this for their own scientific presentation.</p>
Schlüsselkompetenzen	<p>The structure of the modul provides the following competences: The students have the competence to elaborate plant ecological tasks. They are able to compile - by their own and in co-operation with other students - the corresponding information and to present their knowlegde and solutions to different stakeholders by means of communications tools tailored to the specific requirements. They also manage to bring subject-specific knowledge on plant ecology into a wider context, e.g. to elaborate interactions with global climate change, land-use and land-use change, and to present this wider context as well.</p>
Anmerkungen	<p>Dieses Modul entspricht für Studierende, die im SS 14 das Studium der Agrarbiologie, Fachrichtung Landschaftsökologie, aufgenommen haben, dem Modul 3202-520 "Pflanzenökologie"</p>
Plant Ecology (3202-441)	
Person(en) verantwortlich	Prof. Dr. Klaus Schmieder, PD Dr. rer. nat. Petra Högy, PD Dr. Frank Rasche, N.N.
Person(en) begleitend	Dr. Jürgen Franzaring, Dr. rer. nat. Helmut Dalitz, Dr. rer. nat. Robert Gliniars, Zorica Kauf
Lehrform	Vorlesung mit Seminar
SWS	5
Inhalt	Plant Ecology deals with evolutionary and adaptive aspects of plant life. In particular, plant life under adverse habitat conditions is dealt with by means of lectures and seminar presentations by the students

Modul: Plant Quality (3302-460)

Modulverantwortung	Prof. Dr. Uwe Ludewig
Teilnahmevoraussetzungen	-
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl

Studienleistung	Presentation (25 %) with extended abstract (5 %)
Prüfungsleistung	Written exam (70 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>After successfully completing the module, students are able to describe the main requirements for the external appearance and physical composition of plant products (food, feed and other biobased products) from the perspective of the processor, marketer, consumer and legislator.</p> <p>They can specify means of influencing the quality by plant mineral nutrition (external quality, content and storage of value-adding ingredients; suppression of unwanted plant compounds) and can evaluate the possibilities of influencing the quality by mineral nutrition in comparison with other means, such as breeding (eg. genetically modified crops) and plant cultivation strategies. Students are familiar with quality concepts and the quality of the product beyond (eg. production quality).</p> <p>Students acquire these abilities in the lecture (2 SWS). In the accompanying seminar, students present and discuss original work from the literature and current aspects of plant quality in short lectures. A one-day excursion to LUFA Speyer gives an insight into the practice of the official quality control of agricultural products.</p>
Schlüsselkompetenzen	<p>During preparation for the exam, while preparing and following up on lectures and while preparing the seminar, students enhance their organizational skills, self-reliance, time management and team work. They learn and practice both critical and analytical thinking and reading of scientific literature in the seminar, while generally improving their ability of exploring a scientific subject. While preparing the seminar, students improve their scientific articulateness and further improve their oral communication skills, presentation techniques and discourse capacities through presenting their work.</p>
Plant Quality (3302-461)	
Person(en) verantwortlich	Prof. Dr. Günter Neumann, apl. Prof. Dr. Franz Wiesler, Prof. Dr. Uwe Ludewig
Lehrform	Vorlesung mit Seminar
SWS	4
Inhalt	<p>Gliederung</p> <ol style="list-style-type: none"> 1. Definition, Bewertung und Beeinflussung der Pflanzenqualität 2. Die äußere Qualität von Pflanzen 3. Die stoffliche Zusammensetzung von Pflanzen <ol style="list-style-type: none"> 3.1 Anorganische Inhaltsstoffe (ess. Mineralstoffe, Nitrat, Schwermetalle) 3.2 Organische Stickstoffverbindungen

	3.3 Kohlenhydrate 3.4 Lipide 3.5 Organische Säuren 3.6 Vitamine 3.7 Bioaktive Substanzen 3.8 Rückstände und Kontaminanten 4. Spezielle Qualitätsfragen 4.1 Pflanzenernährung und Kartoffelqualität, Zuckerrübenqualität, Obstqualität, Gemüsequalität, Weinqualität 4.2 Pflanzenernährung und Qualität im konventionellen, integrierten oder alternativen Anbau 5. Biotechnologische Methoden der Qualitätsverbesserung
Literatur	Aktuelle Literatur Marschner's Mineral Nutrition of Higher Plants (2011, Academic Press)

Modul: Policy Processes in Agriculture and Natural Resource Management (4903-500)

Modulverantwortung	Prof. Dr. Regina Birner
Teilnahmevoraussetzungen	none
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Presentation with discussion (30 %)
Prüfungsleistung	Written exam (70 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After successfully completing this module, students are able to understand and analyze the politics of policy processes in agriculture and natural resource management. They are familiar with theoretical and analytical concepts developed for this purpose in different disciplines (Advocacy Coalition Framework, policy cycle models, theory of the neo-patrimonial state, public choice models, discourse analysis, social mobilization theories). They can apply such concepts to topics that are relevant for policy management and development cooperation, such as participatory and evidence-based policy-making, research-policy linkages, the politics and management of agricultural policy reforms, such as trade

	liberalization and agricultural subsidy policies, ownership in policy reform, and role of donors and donor coordination.
Schlüsselkompetenzen	During preparation for the exam and while preparing and following up on lectures, students practice time management and self-reliance. They learn and practice critical and analytical thinking, while writing essays enhances their capability of exploring a scientific issue and their scientific articulateness. With the presentation, students improve their oral expression and communication skills.
Policy Processes in Agriculture and Natural Resource Management (4903-501)	
Person(en) verantwortlich	Prof. Dr. Regina Birner
Lehrform	Vorlesung
SWS	4
Inhalt	<ul style="list-style-type: none"> - Politics of policy processes in agriculture and natural resource management - Advocacy Coalition Framework, policy cycle models, theory of the neo-patrimonial state, public choice models, discourse analysis, social mobilization theories

Modul: Portfolio-Modul (Master) (3000-410)

Modulverantwortung	Prof. Dr. sc. agr. Michael Kruse
Teilnahmevoraussetzungen	Pro Studiengang kann nur ein Portfolio Modul belegt werden.
Sprache	deutsch/englisch
ECTS	7,5
Angebotshäufigkeit	jedes Semester
Semesterlage	2. Semester, 3. Semester
Dauer des Moduls	n. V.
Verbindlichkeit	Wahl
Studienleistung	<p>In dem Portfoliomodul können mit einer oder mehreren Studienleistungen insgesamt zwischen 1,0 und 7,5 ECTS credit erworben werden. Als Studienleistungen werden mit ECTS credits anerkannt (Richtlinie 25 - 30 h = 1 ECTS credit): - ein Industrie-/Behörden-/Firmenpraktikum in vor- und nachgelagerten Bereichen (einschließlich Werkstudierenden-Tätigkeit). Hierbei ergeben 20 Arbeitstage mit 20 seitigem Bericht = 6 ECTS credits. Für andere credit Anzahlen wird linear angepasst (z.B. 10 Tage + 10 Seiten Bericht = 3 credits oder 25 Tage + 25 Seiten Bericht = 7,5 credits). Eine Genehmigung des Praktikums oder des Betriebes ist nicht erforderlich. Das Praktikum kann auch vor dem Studium abgelegt worden sein. Der Bericht samt Praktikumsbescheinigung ist bei einem Prüfungsberechtigten (i.d.R. Prof.) abzugeben. Dieser prüft den Bericht und bestätigt dem Studiendekan, dass der Bericht</p>

	<p>angenommen ist und schlägt die Anzahl der zu vergebenden ECTS Punkte vor. Seitens der Fakultät gibt es außer der Seitenzahl keine weiteren Vorgaben für den Bericht. Es ist ratsam, vor Erstellung des Berichts den Prüfungsberechtigten nach seinen Vorgaben zu fragen und diese zu berücksichtigen. Der Studiendekan kann eine Bestätigung darüber ausstellen, dass das Praktikum als Studienleistung anerkannt wird. Das Praktikum kann maximal einmal geteilt werden. Landwirtschaftliche Praktika selbst können im Master nicht angerechnet werden. - Individuelles Forschungspraktikum (d.h. der/die Studierende wird z.B. in die Bearbeitung eines wissenschaftlichen Projekts in einem Institut bzw. einer Forschungseinrichtung integriert). Beispiel für 6 ECTS credits: 20 Arbeitstage mit 20 seitigem Bericht oder Arbeitstagebuch, Projektbeschreibung mit Fragestellungen, angewendete Methoden und ggf. Teilergebnisse. Der Bericht ist bei einem Prüfungsberechtigten (i.d.R. Prof.) abzugeben. Dieser prüft den Bericht und bestätigt dem Studiendekan, dass der Bericht angenommen ist und schlägt die Anzahl der zu vergebenden ECTS Punkte vor. - Hausarbeit/Literaturarbeit über ein wissenschaftliches Thema (5 - 10 Seiten je ECTS credit). - Summerschools für postgraduierte Studierende. (ECTS nach Absprache mit einem Hochschullehrer) - Fortbildungsveranstaltungen wissenschaftlicher Gesellschaften für postgraduierte Studierende. (ECTS nach Absprache mit einem Hochschullehrer) - Fachspezifische Sprachkurse (insges. max. 2 ECTS credits). - Fortbildungen im Bereich „Soft Skills“ mit erkennbarem Bezug für das gewählte Studienfach (insges. max. 2 ECTS credits). - FIT-Tutorenausbildung (insges. max. 3 ECTS credits). Das Abhalten des Tutoriums kann nicht anerkannt werden, wenn es im Rahmen eines HiWi-Vertrags erfolgte. - Kurse zu Statistischer Programmierung oder zu Statistikprogrammen (insges. max. 2 ECTS credits). - Leistungsscheine der Virtuellen Akademie Nachhaltigkeit werden mit den darin ausgewiesenen Credits anerkannt. Die Leistungsscheine werden durch eine elektronische Klausur in Hohenheim oder einer anderen Partner-Hochschule des Projektes erworben: https://www.va-bne.de/index.php/de/studierende/beteiligte-hochschulen-2 und durch Prof. Bieling bestätigt. Der Studiendekan ist bevollmächtigt, im Einzelfall und auf Antrag des/der Studierenden und mit Befürwortung eines Hochschullehrers, weitere Leistungen anzuerkennen. - Tätigkeiten in Rahmen einer Beschäftigung (HiWi) an Forschungseinrichtungen der Universität Hohenheim, werden nicht als Studienleistungen anerkannt. - In Streitfällen bzgl. der Anerkennung von Studienleistungen entscheidet der Prüfungsausschuss.</p>
Prüfungsleistung	keine
Modulprüfung	<p>Die ECTS werden durch den zuständigen Studiendekan Prof. Dr. Michael Kruse aufgrund der vorgelegten Bescheinigungen bzw. auf Empfehlung der betreuenden Hochschullehrer vergeben. Bitte kommen Sie hierzu in die Sprechstunde, Mo. 12 - 13 Uhr (Inst. f. Pflanzenzüchtung (350), Fruwirthstraße 21, 1. Stock, links) und bringen Ihre Bescheinigungen mit. Die dort erhaltene Bescheinigung über die anerkannten Leistungen geben Sie dann beim Prüfungsamt ab. Das Modul kann mit 1 - 7,5 ECTS credits abgeschlossen und bestanden werden. Das Modul ist unbenotet.</p>

Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Nach Abschluss des Moduls sind die Studierenden in der Lage, <ul style="list-style-type: none"> - die Grundlagen wissenschaftlichen Arbeitens zu benennen. - interdisziplinäre Schnittstellen bzgl. ihres Studiengangs zu identifizieren und zu beschreiben - eigene Wissenslücken zu erkennen und selbständig zu schließen. - unter Anleitung ein wissenschaftliches Projekt zu planen und durchzuführen. - Ergebnisse wissenschaftlichen Arbeitens schriftlich festzuhalten und diese im Rahmen einer Präsentation wiederzugeben.
Schlüsselkompetenzen	Das Modul vermittelt Schlüsselkompetenzen in unterschiedlichen Bereichen, je nach inhaltlicher Ausrichtung. Zu nennen sind vor allem: Die Befähigung zum selbständigen (wissenschaftlichen) Arbeiten und zur effektiven Informationsbeschaffung und Informationsanalyse durch das selbständige Erarbeiten eines Themas. Teamfähigkeit, Selbst- und Fremdorganisation und planerische Fähigkeiten durch die Arbeit in Gruppen, Forschungsteams, oder durch ein Praktikum in einem Betrieb, sowie durch die selbständige Organisation der Tätigkeiten in diesem Modul durch die Studierenden.
Anmerkungen	Das Modul ist unbenotet. Es bleibt daher bei der Bildung des Notendurchschnitts unberücksichtigt. Eine Anmeldung zur Prüfung dieses Moduls im Prüfungsamt ist nicht erforderlich. Die vom Studiendekan ausgestellte Bescheinigung wird nach Abschluss des Moduls im Prüfungsamt abgegeben. Bei offenen Fragen kommen Sie in die offene Sprechstunde des Studiendekans montags 12:00 - 13:00 Uhr (Inst. f. Pflanzenzüchtung (350), Fruwirthstraße 21, 1. Stock, links). Schreiben Sie bitte keine e-Mails direkt an den Studiendekan!

Modul: Precision Farming (4404-520)

Modulverantwortung	Prof. Dr. sc. agr. Hans W. Griepentrog
Bezug zu anderen Modulen	This module shows links to other agricultural disciplines and improves the career perspectives in agricultural engineering.
Teilnahmevoraussetzungen	Basic knowledge in English, basic knowledge in process engineering in plant production or practical experience in this field is required.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Modulprüfung	schriftlich (computerunterstützt)

Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	Students will be able to highlight fundamentals, including - background, potential and perspectives of Precision Farming - data base management and decision support systems (farm management information systems) - function and application of different technical solutions. Students can - apply and appraise precision farming technology and equipment - optimize plant production by understanding and applying sophisticated crop models and software.
Schlüsselkompetenzen	Critical and analytical thinking as well as language skills and communication and cooperation skills will be gained during presenting scientific paper related to Precision Farming in group work.
Precision Farming (4404-521)	
Person(en) verantwortlich	Prof. Dr. sc. agr. Hans W. Griepentrog
Person(en) begleitend	Dr. sc. agr. Daniela Stoffel-Jauß
Lehrform	Vorlesung mit Übung
SWS	4
Inhalt	Fundamental precision farming principles and description of spatial heterogeneity of soils and plants; data base structures, geographic information systems (GIS), global navigation satellite systems (GNSS) and variable rate technology (VRT) for the main operations in crop production, especially tillage, sowing, fertilisation and harvesting; decision support and economic evaluation
Literatur	Heege, H.J. (2013): Precision in Crop Farming - Site-specific Concepts and Sensing Methods. Springer Dordrecht Heidelberg New York London
Anmerkungen	Lectures, demonstrations and practical exercises. Each student needs to contribute in a group of students to read, present and discuss a scientific paper as an exam prerequisite. The module is conducted in cooperation with teaching staff from other departments, international scientists and experts from different companies. Lecture handouts and other materials will be provided.

Modul: Processing and Quality of Organic Food (3405-460)

Modulverantwortung	Dr. agr. Sabine Zikeli
Bezug zu anderen Modulen	The students gain insight in organic food processing which enables them to assess problems connected with different steps of the food chain. They are also introduced to the differences between ?conventional? and organic food processing. Such knowledge is an asset whenever processing methods have to be evaluated, e.g. in certification.
Teilnahmevoraussetzungen	Understanding of nature sciences like chemistry and biology.

Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Written exam (100 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After completing this course, students are proficient in the basic principles of organic food processing and organic food quality based on the organic farming standards and guidelines and their differences to conventional food processing and quality. They understand the most important features related to the quality of processed organic products of plant and animal origin and are able to discuss the differences in food quality between organic and conventional products based on the production methods. Students are familiar with the current challenges in organic food production and processing and have knowledge about sensory testing and food quality assesment.
Schlüsselkompetenzen	During preparation for the exam and while preparing and following up on lectures, students practice time management and self-reliance. They learn and practice both critical and analytical thinking and reading of scientific literature, while writing essays improves their capability of exploring a scientific issue and enhances their scientific articulateness. Through the compilation and interpretation of information from stakeholder interviews during the excursions, students practice and improve their capability to explore settings from agricultural practice and food processing and their link to science.
Processing and Quality of Organic Food (3405-461)	
Person(en) verantwortlich	Dr. Wolfgang Armbruster, Prof. Dr. Walter Vetter, Dr. sc. agr. Nikolaus Merkt, Dr. agr. Sabine Zikeli, Dr. sc. agr. Judit Pfenning, apl. Prof. Dr. sc. agr. habil. Michael A. Grashorn, Prof. Dr. Christian Zörb
Person(en) begleitend	Dr. sc. agr. Judit Pfenning, Dr. Benjamin Mast
Lehrform	Vorlesung mit Exkursion
SWS	4
Inhalt	The module gives an overview on organic food processing and quality and covers the following topics: 1. Introduction in the basic principles of food chemistry and food technology

	<p>2. Organic Food Processing including the conversion to organic food processing, regulations of organic food processing; processing of certain products: milk, meat, eggs, cereals, vegetables, wine production</p> <p>3. Introduction to sensory analysis</p> <p>4. Introduction to specific methods that are specific to organic food quality assessment.</p> <p>The different topics will be covered by different lecturers of the Universität Hohenheim and other institutions.</p> <p>During the module three excursions will take place that cover different organic food chains: Meat (visit of a small slaughter house), eggs (visit of an organic egg producer) and cereals (visit of an organic mill).</p>
Literatur	will be provided by the different lecturers
Anmerkungen	Please register for the module online in ILIAS. If you have any questions regarding the module, please ask Dr. Zikeli (sabine.zikeli@uni-hohenheim.de)

Modul: Qualitative Research Methods in Rural Development Studies (4903-470)

Modulverantwortung	Prof. Dr. Regina Birner
Bezug zu anderen Modulen	Complements Modules 4901-430 "Rural Development Policy and Institutions", 4301-430 "Rural Communication and Extension", 4301-410 "Knowledge and Innovation Management".
Teilnahmevoraussetzungen	none
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Written exam (100 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After successfully completing this module, students have an insight into the current critical discourse of participatory research. They are familiar with concepts and methods of participatory research with

	particular emphasis on applications in the field of agricultural and resource economics and in the social sciences. Students are able to assess in which research contexts participatory methods have their particular strengths and how they can be combined with conventional research methods. They are skilled in a range of qualitative methods for both data collection and analysis and have practised them in the field and with the computer.
Schlüsselkompetenzen	During preparation for the exam, while preparing and following up on lectures and during the seminar and practicals, students practice self-reliance, cooperation and time management. They learn and practice both critical and analytical thinking and reading of scientific literature. In the lecture, seminar and practicals, students are acquainted with different approaches of qualitative data collection and analysis, they know how to use computer software for content analysis and are ultimately able to plan a qualitative research project.
Qualitative Research Methods in Rural Development Studies (4903-471)	
Person(en) verantwortlich	Prof. Dr. Manfred Zeller, Prof. Dr. Regina Birner
Lehrform	Vorlesung mit Seminar und Praktikum
SWS	4
Inhalt	<p>Definitions, principles and basic concepts of qualitative social research; relative strengths of qualitative versus quantitative survey methods; specific qualitative methods of data collection; participatory research tools in qualitative inquiry; qualitative data analysis; introduction into computer-assisted qualitative data analysis software (CAQDAS)</p> <p>Lectures with discussions, case studies, group work, computer demonstrations</p>
Literatur	<p>Silverman, D. 2001: Interpreting Qualitative Data: Methods for Analysing Talk, Text and Interaction. Second Edition. Sage, London.</p> <p>Silverman, D. (ed.) 2004. Qualitative Research: Theory, Method and Practice. Second edition. Sage, London.</p> <p>Cooke, B. and Kothari, U. (eds.) 2001. Participation: The new tyranny? Zed Books, London.</p> <p>Miles, M.,B. and Hubermann, A.M. 1994. Qualitative Data Analysis: An Expanded Sourcebook. Second edition, Sage, Thousand Oaks.</p> <p>Selener, D. 1997. Participatory Action Research and Social Change. Cornell Patricipatory Action Research Network. Ithaca.</p> <p>Hickey, S. and Mohan, G. 2004. Participation: From Tyranny to Transformation? Exploring New Approaches to Participation in Development. Zed Books, London.</p>
Anmerkungen	This module is currently not offered!

Modul: Quantitative Methods in Economics (4901-470)

Modulverantwortung	Prof. Dr. Manfred Zeller
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Bezug zu anderen Modulen	This module is considered as basic for all other modules offered to students in the Major of "Rural Development Economics" in the M.Sc. Agritropics.
Teilnahmevoraussetzungen	Bachelor-Niveaurokurse in Statistik werden vorausgesetzt.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	2. Semesterhälfte
Verbindlichkeit	Wahl
Prüfungsleistung	Written exam (100 %)
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>After completing this module, students:</p> <ul style="list-style-type: none"> - Know the steps of preparing a field research project - Comprehend the different methods of sampling commonly used in rural areas of developing countries - Are able to utilize about best practices in questionnaire design - Are proficient in various statistical tools to address research questions and to test research hypotheses - Can apply these tools using Stata, a comprehensive statistics software package
Schlüsselkompetenzen	<p>During preparation for the exam, while preparing and following up on lectures and during the exercises, students practice self-reliance and time management. They learn and practice critical and analytical thinking when challenged with statistical analysis. In the exercises, students further practice team work by working in small groups. Skills in professional statistical software such as STATA are indispensable for further scientific work. The skills and competences gained in the course facilitate students to successfully conduct fieldwork activities in rural areas with the highest scientific standard.</p>
Anmerkungen	<p>This module targets students from all master programs with a strong interest in empirical quantitative social science research. It is highly recommended to students in their 3rd semester who plan to conduct such research for their master thesis. A certain degree of overlap with module 4902-810 "Applied Econometrics" (compulsory for AgEcon students in their 1st semester) regarding linear regression is unavoidable because the module also targets students from other master programs who may not have chosen "Applied Econometrics" in their 1st semester. However, due to its much broader range of topics, "Quantitative Methods in Economics" is a highly recommended module also and especially for AgEcon students. Please register online via ILIAS. We only accept a maximum of 25 students.</p>

Quantitative Methods in Economics (4901-471)	
Person(en) verantwortlich	Prof. Dr. Manfred Zeller
Person(en) begleitend	Dr. Tim K. Loos, Dr. Ling Yee Khor
Lehrform	Vorlesung
SWS	3
Inhalt	<p>This module consists of lectures and exercises in the computer lab. Its emphasis is on the design and execution of socio-economic research that investigates issues of rural or agricultural development in developing countries. The course mainly covers quantitative research methods that are used in development economics and in applied socio-economic research in developing countries.</p> <p>The particular contents of the module are as follows:</p> <ol style="list-style-type: none"> 1. Quantitative research designs in the social sciences 2. The sampling process (constructing sampling frames, sampling procedures, sample size) 3. The measurement of variables and questionnaire design (with group assignment) 4. Data entry and data cleaning (with computer exercises) 5. Overview of statistical instruments 6. Parametric and non-parametric tests (with computer exercises) 7. Principal component analysis (with computer exercises) 8. Linear regression (with computer exercises) 9. Binary response models (with computer exercises) 10. Two-stage Heckman procedure for correcting sample selection bias (with computer exercises)
Literatur	<p>Literature</p> <p>Black, Thomas R. (1999) Doing quantitative research in the social sciences. An Integrated approach to research design, measurement and statistics. Sage Publications, London.</p> <p>Field, Andy (2005) Discovering statistics using SPSS. Second Edition. Sage Publications, London.</p> <p>Hill, R. Carter, Griffiths, William E., and Judge, George G. (2001) Undergraduate econometrics. Second Edition. John Wiley & Sons, New York.</p>
Exercises to Quantitative Methods in Economics (4901-472)	
Person(en) verantwortlich	Prof. Dr. Manfred Zeller
Person(en) begleitend	Dr. Tim K. Loos
Lehrform	Übung
SWS	1
Inhalt	Computer exercises to quantitative methods in economics used in socio-economic research to issues of rural or agricultural development in developing countries.

Modul: Soil Fertility and Fertilisation in Organic Farming (3301-440)

Modulverantwortung	Prof. Dr. Torsten Müller
Bezug zu anderen Modulen	Work in research, public administration, extension services and NGOs.
Teilnahmevoraussetzungen	Basic knowledge in organic or conventional farming. Good knowledge in biology and chemistry.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Presentation with handout (25 %). The successful completion of the "Compulsory assignment" (passing grade) is a prerequisite for participating in the final examination.
Prüfungsleistung	Oral exam (75 %). A failing grade in the final examination results in failing the module.
Prüfungsdauer	30 Minuten
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	After completing this module, students are able to apply profound knowledge in all fields of soil fertility management and fertilisation in organic farming in different climatic areas, as well as in specific organic farming systems e.g. in bio-dynamic or organic biological farming. They are also proficient in dealing with relevant national and international regulations.
Schlüsselkompetenzen	During preparation for exams and while preparing and following up on lectures, students learn to cooperate and work independently. They learn and practice both critical and analytical thinking and reading of scientific literature. Through the seminar presentation, students practice and improve their capability of exploring a scientific issue and of presenting a limited scientific subject.
Soil Fertility and Fertilisation in Organic Farming (3301-441)	
Person(en) verantwortlich	Prof. Dr. Torsten Müller
Lehrform	Vorlesung mit Übung und Seminar
SWS	4
Inhalt	Class teaching, discussion, computer presentation. Specific aspects of soil fertility and its maintenance under organic land cultivation.

	<p>Nutrient and humus management within organic crop rotations. Nutrient and humus balances on field and farm scale. Organic and mineral fertilisation of arable land and grassland, including bio-fertilisers, bio-effectors, green manure and post harvest plant residues. Atmospheric N₂-fixation. Specific aspects of fertilisation in Bio-Dynamic and Organic-Biological Farming.</p> <p>Supervised reading of scientific literature.</p> <p>Seminar: Recent scientific issues on soil fertility and fertilisation in Organic Farming. Student's presentations.</p>
Literatur	Literature will be announced during the lectures. Copies of presentations will be distributed during the lectures.
Anmerkungen	www.soilassociation.org

Modul: Sustainability Discourses and Environmental Sociology (4302-440)

Modulverantwortung	Prof. Dr. Claudia Bieling
Teilnahmevoraussetzungen	.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Modulprüfung	Two essays (70%, split in 35% each); presentation of reading (30%)
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>After completion of the module, students will have an overview on sustainability discourses and political economy and ecology concepts, which will prove useful to place their agriculture-related competences and professional engagement in context. The course will explore human-nature relationships in order to critically reflect on some of the most common assumptions around sustainability.</p> <p>Students will be able to identify main paradigmatic societal discourses associated to sustainability and relate them to the main concepts of environmental sociology. Confronting issues related to political and ecological understanding of human-nature relationship, market, risk, technological innovation, and agriculture and conservation policies, students will gain a better understanding of structural limitations and hope-full opportunities in their professional and social life, as individuals and members of a collective.</p>

Schlüsselkompetenzen	Students will acquire the ability to understand the complex social construction of sustainability and relative paradigms. Thanks to basic concepts of environmental sociology, students will be able to debunk, and spot fallacies in, sustainability discourses associated to risk, to ecology and to general politics of production and consumption. Because of the innovative assessment method, students will: - improve their argumentation abilities because of class discussion and participation; - increase their writing skills thanks to writing two short essays, - increase their reading skills, thanks to an extensive selection of topics, - increase their presentation skills, thanks to the assigned readings that will be presented in class individually.
Anmerkungen	In order to create an interactive working environment, this module is limited to 25 students. Students must register via ILIAS (registration opens 25 March 2019, first come first serve).
Sustainability Discourses and Environmental Sociology (4302-441)	
Person(en) verantwortlich	Prof. Dr. Claudia Bieling
Person(en) begleitend	Dr. Cinzia Piatti
Lehrform	Seminar mit Übung
SWS	4
Inhalt	<p>This course brings together current debates in sustainability science and policy and key concepts in environmental sociology. The aim is to deconstruct and better understand sustainability discourses using environmental sociology approaches.</p> <p>This course will be dealing with a range of interrelated topics spanning from theory to contemporary issues. We will cover debates around material versus constructivist views of nature, nature/culture binaries and the relationship between economic systems. We will touch on political economy and political ecology, the environmental and new environmental politics and subjectivities. These concepts will be explored through application to important environmental issues worldwide.</p> <p>We will work together to:</p> <ul style="list-style-type: none"> - understand the environment, environmental issues, sustainability discourses and environmental sociology. Different perspectives on the unique complexity of the environment give us some great tools upfront. - answer questions such as what is nature? what is society? where do people fit into the environment? These are some of the key questions which will challenge your assumptions. - problematize our economy's assumption of infinite resources to make more products for our consumption. The readings help situate the issue of economy that assumes infinitude on a finite planet. - conceptualize the role of knowledge in relationship to environmental issues.

	<p>- make sense of governance issues and the political paradigms that will determine the course of actions.</p> <p>The aims of the course are to:</p> <ul style="list-style-type: none"> - Become familiar with the ideas and concepts related to environmental sociology and sustainability discourses; - Understand different ways of conceptualizing the relationship between people, society and nature; - Provide theoretical tools that can help students define and discuss environmental problems; - Appreciate the value of thinking sociologically about the environment; - Grasp the complexity related to environmental “problems”.
Literatur	Will be specified during course and uploaded to ILIAS.
Anmerkungen	<p>This course will be very student driven.</p> <p>For this reason, the course is open to a maximum of 25 students.</p> <p>During our scheduled class time (twice a week), students are expected to come to class and discuss the readings. There is no final exam; students will be assessed on the basis of:</p> <ol style="list-style-type: none"> 1) two essays: students will submit via ILIAS two essays, one mid-semester and one at the end. These must necessarily make reference to the readings, and propose personal reflections on a selected topic chosen by a short list offered. 2) presentation of readings according to a self-assigned date: students will present one reading each according to a calendar compiled at the beginning of the course. The presentation will be followed by questions by the lecturer and the classmates, the answers and argumentation to which will concur in the mark for the final grade. <p>A meaningful class participation is expected. This class is built on interaction between participants and lecturer. Participation involves being present in class having read the material: some students will present the selected readings; the others are expected to raise questions, listen to classmates and respond to their comments.</p>

Modul: Waste Management and Waste Techniques (4406-410)

Modulverantwortung	Prof. Dr.-Ing. Martin Kranert
Bezug zu anderen Modulen	This module is a good basis for the environmental part of the M.Sc. programs EnviroFood, AgriTropics and Agricultural Engineering.
Teilnahmevoraussetzungen	Basic knowledge in natural sciences is helpful to understand the lectures.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS

Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Modulprüfung	written
Arbeitsaufwand	56 h Präsenz + 104 h Eigenanteil + Prüfung = 160 h Workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>Students can illustrate the topic "waste" in the municipal, commercial and industrial sectors. They can derive the actual situation of waste management in Germany and abroad from the historical development of industry and society, and illustrate the evolution of waste techniques by the legal framework with a main focus on techniques for waste treatment and their environmental impacts. Students can show opportunities and limitations of waste prevention and waste utilisation by examples.</p> <p>The lecture is illustrated by field trips to e.g. waste treatment plants with composting, sorting, incineration, waste water treatment processes.</p>
Schlüsselkompetenzen	The students will acquire skills like critical and analytical thinking.
Waste Management and Waste Techniques (4406-411)	
Person(en) verantwortlich	Dipl.-Geologe Detlef Clauß, Dipl.-Ing. Matthias Rapf
Lehrform	Vorlesung
SWS	4
Inhalt	<p>Characterisation of hazardous compounds in wastes. The problematic of contaminated sites as a key to understand the goals of modern waste management. The legislative power as initiator for progressive waste management and waste technologies. Techniques to collect and transport wastes. Waste techniques: on ground and underground landfills, waste incineration, pyrolysis, gasification, composting, anaerobic treatment, treatment of municipal and industrial slurries, special treatment processes, waste reduction and waste prevention, opportunities and limitations with examples. Waste utilisation, opportunities and limitations, waste sampling and analytics.</p> <p>Lectures with discussions, use of powerpoint-presentation, overheads, slides and script.</p>

III. Wahlmodule: Bereich Naturwissenschaften

Modul: Agricultural and Forest Meteorology (1201-590)

Modulverantwortung	Prof. Dr. rer. nat. Volker Wulfmeyer
Teilnahmevoraussetzungen	Basic understanding about atmospheric processes, basic modules of the first semester of the master course.

Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester, 3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Active participation in both parts of the module
Modulprüfung	Written exam
Prüfungsdauer	120 Minuten
Arbeitsaufwand	56 h attendance + 124h independent study = 180 h
Fachkompetenzen / Lern- und Qualifikationsziele	The students develop a basic understanding for questions and methods used in agricultural and forest meteorology. They know the relationships between weather and climate on the one hand side and the different types of land surface on the other side and are capable to use this knowledge to solve interdisciplinary questions in applied meteorology.
Schlüsselkompetenzen	The students are capable to combine the competences learned in this module with their knowledge learned in the basis lectures of earth system sciences to work on interdisciplinary questions in agriculture and forestry.
Anmerkungen	Maximum number of participants: 10
Agricultural and Forest Meteorology, Lecture (1201-591)	
Person(en) verantwortlich	Maike Schumacher
Person(en) begleitend	Dr. rer. nat. Hans-Stefan Bauer
Lehrform	Vorlesung
SWS	2
Inhalt	In the first part of the module, the basic understanding of atmospheric processes developed in earlier modules of the master course is briefly repeated and then complemented by details about the relationships between the atmosphere and the underlying land surface. Then the questions answered in agriculture and forest meteorology are presented to develop an understanding of the interrelation between weather and climate on the one side and agriculture, forests and forestry on the other side.
Agricultural and Forest Meteorology, Exercise and Practical (1201-592)	
Person(en) verantwortlich	Maike Schumacher
Person(en) begleitend	Dr. rer. nat. Hans-Stefan Bauer

Lehrform	Übung mit Praktikum
SWS	2
Inhalt	<p>The students solve exercises as preparation for the written examination as well as for deepening the material discussed in the lecture.</p> <p>Furthermore, this part of the module contains practical work with tools used in Agriculture and Forest Meteorology to deepen the understanding of the applied methodologies.</p>

Modul: Fermentation Technology (1502-430)

Modulverantwortung	Prof. Dr. rer. nat. Lutz Fischer
Teilnahmevoraussetzungen	-
Sprache	englisch
ECTS	7,5
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	4 Wochen (Block 2)
Verbindlichkeit	Wahl
Studienleistung	Lab book - Attendance on lectures, seminars and lab experiments -
Modulprüfung	Protocol (40%), Presentation of Results and Oral Exam (60%)
Prüfungsdauer	30 Minuten
Arbeitsaufwand	90 h attendance + 135 h independent study = 225 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	<p>After this modul, the students have knowledge about the fundamtel requirments for a cultivation of microorganisms. This includes the composition of complex and defined media as well as of submers and solid state fermenters. Additionally, the students know about the measuring principle of pH-electrodes, oxygen and exhaust gas measurment devices. Upon completion of this modul, the students are able to plan and conduct suberms cultivations of microorganisms in shaking flasks and a bioreactor. Also the students are able to conduct a solid-state fermentation. After this modul the students can evaluate cultivations of microorganims in view of fundamental requirements like yield, biomass, growth rate etc.. They have knowledge about microorganisms and processing of diverse fermented foods.</p>
Schlüsselkompetenzen	<p>Upon completion of this module the students are able to plan and work in a laboratory independently. They will be able to interpret their results and to compare them with known data from literature. In addition, they will be able to present and discuss their results in front of an audience.</p>
Anmerkungen	Maximum number of participants: 24

Fermentation Technology, Lecture with Exercise (1502-431)	
Person(en) verantwortlich	Prof. Dr. rer. nat. Lutz Fischer
Person(en) begleitend	Dr. rer. nat. Sabine Lutz-Wahl, Dipl.-Ing. (FH) Wolfgang Claaßen
Lehrform	Vorlesung mit Praktikum
SWS	4
Inhalt	<p>In interactive lessons the students will learn the preparation and composition of different culture media, the assembly of the bioreactor and sterile sampling during cultivation. Also the analysing of samples will be understood, planned, performed and evaluated. The theoretical background for planning, performing and analysing batch-cultivations will be discussed and exercised in the practical course.</p> <p>The students will be able to cultivate bacteria and yeasts in shaking flask and bioreactor (1 L; 30 L scale). Important biotechnological parameters such as oxygen transfer ($K_L a$), biomass yields, product yields, enzyme activities and C-source consumption will be discussed and evaluated. Also, the students will be able to cultivate microorganisms using the solid-state principle.</p>
Literatur	<p>Principles of Fermentation Technology (2nd edition), Edts. Stanbury, Whitaker and Hall, 1999, Reed Educational and Professional Publishing Ltd.</p> <p>Manual of Industrial Microbiology and Biotechnology, Edts. Demain and Davies, 1999, ASM Press</p>

Modul: Food Process Design I - Efficient Processing and Transport Phenomena (1503-520)

Modulverantwortung	Prof. Dr.-Ing. Reinhard Kohlus
Teilnahmevoraussetzungen	Technical basics, process engineering, physical chemistry or thermodynamics of multiphase systems
Sprache	englisch
ECTS	7,5
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	4 Wochen (Block 3)
Verbindlichkeit	Wahl
Arbeitsaufwand	80 h attendance + 130 h independent study = 210 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	The students know the fundamentals of thermal separation processes. They are capable of applying physical-chemistry fundamentals, to design the processes.

	<p>The laws of energy and mass and momentum transfer are known and can be applied to standard problems.</p> <p>The fundamental calculation methods are mastered.</p>
Anmerkungen	Maximum number of participants: 50
Food Process Design I - Efficient Processing and Transport Phenomena, Lecture (1503-521)	
Person(en) verantwortlich	Prof. Dr.-Ing. Reinhard Kohlus
Lehrform	Vorlesung
SWS	3
Inhalt	<p>Application of the fundamentals of thermal separation processes, multiphase flow and food process design. Specifically covered topics are drying technology, distillation and rectification, extraction, crystallization, heat transfer processes.</p> <p>Fundamentals: Equilibria equations, Phase and state diagrams, mass transfer equations,</p> <p>Multiphase flows: especially gas –liquid flows, Mass transfer in multiphase systems, two film theory, surface renewance theory</p> <p>Design of rectification system: McCabe Thiele Diagram, hydrodynamic design of rectification columns.</p> <p>Description of residence time distributions, prediction of RTD's</p> <p>Drying, coupling of heat and mass transfer, Glass transition temperature, sorp-tion isotherms.</p> <p>Optimisation of energy requirements, coupling of heat flows- Design and decision taking of heat transfer systems.</p>
Literatur	<p>Sattler; Thermische Trennverfahren; VCH Verlag</p> <p>Kraume, M: Transportvorgänge in der Verfahrenstechnik, Grundlagen und Apparative Umsetzung , Springer Verlag 2004</p>
Food Process Design I - Efficient Processing and Transport Phenomena, Exercise (1503-522)	
Person(en) verantwortlich	Prof. Dr.-Ing. Reinhard Kohlus
Person(en) begleitend	Dr.-Ing. Peter Gschwind
Lehrform	Übung
SWS	2
Inhalt	<p>Application of the fundamentals of thermal separation processes, multiphase flow and food process design. Specifically covered topics are drying technology, distillation and rectification, extraction, crystallization, heat transfer processes.</p>

	<p>Fundamentals: Equilibria equations, Phase and state diagrams, mass transfer equations,</p> <p>Multiphase flows: especially gas –liquid flows, Mass transfer in multiphase systems, two film theory, surface renewal theory</p> <p>Design of rectification system: McCabe Thiele Diagram, hydrodynamic design of rectification columns.</p> <p>Description of residence time distributions, prediction of RTD's</p> <p>Drying, coupling of heat and mass transfer, Glass transition temperature, sorption isotherms.</p> <p>Optimisation of energy requirements, coupling of heat flows- Design and decision taking of heat transfer systems.</p> <p>Exercises and problems in the above given areas will be covered using calculation and engineering software.</p>
Literatur	<p>Sattler; Thermische Trennverfahren; VCH Verlag</p> <p>Kraume, M: Transportvorgänge in der Verfahrenstechnik, Grundlagen und Apparative Umsetzung , Springer Verlag 2004</p>

Modul: Integrated Bioprocess Engineering - Bioproduction (1510-420)

Modulverantwortung	Prof. Dr.-Ing. Rudolf Hausmann
Bezug zu anderen Modulen	Is part of the module series Integrated Bioprocess Engineering
Teilnahmevoraussetzungen	First practical experiences in microbiology are required
Sprache	deutsch/englisch
ECTS	7,5
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	geblockt
Verbindlichkeit	Wahl
Studienleistung	Regular and active participation in the laboratory course (laboratory notebook and scientific report), the lecture, the exercises and the holding of a seminar talk.
Modulprüfung	Laboratory performance, lab book and colloquium (20%), seminar presentation (20%), oral exam (60%)
Prüfungsdauer	20 Minuten
Arbeitsaufwand	90 h attendance + 135 h independent study = 225 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	After the completion of the module participants,

	<p>1. are able to design of media and lay-out feed compositions and strategies</p> <p>2. are able to explain all functions of bioreactors and safely operate bioreactors.</p> <p>3. Explain kinetics of bioprocesses and modelling thereof</p> <p>4. Are able to express expectations on the scale-up of bioprocesses.</p>
Schlüsselkompetenzen	After the completion of the module the participants - have demonstrated working in a self-organized team - have analyzed and interpreted experimental data and discussed them theoretically - have experienced and adapted to an interdisciplinary field. - have enhanced their scientific written and verbal skills.
Anmerkungen	places: 9rnRegistration for module: by email to: bvt@uni-hohenheim.de Registration period: until the last working day before the module start. Criteria for admission is granted: Mostly after first-served basis.

Bioproduction, lecture (1510-421)

Person(en) verantwortlich	Prof. Dr.-Ing. Rudolf Hausmann
Person(en) begleitend	Dr. rer. nat. Karin Moß, Dr.-Ing. Marius Henkel
Lehrform	Vorlesung mit Seminar und Übung
SWS	2
Inhalt	<p>Design of media and laying-out of feed strategies and compositions</p> <p>Functions of bioreactors</p> <p>Kinetics of bioprocesses and modelling thereof</p> <p>Scale-up of bioprocesses</p>
Literatur	<p>- J. Villadsen, J Nielsen and G Lidén (2011): Bioreaction Engineering Principles, Springer</p> <p>- P. M. Doran (2013): Bioprocess Engineering Principles, Academic Press</p> <p>- S Liu (2013): Bioprocess Engineering: Kinetics, Biosystems, Sustainability, and Reactor Design, Elsevier</p> <p>- S. K. Niazi and J. L. Brown (2016): Fundamentals of Modern Bioprocessing, CRC Press</p> <p>- N. S. Mosier and M. R. Ladisch (2009): Modern Biotechnology: Connecting Innovations in Microbiology and Biochemistry to Engineering Fundamentals, Wiley/AICHE</p>

Bioproduction, internship (1510-422)

Person(en) verantwortlich	Prof. Dr.-Ing. Rudolf Hausmann
Person(en) begleitend	Dr. rer. nat. Karin Moß, Dr.-Ing. Marius Henkel
Lehrform	Praktikum
SWS	4

Inhalt	<p>Exemplary production of an heterologous protein in E.coli high cell density bioreactor cultivation</p> <p>Keeping of a labjournal / protocol</p> <p>Documentation and evaluation of bioreactor cultivation</p> <p>Working under sterile conditions</p> <p>On and off line analysis of key cultivation parameters (pO₂, pH, xO₂, xCO₂, cell density, substrate and product concentration)</p> <p>Bioreactor set-up: functions and peripherals</p> <p>Independently plan and carry out operations on the bioreactor</p> <p>Application of feed and induction strategies</p>
Literatur	<p>Henkel et al. (2015): Teaching bioprocess engineering to undergraduates: Multidisciplinary hands-on training in a one-week practical course, in: Biochemistry and Molecular Biology Education, Vol. 43, Iss. 3, pp 189–202 (http://dx.doi.org/10.1002/bmb.20860)</p>
Anmerkungen	<p>Attendance and active participation in the laboratory course is mandatory. Due to the fact that every group has full responsibility for performing their own experiment, in-lab times will be flexible but require reasonable planning on the main experimental days.</p>

Modul: Integrated Bioprocess Engineering - Upstream Processing (1510-440)

Modulverantwortung	Prof. Dr.-Ing. Rudolf Hausmann
Bezug zu anderen Modulen	Completion of the module "Recombinant Proteins (1506-430)" is recommended.
Teilnahmevoraussetzungen	Basic knowledge in microbiology, biochemistry and genetics
Sprache	englisch
ECTS	7,5
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	4 Wochen (Block 2)
Verbindlichkeit	Wahl
Studienleistung	Regular and active participation in the internship (laboratory notebook and scientific report), the lecture, the exercises and the holding of a seminar talk.
Modulprüfung	Laboratory performance, lab book and colloquium (20%), seminar presentation (20%), oral exam (60%)
Prüfungsdauer	20 Minuten

Arbeitsaufwand	90 h attendance + 135 h independent study = 225 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	After the completion of the module participants, ... 1. ...are able to theoretically report on products of industrial biotechnology. 2. ...are able to evaluate advantages and disadvantages of different biological systems. 3. ...are able to give an overview in current methods of upstream processing using bio-molecular methods. 4. ...have practically developed skills of the strain construction with a simple example. 5. ... have submitted a scientific documentation and report. 6. ... are able to analyze biosynthetic pathways in respect to the involved enzymes and corresponding genes with the help of internet-based databases.
Schlüsselkompetenzen	After the completion of the module participants, ... 1. ... have demonstrated organizational skills in the planning of the practical experiments. 2. ... have shown independent working in the lab. 3. ... have trained analytical thinking in the preparing of the scientific reports. 4. ...have practiced written and oral expression in scientific English. 5. ... have practiced communication and cooperation skills in planning the lab experiments.
Anmerkungen	Available places: 9 Registration for module: by email to: bvt@uni-hohenheim.de Registration period: until the last working day before the module start. Criteria for admission is granted: Mostly after first-served basis.
Industrial Biotechnology (1510-441)	
Person(en) verantwortlich	Prof. Dr.-Ing. Rudolf Hausmann
Person(en) begleitend	Dr. rer. nat. Karin Moß, Dr.-Ing. Marius Henkel
Lehrform	Vorlesung mit Übung und Seminar
SWS	2
Inhalt	<ul style="list-style-type: none"> - Overview of the products of industrial biotechnology with a focus on food additives and ingredients (for example, citric acid, glutamate, vitamin B2, etc ...) - In-depth theoretical knowledge of the use of biological, in particular microbial systems for the production of economically valuable biochemical. - Biosynthetic understanding of the primary and the secondary metabolism and fermentation products. - Represent theoretically optimal biosynthetic pathways and to calculate and establish the corresponding maximum yield coefficients.
Literatur	<ul style="list-style-type: none"> - P. M. Doran (2013): Bioprocess Engineering Principles, Academic Press - Shijie Liu (2013): Bioprocess Engineering: Kinetics, Biosystems, Sustainability, and Reactor Design, Elsevier - S. K. Niazi and J. L. Brown (2016): Fundamentals of Modern Bioprocessing, CRC Press - N. S. Mosier and M. R. Ladisch (2009): Modern Biotechnology: Connecting Innovations in Microbiology and Biochemistry to Engineering Fundamentals, Wiley/AICHE

Anmerkungen	Compulsive attendance of the lectures and exercises.
Genetic Strain Construction (1510-442)	
Person(en) verantwortlich	Prof. Dr.-Ing. Rudolf Hausmann
Person(en) begleitend	Dr. rer. nat. Karin Moß, Dr.-Ing. Marius Henkel
Lehrform	Praktikum
SWS	4
Inhalt	<p>A prokaryotic expression system (E. coli) with a plasmid cloning vector has been successfully constructed for the heterologous protein production.</p> <p>Options for different strategies have been investigated and discussed. These include:</p> <ul style="list-style-type: none"> - expression systems, promotor and induction systems, restriction endonucleases and respective recognition sites, genetic markers, preparation of vector, DNA-preparation, ligation, transformation, screening, molecular tags. <p>A laboratory work and evaluation of results have been documented in a lab journal and scientific report.</p>
Literatur	<ul style="list-style-type: none"> - M. Green and J. Sambrook (2012): Molecular Cloning: A Laboratory Manual (Fourth Edition), CSH Press - Cornel Mülhardt (2013) Der Experimentator Molekularbiologie / Genomics, Springer
Anmerkungen	Attendance and active participation in the laboratory course is mandatory. Due to the fact that every group has full responsibility for performing their own experiment, in-lab times will be flexible but require reasonable planning on the main experimental days.

Modul: Integrated Bioprocess Engineering – Bioseparation Process Science (Downstream Processing) (1510-430)

Modulverantwortung	Prof. Dr.-Ing. Rudolf Hausmann
Teilnahmevoraussetzungen	-
Sprache	englisch
ECTS	7,5
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	4 Wochen (Block 3)
Verbindlichkeit	Wahl
Studienleistung	Regular and active participation in the laboratory course (laboratory notebook and scientific report), the lecture, the exercises and the holding of a seminar talk.

Modulprüfung	Laboratory performance, lab book and colloquium (20%), seminar presentation (20%), oral exam (60%)
Prüfungsdauer	20 Minuten
Arbeitsaufwand	90 h attendance + 135 h independent study = 225 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	The participants should obtain a theoretic overview of all relevant process steps used in the purification of industrial bioproducts. At the end of the module they should be able to outline a product-specific scheme of purification. In a hands-on training the participants will have performed and analyzed some selected meth-ods.
Schlüsselkompetenzen	After the completion of the module the participants \r\n- have demonstrated working in a self-organized team\r\n- have analyzed and interpreted experimental data and discussed them theoreti-cally\r\n- have experienced and adapted to an interdisciplinary field.\r\n- have enhanced their scientific written and verbal skills.
Anmerkungen	Available places: 9\r\nRegistration for module: by email to: bvt@uni-hohenheim.dern\r\nRegistration period: until the last working day before the module start.\r\nCriteria for admission is granted: Mostly after first-served basis.

Downstream Processing (1510-431)

Person(en) verantwortlich	Prof. Dr.-Ing. Rudolf Hausmann
Person(en) begleitend	Dr. rer. nat. Karin Moß, Dr.-Ing. Marius Henkel
Lehrform	Vorlesung mit Seminar und Praktikum
SWS	6
Inhalt	The module comprises a lecture, a seminar and a lab hands-on training in which the purification of bioproducts from the original state as a component of a fermentation broth through progressive purification steps to a final product are the topic. Outline: 1) Introduction 2) Solid-Liquid Separation 3) Cell Disruption 4) Precipitation and Crystallization 5) Preparative Chromatography 6) Membrane Separation 7) Extraction 8) Refolding 9) Summary
Literatur	R. G. Harrison, P. Todd, S. R. Rudge, D. P. Petrides (2003): Bioseparations Science and Engineering, Oxford University Press
Anmerkungen	Attendance and active participation in the laboratory course is mandatory. Due to the fact that every group has full responsibility for performing their own experiment, in-lab times will be flexible but require reasonable planning on the main experimental days.

Modul: Projects in Bioeconomic Research - Applied Project (1505-430)

Modulverantwortung	Prof. Dr.-Ing. habil. Jörg Hinrichs, Dr. rer. nat. Zeynep Atamer, Myriam Löffler
Sprache	englisch
ECTS	7,5
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Arbeitsaufwand	180 h workload
Fachkompetenzen / Lern- und Qualifikationsziele	-
Schlüsselkompetenzen	-

Projects in Bioeconomic Research - Applied Project (1505-431)

Person(en) verantwortlich	Prof. Dr.-Ing. habil. Jörg Hinrichs
Person(en) begleitend	Myriam Löffler
Lehrform	Projekt/Projektarbeit
SWS	2
Inhalt	-

Modul: Scientific Writing and Reporting (1501-520)

Modulverantwortung	Prof. Dr. Herbert Schmidt
Teilnahmevoraussetzungen	-
Sprache	englisch
ECTS	7,5
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	4 Wochen (Block 1)
Verbindlichkeit	Wahl
Modulprüfung	Preparing and giving a ca. 30 minute presentation with ensuing discussion on a given natural scientific topic in English (internally graded, grade does not count towards the final grade)
Arbeitsaufwand	112 h attendance + 113 h independent study = 225 h workload

Fachkompetenzen / Lern- und Qualifikationsziele	<p>Students know how to</p> <ul style="list-style-type: none"> - look for literature independently - use statistical methods for analysing experimental data and molecular-biological databases - maintain a laboratory journal - discuss the basic of scientific practice - analyse and discuss micro-biological and biotechnological publications - draft, write and discuss biotechnological presentations and publications - are able to articulate themselves well in the context of natural scientific topics, both in written and spoken form - give scientific presentations - actively participate in scientific discussions - use new experimental and analytical methods in the areas of biotech-nology and microbiology
Literature Research (1501-521)	
Person(en) verantwortlich	Prof. Dr. Herbert Schmidt
Lehrform	Übung
SWS	2
Inhalt	<p>Introduction to literature research (internet, library, interlibrary loan)</p> <p>Introduction to the analysis of statistical experimental data</p> <p>Exemplary display of molecularbiological databases for finding new or improving known proteins</p>
Anmerkungen	This course is compulsory for all students of this MSc, also for those who have successfully completed the module Einführung in wissenschaftliches Arbeiten (Bachelor's programme Lebensmittelwissenschaft und Biotechnologie) (1502-020).
Scientific Publications (1501-522)	
Person(en) verantwortlich	Prof. Dr. Herbert Schmidt
Lehrform	Seminar mit Übung
SWS	4
Inhalt	<p>Introduction, theory and practice of scientific publications and presentations</p> <p>Students are given a topic / review & publication</p> <p>Preparation and independent presentation of a ca. 30-minute scientific presentation on a publication in the area of food microbiology and biotechnology with ensuing discussion</p>

Introduction in Microbiological and Enzymatic Methods (1501-523)	
Person(en) verantwortlich	Prof. Dr. Herbert Schmidt
Person(en) begleitend	Dr. Agnes Weiß, Dr. rer. nat. Elisabeth Hauser
Lehrform	Praktikum
SWS	2
Inhalt	The students learn: <ul style="list-style-type: none"> - Sterile working techniques - Factorial growth kinetics - Determination of food ingredients (e.g. ethanol, glucose, fructose, sucrose, nitrate, citrate) by enzymatic methods - Determination of enzyme activities in food - To protocol experiments - Using statistical methods for analysing experimental data
Literatur	Henniger, G. (2003) Enzymatic techniques for authenticating food components in Lees, M. (ed.) Food Authenticity and Traceability, CRC Press, 239-274

Modul: Soft Matter Science II - Food Physics (1507-510)

Modulverantwortung	Prof. Dr. Jochen Weiss
Bezug zu anderen Modulen	Second part to Soft Matter I - Food Rheology and Structure
Teilnahmevoraussetzungen	Admission to a Master's program. Basic knowledge in physical chemistry and mathematics.
Sprache	englisch
ECTS	7,5
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	4 Wochen (Block 1)
Verbindlichkeit	Wahl
Studienleistung	Laboratory presentation, Laboratory work
Prüfungsleistung	Klausur, Referat/Vortrag: 3-min. Talk, Poster presentation, Poster
Modulprüfung	Klausur (75%), optional mündliche Prüfung, Vortrag (10%), Poster mit Präsentation (15%)
Prüfungsdauer	90 Minuten
Arbeitsaufwand	64 h Präsenzzeit + 146 h Eigenanteil = 210 h Arbeitsaufwand
Fachkompetenzen / Lern- und Qualifikationsziele	Upon completion of the module, students are expected to have gained knowledge of physical phenomena that play a role in food systems. The students are able to demonstrate an understanding of (i) molecular material science approach to food systems, and (ii)

	structure-function relationships in matrices composed of proteins, lipids, and carbohydrates, and (iii) the operating principles of advanced physical analytical techniques as well as their use in the analysis of complex food structures. The students are able to apply principles of molecular mass transport, solution thermodynamics, phase transitions, and molecular interactions to solve problem-oriented case studies in foods. Furthermore, the students are able to explain, evaluate, and communicate concepts and results to their peers and professionals.
Schlüsselkompetenzen	Upon completion of the module, students are able to work as a part of a team, and develop stronger communication skills by completing assignments and designing clear and well-organized presentations, posters and flash talks. The students are expected to apply critical and analytical thinking to solve food physics-related challenges. Students are able to improve their written and oral English skills.
Anmerkungen	Maximum number of participants: 50
Soft Matter Science II - Food Physics (1507-511)	
Person(en) verantwortlich	Prof. Dr. Jochen Weiss
Lehrform	Vorlesung mit Übung und Praktikum
SWS	4
Inhalt	This module reviews fundamental concepts of food physics, and aims to deliver knowledge of principles of physical phenomena (e.g., mass transport, solution thermodynamics, molecular and particle interactions, and phase transitions) in complex food matrices. Case studies highlight the connection between the theory and practical relevance. Student assignments aim to promote knowledge transfer and enable the students to apply the scientific concepts and scientific literature. These assignments involve calculation exercises, and laboratory studies that will be also orally presented during the module. Moreover, individual flash talks and poster presentations based on current papers in the area of food physics will be presented in a formal scientific setting of a mini-conference during the module.
Literatur	Principles of Colloid and Surface Chemistry, CRC Press, 1997, ISBN: 978-0824793975 Polymer Chemistry, CRC Press, 2007, ISBN: 978-1574447798 Phase Transitions in Foods (1. Ed), Academic Press, 1995, ISBN: 978-0125953405 Phase Transitions in Foods (2. Ed) Academic Press, 2016, ISBN: 978-0124080867 Biophysics: An introduction, Springer, 2012, ISBN: 978-3-642-25211-2 Biophysics, Springer, 2002, ISBN: 978-1-4020-0218-2

III. Wahlmodule: Bereich Wirtschafts- und Sozialwissenschaften

Modul: Banking (5106-510)

Modulverantwortung	Prof. Dr. Hans-Peter Burghof
Bezug zu anderen Modulen	keine
Teilnahmevoraussetzungen	keine
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Zwei schriftliche Klausuren á 60 Minuten.
Prüfungsdauer	120 Minuten
Arbeitsaufwand	180 Stunden: 56 Stunden Präsenzstudium 124 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse in grundlegender Banktheorie sowie auch über Management und Risiken von Banken in der Praxis. Sie verfügen über Erfahrung im Umgang mit komplexen theoretischen Zusammenhängen und können ihr Wissen ergebnisorientiert anwenden. Sie können Bankenrisiken analysieren und bewerten. Sie sind in der Lage praktische Fragestellung mit Hilfe von theoretischen Modellen zu beantworten.

Financial Intermediation (5106-511)

Person(en) verantwortlich	Prof. Dr. Hans-Peter Burghof
Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	Financial Intermediation befasst sich mit dem Risiko- und Ertragsmanagement von Banken. Inhaltliche Schwerpunkte in diesem Bereich sind die Messung, Abbildung und Steuerung von Bankrisiken sowie Systeme der ertragsorientierten Bankmanagements und Bankkalkulation.
Literatur	Hartmann-Wendels, T. und A. Pfingsten, M. Weber, 2000, Bankbetriebslehre, Berlin
Anmerkungen	Die Lehrveranstaltung findet in Englisch statt

Theory of Debt & Bank Lending (5106-512)

Person(en) verantwortlich	Prof. Dr. Hans-Peter Burghof
Lehrform	Vorlesung mit Übung
SWS	2

Inhalt	Die Vorlesung beschäftigt sich mit grundlegenden Theorien des Kreditgeschäfts von Banken und dem Management von Bankkrediten in der Praxis. Behandelt werden Grundlagen der Kreditvergabe, Kreditgeschäfte von Banken (Organisation, Regulierung, Kreditwürdigkeitsprüfung und Ratings, optionsbasierte Bewertung von Kreditinstrumenten) und theoretisch optimale Kreditverträge (Vertragstheorie, begrenzte Haftung, Informationsproduktion in langfristigen Kreditbeziehungen, unvollständige Verträge).
Literatur	x

Modul: Consumer Policy (5206-510)

Modulverantwortung	Prof. Dr. Michael Ahlheim
Bezug zu anderen Modulen	Keine
Teilnahmevoraussetzungen	Inhaltliche Vorrasssetzungen: Grundlagenveranstaltungen Theoretical Foundations in Economics und Methods in Economics erfolgreich abgeschlossen.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Klausur
Prüfungsdauer	120 Minuten
Arbeitsaufwand	180 Stunden: 56 Stunden Präsenzstudium 124 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse über die wohlfahrts- und informationsökonomischen Konzepte, die mit dem Prinzip der Konsumentensouveränität in unmittelbarem Zusammenhang stehen, sowie deren praktische Anwendung. Sie verfügen über die Fähigkeit, verbraucherpolitische Probleme zu erkennen, mit angebrachten Methoden zu analysieren sowie geeignete Handlungsempfehlungen zu geben. Die Studierenden vertiefen ihre Kenntnis wohlfahrtsökonomischer Modelle und setzen sich ausführlich mit informations- und spieltheoretischen Inhalten auseinander. Sie sind in der Lage, mathematisch-formale Modelle im Bereich der Wohlfahrts- und Informationsökonomik auch in weiterführenden Zusammenhängen anzuwenden sowie verbraucherpolitische Probleme fundiert zu analysieren.
Anmerkungen	Weitere Informationen finden Sie auf der Homepage des Lehrstuhls (https://umweltoekonomie.uni-hohenheim.de/).
Consumer Policy (Vorlesung) (5206-511)	

Person(en) verantwortlich	Prof. Dr. Michael Ahlheim
Lehrform	Vorlesung
SWS	2
Inhalt	Die Vorlesung behandelt die Thematik des Marktversagens im Konsumsektor und die Möglichkeiten von Staatseingriffen um die Interessen der Konsumenten zu schützen. Der Schwerpunkt liegt auf dem Problem der Konsumenteninformation und den passenden politischen Instrumenten für dieses Problem. Die theoretischen Hauptthemen beinhalten asymmetrische Informationen, Preis- und Qualitätsunsicherheit, Moral Hazard, adverse Selektion und die Prinzipal-Agenten-Theorie. Desweiteren wird ein Überblick über Marktmechanismen gegeben, welche sich mit Informationsaspekten, wie Marketing, Werbung, Gewährleistungen, Lizenzvergabe, etc. beschäftigen. Ein weiteres Thema wird der Konsumentenschutz vor Ausbeutung durch monopolistische oder oligopolistische Marktstrukturen sein.
Literatur	Introductory literature on theory and practical application will be provided on ILIAS. In addition to this, suitable literature to individual topics will also be announced in the lecture course appositely.
Anmerkungen	Weitere Information sind über die Homepage des Lehrstuhls zugänglich (https://umweltoekonomie.uni-hohenheim.de/).

Consumer Policy (Übung) (5206-512)

Person(en) verantwortlich	Prof. Dr. Michael Ahlheim
Lehrform	Übung
SWS	2
Inhalt	Die Übung dient zum tieferen Verständnis der in der Vorlesung behandelten Themen durch das Lösen von mathematischen Problemen und anhand von Fallbeispielen.
Literatur	Introductory literature on theory and practical application will be provided on ILIAS. In addition to this, suitable literature to individual topics will also be announced in the lecture course appositely.
Anmerkungen	Der Beginn der Veranstaltung wird in der Vorlesung bekannt gegeben.

Modul: Derivatives (5106-640)

Modulverantwortung	Prof. Dr. Hans-Peter Burghof
Bezug zu anderen Modulen	keine
Teilnahmevoraussetzungen	keine
Sprache	englisch

ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Klausur
Prüfungsdauer	60 Minuten
Arbeitsaufwand	180 Stunden: 28 Stunden Präsenzstudium 152 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse im Umgang mit Finanztiteln. Sie verfügen über Erfahrung in der Bewertung von Finanzinstrumenten und können die relevanten Risiken einschätzen. Das Modul zeichnet sich durch besondere Praxisnähe aus. Sie sind in der Lage praktische Fragestellungen mit Hilfe von theoretischen Methoden zu analysieren
Derivatives (5106-611)	
Person(en) verantwortlich	Dr. oec. Daniel Sommer
Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	In dieser Vorlesung werden Grundlagen zur Konstruktion, Anwendung und Bewertung von Finanzderivaten (Optionen, Futures, Swaps) vermittelt. Die Veranstaltung beschäftigt sich mit dem dynamischen Fachgebiet der Finanzderivate. In engem Bezug zur Praxis werden theoretische Grundlagen der Bewertung, Anwendung und Risiken verschiedener Finanzderivate (Optionen, Futures, Swaps) vermittelt. Die behandelten Finanztitel reichen von Aktienoptionen über Währungsswaps und Zinsfutures bis zu exotischen Optionen. Zudem werden die Auswirkungen der globalen Finanzkrise auf den Handel mit derivativen Produkten und deren Bewertung näher beleuchtet.
Literatur	Rudolph, Bernd; Schäfer, Klaus "Derivate Finanzinstrumente" 2005

Modul: Entrepreneurial Finance (5105-140)

Modulverantwortung	Prof. Dr. Tereza Tykvová
Bezug zu anderen Modulen	Es bestehen enge methodische (Grundlagen Ökonometrie) und thematische (Grundlagen Corporate Finance) Bezüge zum Modul Advanced Corporate Finance und zum Seminarmodul Banking and Finance

Teilnahmevoraussetzungen	Die Studierenden sollten bereits eine Master-Veranstaltung in Ökonometrie absolviert haben (bspw. „Multivariate Data Analysis“, „Quantitative Finance“, „Econometrics“, „Financial Econometrics“).
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Klausur (60min), Präsentation (45min), aktive Mitarbeit
Prüfungsdauer	60 Minuten
Arbeitsaufwand	180 Stunden 42 Stunden Präsenzstudium 138 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden kennen sämtliche Stufen im Entwicklungsprozess eines jungen Unternehmens, von der Gründung bis hin zum Verkauf, die für Unternehmensgründer, Venture-Capital-Gesellschaften und deren Investoren von großer Wichtigkeit sind. Aufbauend auf Fähigkeiten aus dem Bachelor können die Studierenden zu Finanzierungsmöglichkeiten der jungen Unternehmen, zu Selektionsprozessen der Venture-Capital-Gesellschaften, zu Vertragsstrukturen, Exit-Kanälen oder Bewertungen dieser Unternehmen Stellung nehmen. Sie sind in der Lage sich mit wissenschaftlichen Arbeiten zu diesem Thema selbstständig auseinander zu setzen, diese zu präsentieren und zu diskutieren.
Anmerkungen	Die Studierenden erhalten Einblicke in die entsprechenden Themen sowohl aus theoretischer als auch aus empirischer Sicht.
Entrepreneurial Finance (5105-141)	
Person(en) verantwortlich	Prof. Dr. Tereza Tykvová
Lehrform	Vorlesung
SWS	2
Inhalt	Der Kurs untersucht sämtliche Stufen im Entwicklungsprozess eines jungen Unternehmens, von der Gründung bis hin zum Verkauf. Es werden Kernfragen behandelt, die für Unternehmensgründer, Venture-Capital-Gesellschaften und deren Investoren von großer Wichtigkeit sind: Wie viel Geld muss beschafft werden? Wer soll das Geld zur Verfügung stellen und wann? Wie soll das Unternehmen bewertet werden? Wie muss die Finanzierung strukturiert werden? Wie soll man sich hinsichtlich eines potentiellen Ausstiegs entscheiden? Zusätzlich wird eine ausführliche Analyse über die Strukturen der Venture Capital Industrie durchgeführt.
Literatur	Ausgewählte Artikel .
Cases in Entrepreneurial Finance (5105-142)	

Person(en) verantwortlich	Prof. Dr. Tereza Tykvová
Lehrform	Übung
SWS	1
Inhalt	Diskussion anhand ausgewählter (aktueller) Artikel.
Literatur	Ausgewählte Artikel
Anmerkungen	Für mehr Informationen siehe die Vorlesung Entrepreneurial Finance.

Modul: Environmental Economics 1 (5206-520)

Modulverantwortung	Prof. Dr. Michael Ahlheim
Bezug zu anderen Modulen	Keine
Teilnahmevoraussetzungen	Inhaltliche Voraussetzungen: Grundlagenveranstaltungen "Theoretical Foundations in Economics" und "Methods in Economics" erfolgreich abgeschlossen.
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Klausur
Prüfungsdauer	120 Minuten
Arbeitsaufwand	180 Stunden: 56 Stunden Präsenzstudium 124 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden kennen die umweltökonomischen Instrumente, die wohlfahrtsökonomische Umweltbewertung sowie die Ressourcenökonomie. Sie verfügen über die Fähigkeit, umwelt- und ressourcenökonomische Probleme zu erkennen, mit angebrachten Modellen zu analysieren sowie geeignete Handlungsempfehlungen zu geben. Die Studierenden vertiefen ihre Kenntnisse wohlfahrtsökonomischer Modelle und setzen sich ausführlich mit Umweltinstrumenten und den wohlfahrtsökonomischen Grundlagen von Kosten-Nutzen-Analysen im Umweltbereich auseinander. Sie sind in der Lage, mathematisch-formale Modelle im Bereich der Umwelt- und Ressourcenökonomie auch in weiterführenden Zusammenhängen anzuwenden sowie aktuelle umwelt- und ressourcenökonomische Probleme fundiert zu analysieren.
Anmerkungen	Weitere Informationen finden Sie auf der Homepage des Lehrstuhls (https://umweltoekonomie.uni-hohenheim.de/).

Resource Economics and Environmental Policy (Vorlesung) (5206-521)	
Person(en) verantwortlich	Prof. Dr. Michael Ahlheim
Lehrform	Vorlesung
SWS	2
Inhalt	Die Vorlesung beginnt mit einem Überblick über Sustainability-Konzepte, aus der ökonomischen Literatur und der praktischen Umweltpolitik. Zudem werden ökonomischen Gründe für das Versagen einer Marktökonomie, die Sustainability ohne Staatseingriffe sicherstellt, untersucht. Anschließend werden umweltpolitische Instrumente unter dem Aspekt ihrer Tauglichkeit, dem Marktversagen im nationalen sowie internationalen Kontext gerecht zu werden, untersucht. Desweiteren wird auf Basis verschiedener intertemporaler Ressourcen-Modelle das Problem einer nachhaltigen Ressourcennutzung diskutiert. Die theoretische Diskussion wird durch empirischer Beispiele der praktischen Umweltpolitik veranschaulicht.
Literatur	Introductory literature on theory and practical application will be provided on ILIAS. In addition to this, suitable literature to individual topics will also be announced in the lecture course appositely.
Anmerkungen	Weitere Informationen finden Sie auf der Homepage des Lehrstuhls (https://umweltoekonomie.uni-hohenheim.de/).

Resource Economics and Environmental Policy (Übung) (5206-522)	
Person(en) verantwortlich	Prof. Dr. Michael Ahlheim
Lehrform	Übung
SWS	2
Inhalt	Die Übung dient zum tieferen Verständnis der in der Vorlesung behandelten Themen durch das Lösen von mathematischen Problemen und anhand von Fallbeispielen.
Literatur	Introductory literature on theory and practical application will be provided on ILIAS. In addition to this, suitable literature to individual topics will also be announced in the lecture course appositely.
Anmerkungen	Weitere Informationen finden Sie auf der Homepage des Lehrstuhls (https://umweltoekonomie.uni-hohenheim.de/).

Modul: Environmental Economics 2 (5206-610)

Modulverantwortung	Prof. Dr. Michael Ahlheim
Bezug zu anderen Modulen	Keine
Teilnahmevoraussetzungen	Inhaltliche Voraussetzungen: Grundlagenveranstaltungen "Theoretical Foundations in Economics" und "Methods in Economics" erfolgreich abgeschlossen.

Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Klausur
Prüfungsdauer	120 Minuten
Arbeitsaufwand	180 Stunden: 56 Stunden Präsenzstudium 124 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden kennen die umweltökonomischen Instrumente, die wohlfahrtsökonomische Umweltbewertung sowie die Ressourcenökonomie. Sie verfügen über die Fähigkeit, umwelt- und ressourcenökonomische Probleme zu erkennen, mit angebrachten Modellen zu analysieren sowie geeignete Handlungsempfehlungen zu geben. Die Studierenden vertiefen ihre Kenntnisse wohlfahrtsökonomischer Modelle und setzen sich ausführlich mit Umweltinstrumenten und den wohlfahrtsökonomischen Grundlagen von Kosten-Nutzen-Analysen im Umweltbereich auseinander. Sie sind in der Lage, mathematisch-formale Modelle im Bereich der Umwelt- und Ressourcenökonomie auch in weiterführenden Zusammenhängen anzuwenden sowie aktuelle umwelt- und ressourcenökonomische Probleme fundiert zu analysieren.
Anmerkungen	Modul besteht aus einer Vorlesung von 90 Min/Woche und einer Übung von 90Min/Woche.
Cost Benefit Analysis and Environmental Valuation (Vorlesung) (5206-611)	
Person(en) verantwortlich	Prof. Dr. Michael Ahlheim
Lehrform	Vorlesung
SWS	2
Inhalt	This course focusses on the changes in social welfare caused by changes in environmental quality and on their measurement in monetary terms. Based on neoclassical welfare theory the different concepts of empirical welfare measurement will be discussed. Then practical assessment techniques will be introduced and illustrated on the basis of case studies taken from the able research of the chair in this field. Revealed preference methods like the Travel Cost Method, Averting Behaviour, Hedonic Prices etc. as well as stated preference methods like Choice Experiments and the Contingent Valuation Method will be discussed at length.
Literatur	Literatur wird in ILIAS zur Verfügung gestellt

Anmerkungen	Weitere Information sind über die Homepage des Lehrstuhls zugänglich (https://umweltoekonomie.uni-hohenheim.de/).
Cost Benefit Analysis and Environmental Valuation (Übung) (5206-612)	
Person(en) verantwortlich	Prof. Dr. Michael Ahlheim
Lehrform	Übung
SWS	2
Inhalt	Die Übung dient zum tieferen Verständnis der in der Vorlesung behandelten Themen durch das Lösen von mathematischen Problemen und anhand von Fallbeispielen.
Literatur	Literatur wird in ILIAS zur Verfügung gestellt.
Anmerkungen	Weitere Information sind über die Homepage des Lehrstuhls zugänglich (https://umweltoekonomie.uni-hohenheim.de/).

Modul: Growth Economics 1 (5208-510)

Modulverantwortung	Prof. Dr. Harald Hagemann
Bezug zu anderen Modulen	Advanced Macroeconomics, Economics of Innovation (1+2), Technology and Employment, Money and Employment, International Trade 1, Economic History and History of Economic Thought (1+2)
Teilnahmevoraussetzungen	keine
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Klausur
Prüfungsdauer	60 Minuten
Arbeitsaufwand	180 Stunden: 56 Stunden Präsenzstudium 124 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse der kanonischen Modelle in der modernen Wachstumstheorie. Sie verfügen über ein tieferes Verständnis der Ursachen für die weltweiten Einkommensunterschiede und Wachstumsstrukturen unserer Zeit. Das Ziel dieser Lehrveranstaltung ist es, ein fundiertes Verständnis der Ursachen der Einkommensunterschiede und des langfristigen weltweiten Wirtschaftswachstums zu vermitteln. Warum sind manche Länder wirtschaftlich stärker als andere? Wie lassen sich die großen Unterschiede im Pro-Kopf-Einkommen, der Produktivität und den

	entsprechenden wirtschaftlichen Wachstumsraten erklären? Weshalb lassen sich unterschiedliche Konvergenz- und Divergenzmuster bei einzelnen Ländern feststellen, wobei einige Länder wirtschaftlich auf- und sogar überholen während andere zurückfallen? Sie sind in der Lage, die wichtigsten Wachstumspfadparadigmen (das Neoklassische Modell, Produkt-Varietäts-Modelle, Schumpeter'sche Modelle) kritisch zu diskutieren, wobei die Studierenden auf eine umfassende Besprechung der weiterführenden Themen wie Allzwecktechnologien, "Directed Technical Change", induzierter technologischer Fortschritt, Institutionen sowie Kultur und Religion aufbauen können. All diese Themenkomplexe sollen den Studierenden mehr Aufschluss über die dynamischen Prozesse und die fundamentalen Ursachen für Wachstum und Entwicklung geben.
Modern Economic Growth (Vorlesung) (5208-511)	
Person(en) verantwortlich	Prof. Dr. Harald Hagemann
Lehrform	Vorlesung
SWS	2
Inhalt	Die Studierenden haben vertiefte und fortgeschrittene Kenntnisse der volkswirtschaftlichen endogenen Wachstumstheorie, formaler Modelle sowie empirischer Anwendungen derselben. Sie kennen die zentralen volkswirtschaftlichen Erklärungsansätze zur Rolle von Innovationen und technologischem Fortschritt für wirtschaftliches Wachstum und können diese innerhalb entsprechender mathematischer Modelle herleiten. Sie sind in der Lage, den Zusammenhang zwischen technologischen Entwicklungen, Produktivität, Humankapital und Wirtschaftswachstum betreffende Erklärungsansätze miteinander zu vergleichen und theoretische Argumente anhand empirischer Daten zu überprüfen und zu bewerten. Die Studierenden können ihr Wissen bei fortgeschrittenen Fragestellungen der volkswirtschaftlichen Wachstumstheorie gezielt und ergebnisorientiert anwenden und wirtschaftspolitische Anhaltspunkte ableiten.
Literatur	Acemoglu (2009), Introduction to Modern Economic Growth, Princeton: Princeton University Press. Aghion, P. & Howitt, P. (2009), The Economics of Growth, Cambridge, MA: The MIT Press.
Modern Economic Growth (Übung) (5208-512)	
Person(en) verantwortlich	Prof. Dr. Harald Hagemann
Lehrform	Übung
SWS	2
Inhalt	Die Übung ist als Lektürekurs aufgebaut. Begleitend zu den Vorlesungsinhalten wird mit den Studenten Zeitschriftenartikel oder Buchkapitel intensiv diskutiert. Die Themen orientieren sich hierbei an denen der Vorlesung "Modern Economic Growth". Mit den Studenten wird zunächst die Schlüsselliteratur der

	Wachstumstheorie besprochen. Dies umfasst das neoklassische Wachstumsmodell nach Solow und Ramsey, die endogene Wachstumstheorie, Produktvarietätsmodelle und der Skaleneffekt sowie die Schumpeter'schen Innovationsmodelle. Anschließend wird die zentrale Literatur zu Humankapitalmodellen, Allzwecktechnologien, induziertem technologischen Fortschritt vertieft.
Literatur	Acemoglu (2009), Introduction to Modern Economic Growth, Princeton: Princeton University Press. Aghion, P. & Howitt, P. (2009), The Economics of Growth, Cambridge, MA: The MIT Press.

Modul: Health Economics (5301-450)

Modulverantwortung	Prof. Dr. Alfonso Sousa-Poza
Teilnahmevoraussetzungen	keine
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester, 3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Klausur
Prüfungsdauer	60 Minuten
Arbeitsaufwand	180 Stunden 42 Stunden Präsenzstudium 138 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden kennen die grundlegenden Besonderheiten der Gesundheitsökonomie und die dort angewendete Methodik. Sie kennen den Gesundheitsmarkt von Anbieter- und Nachfragerseite, sowie dort herrschende Anreizstrukturen. Es können Entscheidungen im Bereich des Gesundheitswesens auf Basis ökonomischer Aspekte fundiert bewertet und kritisch reflektiert werden.
Health Economics (5301-411)	
Person(en) verantwortlich	Prof. Dr. Alfonso Sousa-Poza
Lehrform	Vorlesung
SWS	3

Inhalt	Die Veranstaltung befasst sich mit zentralen Fragen der Gesundheitsökonomie. Behandelt werden u.a. ökonomische Bewertungsmöglichkeiten von Gesundheit, deren Nachfrage, der Ärztemarkt, Krankenhausleistungen und die optimale Entlohnung der Leistungsanbieter.
Literatur	Zweifel / Breyer / Kiffmann (2009): Health Economics, Springer.

Modul: International Innovation Management (5706-410)

Modulverantwortung	Prof. Dr. Alexander Gerybadze
Bezug zu anderen Modulen	Keine
Teilnahmevoraussetzungen	Keine
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Klausur
Prüfungsdauer	90 Minuten
Arbeitsaufwand	180 Stunden: 28 Stunden Präsenzstudium 152 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse im Strategischen Management von Technologien. Sie verfügen über Kompetenzen im Technologie- und Innovationsmanagement. Insbesondere verstehen die Studierenden unternehmensseitige Innovationssysteme sowie Systeme zur Generierung neuen Wissens. Sie sind in der Lage unter anderem technologische Kooperationsprojekte zu analysieren und zu managen.

International Innovation Management (5706-411)

Person(en) verantwortlich	Prof. Dr. Alexander Gerybadze
Lehrform	Vorlesung
SWS	2
Inhalt	Die Vorlesung „International Innovation Management“ wird in Englisch abgehalten. Sie gibt einen Überblick zur Innovationsforschung und zu neuesten Entwicklungen und Methoden des Technologie- und Innovationsmanagements.
Literatur	Gerybadze, A. (2004), Technologie- und Innovationsmanagement, Verlag Vahlen, München.

	Weitere Literatur wird in der Veranstaltung bekanntgegeben.
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Modul: International Innovation Management 2 (5706-550)

Modulverantwortung	Prof. Dr. Bernd Ebersberger
Teilnahmevoraussetzungen	keine
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Klausur und Referat
Prüfungsdauer	60 Minuten
Arbeitsaufwand	180 Stunden: 56 Stunden Präsenzstudium 124 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	<p>Die Studierenden verfügen über ein fundiertes Wissen und Verständnis über die wichtigsten Prinzipien sowie der grundlegenden Konzepte und Theorien des Innovationsmanagements und seiner Fragestellungen, insbesondere im Hinblick auf die Innovationsquellen, die Innovationszusammenarbeit, die Auswahl von Innovationsprojekten und die Wertschöpfung aus Innovationen.</p> <p>Studierende können Innovation und Innovationsmanagement in den Kontext internationaler Unternehmungen stellen. Sie haben einen umfassenden Überblick über die Methoden und Instrumente des Innovationsmanagements.</p> <p>Die Studierenden kennen die wesentliche Literatur des Innovationsmanagements und können diese kritisch diskutieren. Sie können diskutieren, wie sich die in wissenschaftlichen Arbeiten erzielten Erkenntnisse auf die Herausforderungen des Innovationsmanagements beziehen. Sie können die Anwendbarkeit von Methoden und Instrumenten des Innovationsmanagements bewerten. Die Studierenden können ihre eigenen Meinungen und Erfahrungen in Diskussionen über Innovation und Innovationsmanagement einbringen.</p>
Anmerkungen	Für weitere Informationen besuchen Sie bitte innovation.uni-hohenheim.de

International Innovation Management 2 (5706-551)

Person(en) verantwortlich	Prof. Dr. Bernd Ebersberger
Lehrform	Vorlesung mit Übung

SWS	4
Inhalt	Innovationszusammenarbeit. Entscheidungsfindung unter Unsicherheit. Neue Produkte und Dienstleistungen schaffen. Open Innovation und Zusammenarbeit. Entrepreneurship und neue Unternehmungen. Ökonomische Vorteile von Innovation sichern.
Literatur	Dodgson, M., Gann, D.M., & Salter, A.J. (2008). The management of technological innovation. Oxford: Oxford Univ Press. Tidd, J., & Bessant, J. (2018). Managing innovation: Integrating technological, market and organizational change (6 th ed.). Wiley. Mehrere Papiere aus den Zeitschriften R&D Management, Research Policy, Strategic Management Journal, Journal of International Business Studies, World Development, etc. Diese Papiere werden im Kurs bekannt gegeben.
Anmerkungen	Für weitere Informationen besuchen Sie bitte innovation.uni-hohenheim.de

Modul: Management-Methodik II (5301-440)

Modulverantwortung	Prof. Dr. Alfonso Sousa-Poza
Bezug zu anderen Modulen	Quantitative Methoden 1, Quantitative Methoden 2, Quantitative Methoden 3 (B.Sc.)
Teilnahmevoraussetzungen	Ansätze der deskriptiven Datenanalyse, Grundlagen der Wahrscheinlichkeitstheorie, das Konzept von Zufallsvariablen und ihrer Verteilung, inferenzstatistische Schätz- und Testansätze sind bekannt.
Sprache	englisch
ECTS	4
Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester, 3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Klausur
Prüfungsdauer	60 Minuten
Arbeitsaufwand	120 Stunden: 42 Stunden Präsenzstudium 78 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden kennen einige der gängigsten Verfahren der multivariaten Datenanalyse. Aufbauend auf Fähigkeiten aus dem ersten Hochschulstudium / Bachelor können die Studierenden die Ergebnisse wesentlicher multivariater Analysemethoden verstehen und interpretieren. Das Modul vermittelt, wie sich schwierige statistische/ökonomische Konzepte in ihre wesentlichen

	Bestandteile zerlegen lassen und welche Erkenntnisse sich aus deren Ergebnisse ableiten lassen. Sie sind in der Lage Analysemethoden wie multiple Regression, Faktorenanalyse oder logistische Regression geeignet zum Einsatz zu bringen und die Ergebnisse zu interpretieren.
Anmerkungen	Vorlesungen werden auf Englisch stattfinden.
Multivariate Data Analysis (5301-441)	
Person(en) verantwortlich	Prof. Dr. Alfonso Sousa-Poza
Lehrform	Vorlesung mit Übung
SWS	3
Inhalt	Diese Vorlesung vermittelt Kenntnisse zum Verständnis und zur Anwendung multivariater Analysemethoden. Dabei handelt es sich um eine anwendungsbezogene Vorlesung, deren Fokus weniger auf der formalen Herleitung sondern eher auf der Anwendung der besprochenen Methoden liegt. In der Vorlesung wird vermittelt, wie sich schwierige statistische Konzepte in ihre wesentlichen Bestandteile zerlegen lassen und wie die Ergebnisse spezifischer Analysetechniken zu verstehen und zu interpretieren sind. Insbesondere werden die Analysemethoden multiple Regression, Faktoranalyse und logistische Regression behandelt
Literatur	Joseph F. Hair, William C. Black, Barry J. Babin, Rolph E. Anderson, Multivariate Data Analysis: A Global Perspective, 7th Edition, Pearson, 2010. Jeffrey M. Wooldridge, Introductory Econometrics – A Modern Approach, 5th Edition, South-Western, 2009.

Modul: Portfoliomanagement (5106-630)

Modulverantwortung	Prof. Dr. Hans-Peter Burghof
Bezug zu anderen Modulen	keine
Teilnahmevoraussetzungen	keine
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Portfolio Management: Klausur (50%), Präsentation (50%)
Prüfungsdauer	60 Minuten

Arbeitsaufwand	180 Stunden: 28 Stunden Präsenzstudium 152 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse im Umgang mit Finanztiteln. Sie verfügen über Erfahrung in der Bewertung von Finanzinstrumenten und können die relevanten Risiken einschätzen. Das Modul zeichnet sich durch besondere Praxisnähe aus. Sie sind in der Lage praktische Fragestellungen mit Hilfe von theoretischen Methoden zu analysieren
Portfoliomanagement (5106-612)	
Person(en) verantwortlich	Prof. Dr. Hans-Peter Burghof
Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	Basierend auf wissenschaftlichen Theorien (Portfoliotheorie, Capital Asset Pricing Modell) wird in dieser Vorlesung vermittelt, wie aus verschiedenen Assets ein ertragsmaximierendes Portfolio unter Berücksichtigung von Risiken generiert werden kann. Zudem sollen die Studierenden einen Teilbereich mit Praxisbezug selbstständig erarbeiten.
Literatur	Grinblatt / Titman: Financial Markets and Corporate Strategy, 2. Ed., New York, 2002; Bodie / Kane / Marcus: Investments and Portfolio Management, 9. Ed., New York, 2011

Modul: Portfoliomanagement & Derivatives (5106-610)

Modulverantwortung	Prof. Dr. Hans-Peter Burghof
Bezug zu anderen Modulen	keine
Teilnahmevoraussetzungen	keine
Sprache	englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Portfolio Management: 60-minütige Klausur (50%), Präsentation (40%) und mündliche Leistung (10%); Derivatives: 60-minütige Klausur
Arbeitsaufwand	180 Stunden: 28 Stunden Präsenzstudium 152 Stunden Selbststudium

Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse im Umgang mit Finanztiteln. Sie verfügen über Erfahrung in der Bewertung von Finanzinstrumenten und können die relevanten Risiken einschätzen. Das Modul zeichnet sich durch besondere Praxisnähe aus. Sie sind in der Lage praktische Fragestellungen mit Hilfe von theoretischen Methoden zu analysieren
Anmerkungen	Das Modul besteht aus zwei Wahlpflicht Lehrveranstaltungen (Portfolio Management und Derivatives), von denen eine gewählt werden muss.
Derivatives (5106-611)	
Person(en) verantwortlich	Dr. oec. Daniel Sommer
Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	<p>In dieser Vorlesung werden Grundlagen zur Konstruktion, Anwendung und Bewertung von Finanzderivaten (Optionen, Futures, Swaps) vermittelt.</p> <p>Die Veranstaltung beschäftigt sich mit dem dynamischen Fachgebiet der Finanzderivate. In engem Bezug zur Praxis werden theoretische Grundlagen der Bewertung, Anwendung und Risiken verschiedener Finanzderivate (Optionen, Futures, Swaps) vermittelt. Die behandelten Finanztitel reichen von Aktienoptionen über Währungsswaps und Zinsfutures bis zu exotischen Optionen. Zudem werden die Auswirkungen der globalen Finanzkrise auf den Handel mit derivativen Produkten und deren Bewertung näher beleuchtet.</p>
Literatur	Rudolph, Bernd; Schäfer, Klaus "Derivate Finanzinstrumente" 2005
Portfoliomanagement (5106-612)	
Person(en) verantwortlich	Prof. Dr. Hans-Peter Burghof
Lehrform	Vorlesung mit Übung
SWS	2
Inhalt	Basierend auf wissenschaftlichen Theorien (Portfoliotheorie, Capital Asset Pricing Modell) wird in dieser Vorlesung vermittelt, wie aus verschiedenen Assets ein ertragsmaximierendes Portfolio unter Berücksichtigung von Risiken generiert werden kann. Zudem sollen die Studierenden einen Teilbereich mit Praxisbezug selbstständig erarbeiten.
Literatur	<p>Grinblatt / Titman: Financial Markets and Corporate Strategy, 2. Ed., New York, 2002;</p> <p>Bodie / Kane / Marcus: Investments and Portfolio Management, 9. Ed., New York, 2011</p>

Modul: Supply Chain Planning & Advanced Planning Systems 1 (5803-420)

Modulverantwortung	Prof. Dr. Herbert Meyr
Bezug zu anderen Modulen	Modul Supply Chain Planning & Advanced Planning Systems 2
Teilnahmevoraussetzungen	keine
Sprache	deutsch/englisch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	1. Semester, 3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Klausur
Prüfungsdauer	60 Minuten
Arbeitsaufwand	180 Stunden: 42 Stunden Präsenzstudium 138 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse im Bereich der Supply Chain Planung (SCP) und hinsichtlich Advanced Planning Systemen (APS). Sie verfügen über Kenntnisse hinsichtlich lang-, mittel- und kurzfristiger Planungsprobleme und Lösungsansätze aus allen Teilbereichen der SCP sowie hinsichtlich der Verbindung zu integrierten Planungskonzepten und bzgl. der Struktur von APS. Sie haben erlernt, Supply Chains zu analysieren und erfahren, wie APS strukturiert sind und eingesetzt werden. Sie sind in der Lage die genannten Probleme zu identifizieren und zu analysieren sowie praxisrelevante Maßnahmen bzgl. der identifizierten Probleme abzuleiten und anzuwenden.
Anmerkungen	Festlegung der Veranstaltungssprache erfolgt in den ersten beiden Vorlesungswochen.

Supply Chain Planning & Advanced Planning Systems 1 (5803-421)

Person(en) verantwortlich	Prof. Dr. Herbert Meyr
Lehrform	Vorlesung mit Übung
SWS	3
Inhalt	Ein wesentlicher Aspekt im Supply Chain Management ist - neben der Integration & Koordination mehrerer, rechtlich eigenständiger Unternehmen - die Koordination und Optimierung von Material- und Informationsflüssen innerhalb eines Produktions-Distributions-Netzwerks. Diese Aufgaben werden unter dem Begriff "Supply Chain Planung" (SCP) zusammengefasst. Die SCP wird durch moderne Decision Support Systeme - so genannte "Advanced Planning Systeme" (APS), die von Softwareherstellern, wie AspenTech, JDA, Oracle oder SAP

	(Advanced Planner and Optimizer) angeboten werden, unterstützt. In dieser Veranstaltung werden Grundlagen der SCP sowie Konzepte von APS (wie bspw. Supply Chain Analyse, Grundlagen der Modellierung, Advanced Planning, die Struktur von APS, Demand Planning) vorgestellt.
Literatur	H. Stadtler / C. Kilger (edts.): Supply Chain Management and Advanced Planning, 4th ed., Springer, Berlin et al., 2008. oder H. Stadtler / C. Kilger / H. Meyr (Hrsg.): Supply Chain Management und Advanced Planning, Springer, Berlin et al. 2010. Fleischmann, B. / Meyr, H. (2003): Planning Hierarchy, Modeling and Advanced Planning Systems, in: Graves, S. / de Kok, A.G.: Supply Chain Management: Design, Coordination, Operation, Chap. 9, Elsevier, Amsterdam et al.

Modul: Supply Chain Planning & Advanced Planning Systems 2 (5803-520)

Modulverantwortung	Prof. Dr. Herbert Meyr
Bezug zu anderen Modulen	Modul Supply Chain Planning & Advanced Planning Systems 1
Teilnahmevoraussetzungen	keine
Sprache	deutsch/englisch
ECTS	6
Angebotshäufigkeit	jedes SS
Semesterlage	2. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Studienleistung	Klausur
Prüfungsdauer	60 Minuten
Arbeitsaufwand	180 Stunden: 42 Stunden Präsenzstudium 138 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse im Bereich der Supply Chain Planung (SCP) und hinsichtlich Advanced Planning Systemen (APS). Sie verfügen über Kenntnisse hinsichtlich lang-, mittel- und kurzfristiger Planungsprobleme und Lösungsansätze aus allen Teilbereichen der SCP (insbes. der strategischen Netzgestaltung, des mittelfristigen „Master Planning“, der kurzfristigen Produktionsplanung und -steuerung sowie des „Demand Fulfillment“) sowie hinsichtlich der Verbindung zu integrierten Planungskonzepten. Sie haben gelernt, wie in APS verankerte Verfahren zur Lösung dieser Probleme eingesetzt werden. Sie sind in der Lage die genannten Probleme zu identifizieren und zu analysieren sowie geeignete Verfahren zur Lösung dieser Probleme auszuwählen und anzuwenden.

Anmerkungen	Festlegung der Veranstaltungssprache erfolgt in den ersten beiden Vorlesungswochen
Supply Chain Planning & Advanced Planning Systems 2 (5803-521)	
Person(en) verantwortlich	Prof. Dr. Herbert Meyr
Lehrform	Vorlesung mit Übung
SWS	3
Inhalt	Supply Chain Planning and Advanced Planning Systems 2 (SCP & APS 2) ergänzt die Einführungsveranstaltung SCP & APS 1. Die Veranstaltung SCP & APS 2 ist eine in sich abgeschlossene Veranstaltung, die auch ohne vorherigen Besuch von SCP & APS 1 gehört werden kann. In dieser Veranstaltung werden Konzepte von APS, derzeitig verfügbare APS-Produkte, ausgewählte Planungsaufgaben im Bereich Supply Chain Planung sowie verschiedene Fallstudien vorgestellt. Der Schwerpunkt der Veranstaltung liegt dabei auf den Planungsbereichen "Strategic Network Design", "Master Planning", "Demand Fulfillment & ATP" und "Production Planning and Scheduling".
Literatur	H. Stadler / C. Kilger (eds.): Supply Chain Management and Advanced Planning, 4th ed., Springer, Berlin et al., 2008. or H. Stadler / C. Kilger / H. Meyr (Hrsg.): Supply Chain Management und Advanced Planning, Springer, Berlin et al. 2010. Fleischmann, B. / Meyr, H. (2003): Planning Hierarchy, Modeling and Advanced Planning Systems, in: Graves, S. / de Kok, A.G.: Supply Chain Management: Design, Coordination, Operation, Chap. 9, Elsevier, Amsterdam et al. H. Stadler / B. Fleischmann / M. Grunow / H. Meyr / C. Sürie (eds.): Advanced Planning in Supply Chains: Illustrating the Concepts Using an SAP® APO Case Study, Springer, Berlin et al., 2012.

Modul: Verhandlungsmanagement (5701-460)

Modulverantwortung	Prof. Dr. Markus Voeth
Bezug zu anderen Modulen	Keine
Teilnahmevoraussetzungen	Keine
Sprache	deutsch
ECTS	6
Angebotshäufigkeit	jedes WS
Semesterlage	3. Semester
Dauer des Moduls	1 Semester
Verbindlichkeit	Wahl
Prüfungsleistung	Klausur

Arbeitsaufwand	180 Stunden: 42 Stunden Präsenzstudium 138 Stunden Selbststudium
Fachkompetenzen / Lern- und Qualifikationsziele	Die Studierenden haben vertiefte Kenntnisse über das Management von Verhandlung und deren zunehmende Bedeutung auf Managementebene. Sie verfügen über ein profundes Wissen hinsichtlich eines systematischen Verhandlungsmanagements. Insofern sind die Studierenden zu einer sachlichen Argumentation bezüglich des Themengebiets "Verhandlungsmanagement" befähigt. Sie sind in der Lage sich kritisch mit Fragestellungen zum Thema auseinanderzusetzen sowie diese tiefgehend zu analysieren und diskutieren.
Verhandlungsmanagement (5701-461)	
Person(en) verantwortlich	Prof. Dr. Markus Voeth
Lehrform	Vorlesung mit Übung
SWS	3
Inhalt	Verhandlungen spielen in nahezu allen betriebswirtschaftlichen Aufgabenfeldern eine zentrale Rolle. Zunehmend entdecken Unternehmen vor diesem Hintergrund, dass Verhandlungen auch im Managementbereich ein wichtiges Aufgabenfeld darstellen. Hierbei geht es nicht nur darum, Mitarbeitern Hilfestellung bei der konkreten Verhandlungsführung zu geben, sondern zudem auch die Verhandlungsvorbereitung, -organisation und -nachbereitung als weitere Aufgabengebiete eines Verhandlungsmanagementsystems zu gestalten. Im Zuge dieser Veranstaltung werden die Ablaufschritte des Verhandlungsmanagement systematisch analysiert und diskutiert.
Literatur	Voeth, M. / Herbst, U. (2009): Verhandlungsmanagement: Planung, Steuerung und Analyse, Stuttgart. Backhaus et al. (2010): Allgemeine Betriebswirtschaftslehre - Koordination betrieblicher Entscheidungen: Die Fallstudie Peter Pollmann, 4. Auflage, Berlin/Heidelberg. Ergänzende Lektüre wird im Rahmen der Veranstaltung bekannt gegeben.