

**University of Kassel**  
**Faculty Organic Agricultural Sciences**

# **Master Agriculture, Ecology and Societies**

## **Module Descriptions**

April 2024

# Overview

## Mandatory modules

- E46 Food systems governance and agriculture (6 Credits)
- I20 Agriculture and ecosystem services (6 Credits)
- Interdisciplinary project (6 Credits)

## Bridging modules

For students with an agricultural sciences background:

- F16 Research methods in social sciences (6 Credits)
- K51 History, societies and environment (6 Credits)

For students with a social sciences, economics or humanities background:

- I29M Research methods and data science in the life sciences (6 Credits)
- F17 Principles of organic farming (6 Credits)
- P07 Soil and plant science (6 Credits)
- A14 Organic livestock farming under temperate conditions (6 Credits)

## Mandatory electives I: Agriculture and Ecology

- A07 Unconventional livestock and wildlife (6 Credits)
- A10M Livestock nutrition and feed evaluation under (sub)tropical conditions (6 Credits) **(Methods module)**
- A13M Livestock-based sustainable land use (6 Credits)
- A17 Digitalization in livestock systems (6 Credits)
- I02 Management of (sub-)tropical land use systems (6 Credits)
- I10M Applied statistical modelling (6 Credits) **(Methods module)**
- I14M GIS and remote sensing in agriculture (6 Credits) **(Methods module)**
- I17 Sustainable diets (6 Credits)
- I24 Modelling climate impacts on agroecosystems (6 Credits) **(Methods module)**
- I30 Organic agriculture in Europe (6 Credits)
- P01 Ecology and agroecosystems (6 Credits)
- P05 Organic cropping systems under temperate and (sub)tropical conditions (6 Credits)
- P06 Soil and water (6 Credits)
- P13 Agrobiodiversity and plant genetic resources in the tropics (6 Credits)
- P24 Agroforestry (6 Credits)
- P27M Nutrient dynamics, experimental design and statistical modelling (6 Credits) **(Methods module)**
- P28 Digitalization in agriculture (6 Credits)
- P31 Biochar for Environmental Management (6 Credits)
- P32M Soil-plant interactions (6 Credits)
- Food processing (6 Credits)
- Sustainable land-use and climate mitigation (6 Credits)
- Biodynamic agriculture (6 Credits)
- Innovative sustainable breeding (6 Credits)
- Grassland-based livestock systems and climate change mitigation (6 Credits)
- Nutrient acquisition by plants (6 Credits)
- Water in the soil plant system (6 Credits)
- Understanding Landscapes – from ecological principles to sustainable planning (6 Credits)

If not chosen as bridging module:

- I29M Research methods and data science in the life sciences (6 Credits) **(Methods module)**
- F17 Principles of organic farming (6 Credits)
- A14 Organic livestock farming under temperate conditions (6 Credits)

## Mandatory electives 2: Society and Environment

- A08 Social-ecology in livestock farming systems (6 Credits)
- E06 International organic food markets and marketing (6 Credits)
- E17M Management and management accounting (6 Credits)
- E21 Rural sociology (6 Credits)
- E39 Critical perspectives on the global food system (6 Credits)
- E41 EU policies, organic farming and food system transformation (6 Credits)
- F32 Marketing research (6 Credits) **(Methods module)**
- I19M Participatory research methods for sustainability (6 Credits) **(Methods module)**
- K01 Sustainability-oriented environmental social science (6 Credits)
- K02 Climate change governance and one health (6 Credits)
- K21 Philosophy of sciences (6 Credits) **(Methods module)**
- K22 Philosophy of environment and society (6 Credits)
- K52 Global political economy and development (6 Credits) **(Depending on the seminar can be a methods module)**
- K53 Methods of sociology and humanities (6 Credits) **(Methods module)**
- K61 Spatial Dimensions of Sustainability Transitions: Living Labs, Experiments and Planning (6 Credits)
- K71 Supply chain management (6 Credits)
- K72 Sustainable behaviour and governance (6 Credits) **(Depending on the seminar can be a methods module)**
- K73 Decision Support Tools in Sustainability Management (6 Credits)
- Sustainable? Development? (6 Credits)
- Sustainable food systems and management (6 Credits)
- Environment and health (6 Credits)
- Global agricultural trade and its political ecology (6 Credits)

If not chosen as bridging module:

- F16 Research methods in social sciences (6 Credits) **(Methods module)**
- K51 History, societies and environment (6 Credits)

## Master Thesis and Colloquium

- Master Thesis and Colloquium (30 Credits)

## Professional modules (obligatory)

<b>Module Name</b>	<b>Food systems governance and agriculture</b>
<b>Code</b>	<b>E46</b>
<b>Module Coordinator</b>	Prof. Dr. A. Thiel, University of Kassel
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>Students</p> <ul style="list-style-type: none"> <li>• will understand the food system concept and the role of governance and institutions within it against the background of the European Union, and its role for and interactions with diverse production systems worldwide</li> <li>• will obtain an overview of the ways in which the many European food systems and demands for agricultural produce shape local agriculture and rural areas in Europe and worldwide</li> <li>• will obtain an overview of the role of policies, governance arrangements and institutions for the way Europe shapes global food systems and agriculture</li> <li>• will become familiar with a public choice and institutionalist perspective on public policy making</li> <li>• will become familiar with a constitutional, new institutional economic and a critical institutionalist perspective on food system interactions and their change</li> <li>• will reflect on the concepts of the course throughout seminar discussions</li> <li>• will explore analytical tools throughout issue-related discussions with practice partners.</li> </ul>
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours, 120 hours of independent study
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	Participation and preparation of excursions and stakeholder meetings
<b>Examination</b>	Five literature discussions or responses to set questions (graded) 40%; Oral presentation (student-led seminar) (20 minutes) or oral examination (25min) or written term paper (2500 words) 60%; or working report (max. 2500 words) 100%
<b>Number of Credits for the Module</b>	6
<b>Teaching Unit</b>	Section “International Agricultural Policy and Environmental Governance” and Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. A. Thiel and staff
<b>Types of Media</b>	In correspondence with instruction type
<b>Literature</b>	Literature and seminar papers will be circulated to students at the beginning of term
<b>Course Content</b>	Agricultural production is nowadays conceived as integral part of global food, feed, fuel, and fibre-related supply systems. The European Union plays a major role in structuring global agriculture, food and supply systems. Policies structuring governance and institutions are core elements shaping economic exchange in the food system and the exploitation of natural resources. The course covers what food and agricultural systems are, what roles policies, governance and institutions play in these, and how the European Union’s structure of agricultural production shapes them. To explain policy outcomes, the course relies on a public choice and institutionalist perspective. For analyzing the food system, it further introduces new and critical institutionalist approaches and collective action theory, and illustrates these through case materials and literature discussions. Analytical perspectives will further be explored through the discussion of various European governance issues with practice partners and policy makers.
<b>Course Title</b>	Food systems governance and agriculture

<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar, group works, virtual and in presence stakeholder meetings and potentially short excursions, presentations, readings, presentations (learning through teaching)
<b>Module Applicability</b>	Obligatory module according to §9 (3) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Agriculture and ecosystem services</b>
<b>Number/Code</b>	<b>I20</b>
<b>Module Coordinator</b>	Prof. Dr. T. Plieninger
<b>Type of Module</b>	Obligatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	This course will introduce students into the concepts of ecosystem services and human well-being, with a particular focus on their relevance for agriculture and other land uses. It will foster the ability of students to assume an interdisciplinary research perspective (including ecological, socio-cultural, and economic approaches) and to critically discuss and analyse the concept of ecosystem services in its multiple scientific, political and practical meanings.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 54 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Presentation (approx. 30 min) 50% and term paper (max. 20 p) 50%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. T. Plieninger and staff
<b>Types of Media</b>	diverse
<b>Literature</b>	Potschin M., Haines-Young R., Fish R. and Turner R.K. 2016: Routledge Handbook of Ecosystem Services. Routledge-Earthscan; London, New York.
<b>Course Content</b>	Global environmental assessments (e.g., the Intergovernmental Platform on Biodiversity and Ecosystem Services, IPBES) have highlighted that human well-being is critically dependent on ecosystem services – the benefits that nature provides to people. Depending on the particular land-use system and its social-ecological context, agriculture can either degrade or enhance such ecosystem services. This course gives an overview on the rising field of ecosystem services science. Focus will be on: <ul style="list-style-type: none"> <li>• techniques for decision support,</li> <li>• practical applications of the approach in agriculture and other land-use sectors, and</li> <li>• linkages to other sustainability issues (e.g., biodiversity, climate change, water security, poverty).</li> </ul> These topics will be outlined in lectures and deepened in seminars and field exercises, where key issues will be explored and critically discussed.
<b>Course Title</b>	Agriculture and ecosystem services
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Obligatory module according to §9 (3) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Interdisciplinary project</b>
<b>Number/Code</b>	-
<b>Module Coordinator</b>	Prof. Dr. A. Thiel
<b>Type of Module</b>	Obligatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>Students are able to work independently in a group of limited size and interdisciplinary composition and with some guidance, to answer the inter- or transdisciplinary scientific questions derived from the topic in the field of agricultural and food systems affected by Europe's needs for or supply of food, fibres and biomass,</p> <p>To achieve this goal, they acquire the following competencies:</p> <ul style="list-style-type: none"> <li>• Teamwork</li> <li>• Structuring complex group work towards a common goal</li> <li>• Independent data collection and analysis</li> <li>• Synthesis of group work</li> <li>• In-depth processing of social, humanistic, agronomic or utility animal scientific ecological sub-questions</li> <li>• Literature analysis</li> <li>• Exchange with stakeholders</li> <li>• Presentation and discussion of research and work results</li> </ul>
<b>Types of Courses</b>	Project work 360h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	360 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Project report (ca. 10000 words) 70% and group presentation (ca. 30 minutes) 30%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	University of Kassel
<b>Module Teacher</b>	Two lecturers of MSc AGES representing different disciplines
<b>Types of Media</b>	Depending on theme
<b>Literature</b>	Depending on theme, initial literature provided by lecturers
<b>Course Content</b>	<p>Content related: Students work on an interdisciplinary project optionally in different contexts such as soil, plant, animal, economic and/or social.</p> <p>Supra-content related: Planning, implementation and evaluation as well as presentation of the results of a project (field experiment, laboratory experiment, empirical study or similar).</p>
<b>Course Title</b>	Interdisciplinary project
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Project work
<b>Module Applicability</b>	Obligatory module according to §9 (4) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	each semester
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	none

## Bridging modules

<b>Module Name</b>	<b>Research methods in social sciences</b>
<b>Code</b>	<b>F16</b>
<b>Module Coordinator</b>	Dr. T. Krikser
<b>Type of Module</b>	Bridging module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>The aims of the module are:</p> <ul style="list-style-type: none"> <li>• To understand the philosophical bases of research in the social sciences;</li> <li>• To foster students' understanding of key techniques for collecting and analysing qualitative and quantitative data and their relative strengths and weaknesses;</li> <li>• To be aware of the linkages between theory, data, analysis and interpretation and of the role and impact of the researcher in the research process;</li> <li>• To improve accessibility of research material, such as, journal articles;</li> <li>• To provide more advanced skills in support of other modules and dissertation research involving quantitative and qualitative analysis.</li> </ul>
<b>Types of Courses</b>	Seminar 30h, Exercises 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written report (appr. 8.000 words) 50%, written examination (90 min) 50%
<b>Number of Credits for the Module</b>	6
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, Kassel University
<b>Module Teacher</b>	Dr. T. Krikser, NN
<b>Types of Media</b>	Lectures, exercises
<b>Literature</b>	A reading list will be provided on the e-learning platform
<b>Course Content</b>	<ul style="list-style-type: none"> <li>• Principles, practicalities and issues of using qualitative and quantitative research methods typically found in the social sciences;</li> <li>• Concepts (e.g. ontology, epistemology and methodology) and how these form research questions and data analysis;</li> <li>• Techniques for collecting and analysing qualitative data, e.g. interviews and focus groups, documentary analysis, ethnography, visual methods, discourse analysis and case study design;</li> <li>• Techniques for collecting and analysing quantitative data, e.g. statistics, hypothesis testing, sample design, multiple regression analysis, multiple analysis of variance, discriminant analysis, factor analysis, cluster analysis, discrete choice analysis;</li> <li>• Qualitative comparative analysis and mixed-method approaches.</li> </ul>
<b>Course Title</b>	Research methods in social sciences
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lectures and short lectures combined with facilitated group discussion, seminars and exercises
<b>Module Applicability</b>	Bridging module according to §9 (5) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>History, Societies and Environment</b>
<b>Number/Code</b>	K51
<b>Module Coordinator</b>	PD. Dr. M. Roscher
<b>Type of Module</b>	Bridging module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>Students are knowledgeable in historical, sociological and philosophical perspectives on and tentative explanations of the dynamics of European agro-based and food economies. They understand bio-economics in their global contexts and in connection with questions of sustainability (Climate protection, biodiversity, adaption to climate change, social justice, and economic feasibility). Debates on sustainability are not only linked to economic, judicial and ethical aspects, but also to questions on cultural diversity and its suppression. This, in turn, comes with clear systemic implications. Students, thus, gain insights into questions and controversies attached to the linkages of migration and agriculture, education and environment, gender and labor, animal usage and domination.</p> <p>Students reflect on fundamental questions regarding human-nature, human-environment and human-animal relations, ethnicized economies and gender (in)equalities. Thus, the role of nature, the environment and animals in Western and non-Western schools of thought, histories of ideas and societies at large, particularly with view of colonial entanglements, are investigated as are the material interactions between humans and their surrounding environment(s). Students equally reflect on meta narratives such as those on modernity, civilization and North-South dualisms. With regard to concrete social practices in diverse fields such as science, economy, labor and agriculture, they are able to understand and analyze long-term developments and transformative processes in their historical contexts and meanings. These include, for example, the history of domestication as economic praxis, the transfusion and production of knowledge on and about “nature”, the socializing impact of animals, the history of agriculture, animal husbandry and food production, as well as of patterns of consumption. Just as important for this kind of analysis is the reflection of these developments as results of a Longue Durée, of epoch-shaping transformative processes, climate change etc. (Keyword: “Anthropocene”).</p> <p>Students learn how to apply central investigative perspectives and categories used by the social sciences, cultural studies and the humanities (gender, class, race, ethnicity, religion, geographical area, species etc.). They draw on approaches provided by, for example, Postcolonial Studies, Gender Studies, Cultural and Historical Anthropology, Critical Sustainability Studies, Human-Animal Studies and Multispecies Studies respectively, as well as Environmental Humanities. By means of working on exemplary topics, students gain insights into methods used by the sociology and history of philosophy, animals and the environment. They also learn how to work in interdisciplinary team. On this basis, students are able to develop their own research questions and to take the necessary methodological and organizational steps to work on them (research and writing skills).</p>
<b>Types of Courses</b>	Seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 30 hours contact
<b>Course Projects</b>	Maximum of two course projects as directed by the course instructor: presentation, report, protocol, excerpt, essay, interview, source criticism, hosting of a class, simulation, podcast, paper, poster and the like.
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written report (appr. 7.000 words) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Social Science, University of Kassel

<b>Module Teacher</b>	PD Dr. M. Roscher, Prof. Dr. H. Büschel, Prof. Dr. E. Tuidler, Prof. Dr. B. Langfeldt, Prof. Dr. K. Köchy (FB 02), D. apl. Prof. Dr. D. Stederoth (FB 02), Prof. Dr. C. Neu
<b>Types of Media</b>	alternates, depending on disciplinary affiliation
<b>Literature</b>	alternates, depending on disciplinary affiliation
<b>Course Content</b>	alternates, depending on disciplinary affiliation
<b>Course Title</b>	History, Societies and Environment
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	alternates, depending on disciplinary affiliation
<b>Module Applicability</b>	Bridging module according to §9 (5) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	none

<b>Module Name</b>	<b>Research methods and data science in the life sciences</b>
<b>Number/Code</b>	<b>I29M</b>
<b>Module Coordinator</b>	Prof. Dr. B. Ludwig
<b>Type of Module</b>	Bridging module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students have an understanding of the methods of quantitative and qualitative data collection in the life sciences and the different sampling techniques and experimental designs. They are able to apply standard data analysis techniques. They understand the usefulness and limitations of selected multivariate approaches for regressions and pattern recognitions in the data science and learn the concepts of different machine learning approaches. They are able to apply the acquired skills in the analysis of their own MSc (and PhD) datasets.
<b>Types of Courses</b>	Lecture 40h, exercises 20h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral examination (ca. 30 min) 100%
<b>Number of Credits for the Module</b>	6
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. B. Ludwig and colleagues
<b>Types of Media</b>	diverse
<b>Literature</b>	Everitt B., Hothorn T. P. 2011: An Introduction to Applied Multivariate Analysis with R. Springer, New York Glaz, B. Yeater, K.M. 2020: Applied Statistics in Agricultural, Biological, and Environmental Sciences. John Wiley & Sons Holmes D., Moody P., Dine D., Trueman L. 2017. Research Methods for the Biosciences. Oxford University Press Touchon J.C. 2021: Applied Statistics With R: A Practical Guide for the Life Sciences. Oxford University Press Wehrens R. 2020: Chemometrics with R, Springer
<b>Course Content</b>	<i>Research methods and standard analyses in the life sciences:</i> <ul style="list-style-type: none"> <li>• Introduction to methods of quantitative and qualitative data collection in the life sciences</li> <li>• introduction to sampling techniques and experimental design</li> <li>• Description and exploration of data, visualization using univariate and bivariate plotting and application of standard statistical techniques (regressions and analyses of variance)</li> </ul> <i>Data science in the life sciences:</i> <ul style="list-style-type: none"> <li>• Application of multivariate approaches: principal component analysis (PCA) and regression (PCR), cluster analyses, factor analyses</li> <li>• Introduction to machine learning: perceptron, artificial neural networks, regression trees, rule-based models and support vector machine classification and regression</li> </ul>
<b>Course Title</b>	Research Methods and data science in the Life Sciences
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, exercisess
<b>Module Applicability</b>	Bridge module according to § 9 (5) Examination Regulations Master AGES
<b>Duration of Module</b>	one Semester
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Principles of organic farming</b>
<b>Code</b>	<b>F17</b>
<b>Module Coordinator</b>	Prof. Dr. M. Athmann
<b>Type of Module</b>	Bridging module (mandatory)
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students are able to describe <ul style="list-style-type: none"> <li>• the principles and structures as well as functions of agricultural ecosystems in general</li> <li>• nutrient cycles and their management in agriculture</li> <li>• systems of land use and their ecological impact</li> <li>• nutrient management as based on cropping techniques in organic agriculture</li> <li>• principles of organic pest management</li> <li>• principles of organic animal husbandry</li> </ul>
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180h, of which 60 contact hours, 120 hours of independent study
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral examination and oral presentation (appr. 20min) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. M. Athmann, Prof. Dr. U. Niggli, Dr. D. Kusche, NN
<b>Types of Media</b>	-
<b>Literature</b>	Lecture based materials
<b>Course Content</b>	<ul style="list-style-type: none"> <li>• Various relevant theories of low-input and intensive organic agriculture</li> <li>• Structures and functions of agricultural ecosystems in general</li> <li>• Development, evaluation and comparison of ecological crop management systems on the background of various natural, economic and socio-cultural circumstances</li> <li>• Principles of pest management and fertilisation in organic agricultural systems</li> <li>• Principles of animal husbandry in organic agricultural systems</li> <li>• The biodynamic approach – an integral basis of organic agriculture and differentiation of organic and conventional food quality on the example of milk and effects on human health</li> </ul>
<b>Course Title</b>	Principles of organic farming
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Presentations, discussions and conclusions in form of closing sessions in plenum
<b>Module Applicability</b>	Bridging module according to §9 (5) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Soil and plant science</b>
<b>Number/Code</b>	<b>P07</b>
<b>Module Coordinator</b>	Dr. Helmut Saucke
<b>Type of Module</b>	Bridging module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Bridging module for students lacking basic knowledge in some agronomy disciplines. With the help of lectures and reading materials students will be enabled to fill in gaps and get updated on state-of-the art knowledge with a special focus on questions pertinent to organic agriculture. Students, having taken this module, will be able to follow advanced courses in the above fields.
<b>Types of Courses</b>	Lecture 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written exam (120 min) 100% or oral exam (appr. 20 min) 1005
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr. Helmut Saucke, Prof. Dr. A. Bürkert, Prof. Dr. G. Backes
<b>Types of Media</b>	diverse
<b>Literature</b>	Brady N.C. 1990: The nature and properties of soils. 10th edition, Prentice Hall; Marschner H. 1995: Mineral Nutrition of Higher Plants, Academic Press, New York; Sanchez P. 1976: Properties and Management of Soils of the Tropics, Wiley, New York; van Wyk B.E. 2005: Food Plants of the World. Briza Publication, Pretoria; Rehm S., Espig G. 1991: The Cultivated Plants of the Tropics and Subtropics, Verlag Josef Margraf, Weikersheim, Germany; Agrios G.N. 2005: Plant Pathology, 5th edition, Academic Press, New York; Pedigo L.P. 2002: Entomology and Pest Management, 4th edition, Macmillan Pub Co.
<b>Course Content</b>	Influence of soil formation processes on physical properties (texture, soil water, pore space), chemical properties (buffering, exchange capacity, nutrients), and biological properties (organic matter, edaphon), soil formation and classification. Nutrient availability and nutrient mobilization under conventional and organic agricultural conditions. Major and minor nutrients and food quality. Plant breeding goals for different agricultural systems. Plant morphology, genetics and breeding: principles of plant domestication and use, characterization and evaluation, use of genetic resources in plant breeding, genetic basis for plant breeding Genetics of host-parasite interactions, epidemiology and plant defense. Insect physiology, ecology.
<b>Course Title</b>	Soil and plant science
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture
<b>Module Applicability</b>	Bridging module according to §9 (5) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Organic livestock farming under temperate conditions</b>
<b>Number/Code</b>	<b>A14</b>
<b>Module Coordinator</b>	Dr. M. Krieger
<b>Type of Module</b>	Bridging module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Animal nutrition and animal health: Students have a basic understanding of farm animal nutrition and health management; they understand the challenges emerging in organic livestock systems related to both animal nutrition and animal health and know how to assess, quantify, evaluate and approach these challenges. Animal welfare: Students have a basic understanding of animal welfare, familiarise with different organic husbandry systems, practical problems and scientific concepts including how to assess animal welfare both at farm and system level.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written examination (120 min) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr. M. Krieger, Prof. Dr. U. Knierim, Prof. Dr. M. Wachendorf
<b>Types of Media</b>	diverse
<b>Literature</b>	Appleby M.C., Hughes B.O. (eds) 1997: Animal welfare. CAB International, Wallingford; Vaarst, M. et al. (eds.) 2004: Animal health and welfare in organic Agriculture. CAB International, Wallingford; Vaarst & Roderick (eds.) 2019: Improving organic animal farming. Burleigh Dodds Science Publishing, Philadelphia, USA.
<b>Course Content</b>	<i>Course: Animal nutrition and animal health:</i> Principles and regulations of organic livestock farming in Europe; Nutrition in organic cattle, pigs and poultry; Animal health and production diseases; Production diseases in organic cattle, pigs and poultry; Health management in organic livestock farms  <i>Course: Animal Welfare:</i> Principles of animal welfare in relation to organic farming; scientific methods of welfare assessment; organic livestock husbandry.
<b>Course Title</b>	Organic livestock farming under temperate conditions
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecturing, self-study, textbook assignments, group work, group discussion, student presentations, excursions.
<b>Module Applicability</b>	Bridging module according to § 9 (5) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge of animal sciences.

## Mandatory modules I: Agriculture and Ecology

<b>Module Name</b>	<b>Unconventional livestock and wildlife</b>
<b>Number/Code</b>	<b>A07</b>
<b>Module Coordinator</b>	Dr. C. Hülsebusch
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Based on the historical development of agriculture, particularly the domestication of animals, students know the differences between livestock and wildlife and the importance and potential of unconventional livestock and wildlife for rural development and human livelihoods in different regions of the world. Students obtain an overview over the wide variety of unconventional livestock, their adaptive features, biology and ecology and the various production systems under which they are kept. Students familiarize with the variety of wildlife species, their biology, ecology, and population dynamics and the potential of their exploitation. They know the major international conventions pertaining to wildlife conservation and are familiar with the nature and magnitude of human/wildlife conflicts. They know about costs and benefits associated with human-wildlife-co-existence and understand the dilemma between (inter)national conservation objectives and local household livelihood objectives. Students obtain an overview over different terminal and non-terminal options of wildlife utilization and management and their respective potential contribution to the above conflicting objectives.
<b>Types of Courses</b>	Seminar 40h, Exkursion 20h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral presentation (ca. 20 min) 30%, written exam (90 min) 70%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr. C. Hülsebusch
<b>Types of Media</b>	diverse
<b>Literature</b>	Diamond J. 1999: Guns, Germs, and Steel: The Fates of Human Societies. W.W.Norton and Company, New York, 480 p.; Board on Science and Technology for International Development 1991: Microlivestock Little-Known Small Animals with a Promising Economic Future. National Academy Press, Washington D.C., 449; Bonner R. 1993: At the Hand of Man - Peril and Hope for Africa's Wildlife. Alfred A. Knopf Inc., New York, 322 p.; Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973/1979 at <a href="http://www.cites.org/">http://www.cites.org/</a> (incl. appendices)
<b>Course Content</b>	History of domestication of livestock. Unconventional livestock in Asia/Oceania, Africa and Latin America: Biology, management and, production systems. Commercial and subsistence products from little known domesticated animal species – such as insects, snails, reptiles, rodents, up to little-used ungulates. Local and national economic potential and contribution to local livelihoods. Wildlife in Asia, Africa and Latin America: Biology, wildlife population dynamics, human/wildlife conflicts, international conventions on (agro)-biodiversity and conservation, strategies for wildlife conservation through utilisation, different wildlife utilisation concepts, wildlife-based tourism, terminal wildlife utilization of different intensity ("Hunting/Trophy hunting", "Game-Ranching", "Game Farming", "Feedlot" with beginning domestication), community-based utilisation cum conservation approaches. Contribution of wildlife utilisation to the

	livelihood of rural communities. Regulations, possibilities and constraints for wildlife conservation.
<b>Course Title</b>	Unconventional livestock and wildlife
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar, excursion
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	2 Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge of soil, plant and animal sciences

<b>Module Name</b>	<b>Livestock nutrition and feed evaluation under (sub)tropical conditions</b>
<b>Number/Code</b>	<b>A10M</b>
<b>Module Coordinator</b>	Prof. Dr. E. Schlecht
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>Students are able to:</p> <ul style="list-style-type: none"> <li>describe the function of the major digestive systems and processes of domestic livestock species and their consequences for ration formulation</li> <li>understand the different feeding strategies and nutritional requirements of the main livestock species</li> <li>assess the quality of feedstuffs through theoretical concepts and practical feed quality analyses</li> <li>calculate rations for the main livestock species</li> <li>understand abiotic and biotic environmental influences on the physiology of different livestock species</li> <li>discuss opportunities and limitations of feeding strategies for an optimization of livestock production under specific agro-ecological settings</li> </ul>
<b>Types of Courses</b>	Lectures 36h and lab practical 20h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 56 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral exam (appr. 20 min) 75% and lab-protocol (max. 3.000 words) 25%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. E. Schlecht
<b>Types of Media</b>	Classical lectures, videos, articles
<b>Literature</b>	<p>Close W.H., Menke, K.H. (eds.) 1986: Selected topics in animal nutrition. A manual. Deutsche Stiftung für Internationale Entwicklung (DSE), Feldafing, Germany</p> <p>Van Soest P.J. 1994: Nutritional Ecology of the Ruminant. Cornell University Press, Ithaca, US</p> <p>Selected up-to-date journal articles</p>
<b>Course Content</b>	<p>Livestock nutrition and feed science: The lecture explains and discusses the nutritional physiology of the globally most important livestock species. The adaptation of the different livestock species to climatic conditions and to qualitatively and quantitatively variable fodder supply is analysed. Possibilities to reduce the negative impact of environmental factors on animal production through adapted feeding strategies and ration formulation are evaluated. Laboratory analyses of feedstuffs: Students are introduced to the main standard methods of feed quality analyses, such as determination of crude protein, macro-minerals, cell wall constituents and tannin content. They apply these methods onto selected tropical feed samples and write an essay on one or more methods, thereby interpreting the related quality of their feed samples.</p>
<b>Course Title</b>	Livestock nutrition and feed evaluation under (sub)tropical conditions
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	In-class lectures, online self-study materials, hands-on lab-practical
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge of animal sciences

<b>Module Name</b>	<b>Livestock-based sustainable land use</b>
<b>Number/Code</b>	<b>A13M</b>
<b>Module Coordinator</b>	Prof. Dr. E. Schlecht
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	To understand the interactions of livestock with the natural resource base and their site- and management specific positive or negative environmental impacts; To get acquainted with and test methodological approaches used in field research on livestock-environment interactions; To learn about simple modelling approaches and the significance of their results.
<b>Types of Courses</b>	Lectures 40h and field exercises 16h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 56 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written examination (90 min) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. E. Schlecht
<b>Types of Media</b>	Classical lectures, videos, articles
<b>Literature</b>	Steinfeld H., Gerber P., Wassenaar T., Castel V., Rosales M., de Haan C. 2006: Livestock's long shadow. FAO, Rome, Italy; Specific scientific articles, distributed in the course.
<b>Course Content</b>	This module highlights the general positive and negative impacts of livestock and livestock management on the natural resources (air, water, soil, vegetation), specifically under (sub)tropical conditions, at the plot to the watershed scale. It discusses options for sustainable livestock-based land use, thereby building upon the beneficial impacts of animals on soils and plants. Management options for reducing negative environmental effects of livestock (greenhouse gas emissions, nutrient excretion) are highlighted, and possibilities for consolidating the interests of livestock keepers with international conventions of environmental protection are discussed. Through classical lectures, own reading, and practical field exercises, the students are introduced to up-to-date quantitative and qualitative methods that are used in studies on animal-environment interactions. Simple modelling approaches that depict animal-environment interactions at the plot level up to the watershed scale are presented and tested by the participants.
<b>Course Title</b>	Livestock-based sustainable land use
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lectures, online self-study materials, hands-on field exercises
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge of soil, plant and animal sciences

<b>Module Name</b>	<b>Digitalization in livestock systems</b>
<b>Number/Code</b>	<b>A17</b>
<b>Module Coordinator</b>	Dr. S. Addo
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<ul style="list-style-type: none"> <li>• Have an overview of the current trends in digital technology for agricultural development with particular emphasis on livestock husbandry.</li> <li>• Be familiar with key terminologies including Precision Agriculture (PA), Precision Livestock Farming (PLF), Precision Pasture Management (PPM), and Digital Livestock Farming (DLF). They should be able to give relevant examples of a range of technologies currently applied to facilitate individual animal management systems.</li> <li>• Identify the opportunities and challenges of PLF for organic agriculture</li> <li>• Be able to critically assess the benefits of digitalisation vis-à-vis the socioeconomic realities of agricultural transformation, especially in low- and middle-income countries</li> <li>• Develop scientific presentation and reporting skills</li> </ul>
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Assessment based on individual presentations of journal articles (70%) Assessment based on a 10-page (max.) summary report of lessons learnt from excursion, presentation by other colleagues, and remarks from one's own presentation (30%).
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr. S. Addo
<b>Types of Media</b>	diverse
<b>Literature</b>	de Queiroz DM, Valente DSM, Pinto FAC, Borém A, Schueller JK, eds. <i>Digital Agriculture</i> . Springer; 2022
<b>Course Content</b>	<p>Digitalisation is revolutionising the agricultural sector at an unprecedented pace requiring the building of human resource capacity to conveniently cope with the emerging norms of farming and livestock husbandry practices. In this module, students will be given a broader overview of the changes that have taken place in agricultural development. The concept of digital transformation which is enforcing the adoption of automation, high-tech sensors, cloud computing, decision making algorithms, and the Internet of Things will be introduced, and terminologies such as PA and PLF will be explained. Focusing on PLF, students will be helped to self-study a range of digital tools currently in use for either individual or group intensive and extensive management systems. These may include but not limited to the following:</p> <ul style="list-style-type: none"> <li>• Use of radio frequency identification (RFID) leveraged in other technologies for monitoring feed intake, weight gain etc.</li> <li>• Behavioural monitoring using on-animal motion and pressure sensors</li> <li>• Thermal and biochemical sensors for monitoring disease state</li> <li>• Autonomous animal location management (virtual fencing)</li> <li>• Pasture management using geographical information system (GIS)</li> </ul> <p>The students must have a fair understanding of what these tools/systems are, their mode of operation, associated costs, and the pros and cons of usage. As part of the learning process, students will be provided with journal article(s) relevant to the trends in application of digitalisation in PLF. Each student would be required to carefully study/review the article provided, and prepare a 25-page (max.) PowerPoint presentation to be presented in a weekly seminar session.</p>

	Non-presenting students are also required to attend the weekly seminars and learn from their colleagues.
<b>Course Title</b>	Digitalization in livestock systems
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar, excursion
<b>Module Applicability</b>	Mandatory module according to § 9(7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Management of (sub-)tropical landuse systems</b>
<b>Number/Code</b>	<b>I02</b>
<b>Module Coordinator</b>	Prof. Dr. A. Bürkert
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Enable students to understand the functioning and bio-physical limitations of (subtropical agro-pastoral land use systems, to argue for the need of interdisciplinary approaches to overcome these and to apply current research methods in land use systems analysis.
<b>Types of Courses</b>	Lecture 42h with integrated exercises 6h and student seminars (20%)
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours;
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	Limited to 5 students of Master AGES
<b>Examination</b>	Written examination (90 min) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel; Venue: Prague, Czechia
<b>Module Teacher</b>	Prof. Dr. A. Bürkert, Prof. Dr. E. Schlecht, lecturers of University of Prague
<b>Types of Media</b>	diverse
<b>Literature</b>	Altieri M. 1995: Agroecology, Westview Press, USA; Martius, C. 2002: Managing Organic Matter in Tropical Soils: Scope and Limitations. Kluwer Academic Publishers; Van Soest P. 1994: Nutritional ecology of the ruminant. Cornell University Press, London, UK; Provenza F.D. 1995: Post-ingestive feedback as an elementary determinant of food preference and intake in ruminants. Journal of Range Management, 48: 2-17.
<b>Course Content</b>	Teachers from Witzenhausen: Plant-animal interactions, diet selection and nutritional wisdom, impact of grazing on pastures; statistical approaches to measure and cope with short-distance variability in crop growth; measurement techniques for nutrient fluxes in different agroecosystems. Teachers from Prague: Land-use management: farm and family income in different farming systems, soil conservation technologies for smallholder farming systems, conservation tillage systems, potential use of waste-stream products to enhance soil productivity in tropical peri-urban and rural areas, crop diversity in tropical agricultural systems.
<b>Course Title</b>	Management of (sub-)tropical landuse systems
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, exercises, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES, participation limited to 5 students from AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	2 annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Knowledge in plant, soil and animal sciences

<b>Module Name</b>	<b>Applied statistical modelling</b>
<b>Code</b>	<b>I10M</b>
<b>Module Coordinator</b>	Prof. Dr. Bernard Ludwig
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students have a detailed understanding of the concepts of statistical modelling, regression analyses and analyses of variance. They are familiar with the basic concepts of linear models and non-parametric estimation procedures, which now belong to the standard methods in applied statistics. Students are able to practically apply these methods and carry out statistical analyses in soil, plant and animal sciences using the statistical software R. They are able to apply the acquired skills in the analysis of their own MSc (and PhD) datasets.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written examination (120 min)
<b>Number of Credits for the Module</b>	6
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, Kassel University
<b>Module Teacher</b>	Prof. Dr. Bernard Ludwig, Dr. E. Rommelfanger
<b>Types of Media</b>	diverse
<b>Literature</b>	Crawley M.J. 2012: The R Book, Wiley Dobson A., Barnett A. 2008.: An Introduction to Generalized Linear Models, Chapman & Hall. Field A., Miles J., Field Z. 2012: Discovering Statistics using R, SAGE Mrode R. A. (2005) Linear Models for the Prediction of Animal Breeding Values, CABI Publishing. Welham, S.J., Gezan, S.A., Clark, S.J., Mead, A. 2014. Statistical Methods in Biology. Design and Analysis of Experiments and Regression, CRC Press, Boca Raton. Glaz B., Yeater K.M. 2020: Applied Statistics in Agricultural, Biological, and Environmental Sciences. John Wiley & Sons.
<b>Course Content</b>	<ul style="list-style-type: none"> <li>• Review of statistical concepts (boxplots, QQ plots, distributions, classical tests, correlations, analyses of count and proportion data)</li> <li>• General aspects of hypotheses formulation and testing</li> <li>• Basic concepts of experimental design</li> <li>• Standard experimental field designs</li> <li>• Introduction to the software R</li> <li>• Regression (multiple linear, non-linear and logistic)</li> <li>• Statistical modelling, model types and model simplifications</li> <li>• Transformations</li> <li>• Analyses of variance, post-hoc tests</li> <li>• Non-parametric test procedures</li> <li>• Analysis of covariance</li> <li>• Particularities of unbalanced designs</li> <li>• Formulation of statistical models and basic programming in R</li> <li>• Linear mixed models</li> </ul>
<b>Course Title</b>	Applied statistical modelling
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Obligatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	one semester
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English

<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge of applied statistics
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<b>Module Name</b>	<b>GIS and remote sensing in agriculture</b>
<b>Number/Code</b>	<b>I14M</b>
<b>Module Coordinator</b>	Dr. J. Wijesingha
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p><i>GIS:</i> A broad overview of basic GIS functions and related background knowledge should enable students to explore GIS-Software for relevant commands and prepare functional strategies for spatial data management and analysis. Lecture and exercise examples have predominantly agricultural reference.</p> <p><i>Remote Sensing:</i> The lecture will introduce physical principles (reflectance, transmittance, and absorption), sensor techniques (passive and active sensors, satellites, field spectrometer) and methods of analysis (calibration, validation) in remote sensing applications. This technical framework is presented using agricultural examples, as e.g. the generation of maps for crop yield and protein, assessment of species composition in mixed vegetation (e.g. grassland), like legume content for a calculation of residual nitrogen and crop rotation effects.</p>
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 56 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral examination (appr. 30 min) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr. J. Wijesingha
<b>Types of Media</b>	diverse
<b>Literature</b>	Burrough P. A. and R. A. McDonnell 2015: Principles of Geographical Information Systems Campbell J. B. and R. H. Wynne 2011: Introduction to Remote Sensing
<b>Course Content</b>	<p><i>GIS:</i> The course gives an introduction to Geographical Information Systems (GIS). Starting from geodetical background information, a wide range of different GIS-methods and -functions are presented using agricultural examples (e.g. data import, georeferencing, aggregation, (re)classification, interpolation, overlays and image analysis). The students have the opportunity to carry out exercises on the computer themselves for some important GIS-procedures. A special focus is given on data capturing using maps and field data survey with GPS as well as the spatial analysis of site conditions. Finally a particular view on GIS in organic farm management and Precision Farming is given.</p> <p><i>Remote sensing in agriculture:</i> The lecture will introduce physical principles (reflectance, transmittance, and absorption), sensor techniques (passive and active sensors, satellites, field spectrometer) and methods of analysis (calibration, validation) in remote sensing applications. This technical framework is presented using agricultural examples, as e.g. the generation of maps for crop yield and protein, assessment of species composition in mixed vegetation (e.g. grassland), like legume content for a calculation of residual nitrogen and crop rotation effects.</p>
<b>Course Title</b>	GIS and remote sensing in agriculture
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, winter term

<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Sustainable diets</b>
<b>Number/Code</b>	<b>I17</b>
<b>Module Coordinator</b>	Dr. L. Stefanovic
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students are able to <ul style="list-style-type: none"> <li>• Evaluate food quality using the criteria of sustainability,</li> <li>• describe nutrition in the context of human health and sustainable development,</li> <li>• describe the impact of a meal/food on nutrition and the environment using concrete indicators,</li> <li>• develop a strategy to optimize a meal/food in terms of sustainability,</li> <li>• name and apply measurement tools to assess sustainability in nutrition,</li> <li>• work and present in groups.</li> </ul>
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Presentation (ca. 10 min) 75%), group presentation (max. 15 p) 25%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr. L. Stefanovic
<b>Types of Media</b>	Short videos (Internet-based); published reports; interactive tools
<b>Literature</b>	Renner B., Arens-Azevêdo U., Watzl B., Richter M., Virmani K., and Linseisen J. for the German Nutrition Society (DGE) 2021: DGE position statement on a more sustainable diet. In: <i>ErnährungsUmschau</i> , Vol. 68, No. 7, pp. 144–54. Steffen W., Richardson K., Rockstrom J., Cornell S. E., Fetzer I., Bennett E. M., Biggs R., Carpenter S. R., Vries W. de, Wit C. A. de, Folke C., Gerten D., Heinke J., Mace G. M., Persson L. M., Ramanathan V., Reyers B. and Sorlin S. 2015: Sustainability. Planetary boundaries: guiding human development on a changing planet. In: <i>Science</i> , Vol. 347, No. 6223, p. 1259855. The Lancet 2019: Food Planet Health. Healthy Diets From Sustainable Food Systems. Summary Report of the EAT-Lancet Commission. von Koerber K., Waldenmaier J. and Carlsbur, M. 2020: Nutrition and the guiding principle sustainability. Global challenges and problem-solving approaches on a national and international, UN level. <i>ErnährungsUmschauinternational</i> , Vol. 67, No. 2, pp. 32–41. Willett W., Rockström J., Loken B., Springmann M., Lang T., Vermeulen S., Garnett T., Tilman D., DeClerck F., Wood A., Jonell M., Clark M., Gordon L. J., Fanzo J., Hawkes C., Zurayk R., Rivera J. A., Vries W. de, Majele Sibanda L., Murray C. J. L. 2019: Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. In: <i>Lancet</i> , 393(10170), 447–492. DOI: 10.1016/S0140-6736(18)31788-4.
<b>Course Content</b>	<ul style="list-style-type: none"> <li>• Culture and cultural patterns of diets</li> <li>• Interactions of food quality and lifestyle on sustainability and human health</li> <li>• Healthy diets within sustainable food systems</li> <li>• Model diets such as Med. Diet and New Nordic Diet</li> <li>• Optimization of a dish/meal according sustainability and nutrition impacts</li> <li>• Role of organic food systems</li> </ul>
<b>Course Title</b>	Sustainable diets
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,

<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge on nutrition, statistics and environmental issues.

<b>Module Name</b>	<b>Modelling climate impacts on agroecosystems</b>
<b>Number/Code</b>	<b>I24</b>
<b>Module Coordinator</b>	Prof. Dr. C. Gornott
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	The students have an overview of models used to capture climate change impacts on different agroecosystems and the effects of climate adaptation measures. The module teaches climate change impacts on various agroecosystems, adaptation measures and how these aspects can be captured by different types of statistical and process-based agricultural models. With this knowledge, the students are able understand and develop agricultural models to assess climate impacts, risks and resilience. In the last section, adaptation measures to climate change are modeled, discussed and evaluated using various methods and indicators.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral examination (approx. 30 min) 50% and written report (max. 7.500 words) 50%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. C. Gornott
<b>Types of Media</b>	diverse
<b>Literature</b>	Shukla, Gleixner, Yalew, Schauburger, Sietz, Gornott 2021: Dynamic vulnerability of smallholder agricultural systems in the face of climate change for Ethiopia, Environmental Research Letters. Laudien, Schauburger, Makowski, Gornott 2020: Robustly forecasting maize yields in Tanzania based on climatic predictors, Nature Scientific Reports. Iizumi T., Hirata R., Matsuda R. 2019: Adaptation to Climate Change in Agriculture, Springer, ISBN 978-981-13-9235-1 Bryant C.R., Sarr M.A., Délusca K. 2020: Agricultural Adaptation to Climate Change, Springer, ISBN 978-3-319-31392-4 Torquebiau E. 2016: Climate Change and Agriculture Worldwide, Springer, ISBN 978-94-017-7462-8 Castro P., Azul A.M., Leal Filho W., Azeiteiro U.M. 2019: Climate Change-Resilient Agriculture and Agroforestry, Springer, ISBN 978-3-319-75004-0
<b>Course Content</b>	The course gives an overview of climate change impacts across different agroecosystems, a solid understanding of climate and agricultural models and the projected climate impacts on the agricultural production, resilience and adaptation. In addition, short term climate and weather risks are discussed in the course. The lecture is in parallel with an exercise, where the students rebuild and develop own models in the statistic software R.
<b>Course Title</b>	Modelling climate impacts on agroecosystems
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English, German
<b>Recommended (Content) Prerequisites for Taking the Module</b>	First experience with the statistic software R is valuable.

<b>Module Name</b>	<b>Organic agriculture in Europe</b>
<b>Code</b>	<b>I30</b>
<b>Module Coordinators</b>	Prof. Dr. G. Backes/H.Mittelstraß
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students understand the situation of organic agriculture in different European countries. Students are able to discuss and judge standards of organic agriculture.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180h, within 40h contact hours
<b>Course Project</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Individual work report (15 p.) 80% or group student presentation (25min) 40% and individual report (10 p.) 40%; oral examination (15min) 20%
<b>Number of Credits</b>	6 Credits
<b>Teaching Unit</b>	University of Kassel, Faculty Organic Agricultural Sciences
<b>Module Teacher</b>	ENOAT (European network of organic agriculture teachers): Prof. Dr. G. Backes/H.Mittelstraß (DE), Prof. Dr. E. Rembalkowska (PL), Dr. C. Vogl (AT), Dr. R. Georgieva/Prof. I. Manolov (BG), Prof. Dr. J. Moudrý (CZ), Dr. A. Vincent (FR), Dr. A. Divéky-Ertse (HU), Prof. Dr. R. Mancinelli (IT), E. Aplocina/Dr. D. Kreismane (LV), Dr. M. Bavec/Prof. Dr. F. Bavec (SL), Dr. T. Briz/Dr. B. Urbano (ES), Dr. R. Chongtham Iman (SE), Prof. Dr. M. Grabovskyi (UKR)
<b>Types of media</b>	Video conference
<b>Literature</b>	FIBL and IFOAM (ed.) 2022: The world of organic agriculture. Frick/Switzerland
<b>Course Content</b>	Comparison of standards of organic agriculture (IFOAM, EU, within EU). Situation of organic production, processing and markets in different European countries. Organic agriculture in European Universities: current research projects, teaching activities. Necessary measures on all levels in the coming future to transform agriculture production in different countries to organic agriculture.
<b>Course Title</b>	Organic agriculture in Europe
<b>Teaching and Learning Methods</b>	Online lectures, discussions, group work
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites</b>	-

<b>Module Name</b>	<b>Ecology and agroecosystems</b>
<b>Number/Code</b>	<b>P01</b>
<b>Module Coordinator</b>	Prof. Dr. A. Bürkert
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students are able to define site-specific conditions of sustainability, identify key constraints to the productivity and sustainable use of agro-ecosystems, assess the scope of human (management) interventions, determine the causes of productivity decline and chose approaches to strengthen sustainability
<b>Types of Courses</b>	-
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 56 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written Exam (90 min) 70% and presentation (25 min) 30%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. A. Bürkert
<b>Types of Media</b>	diverse
<b>Literature</b>	Altieri, M. 1987: Agroecology: the scientific basis of alternative agriculture. Westview Press, Boulder, Colorado, USA; Gliessman, S.R. 1998: Agroecology: ecological processes in sustainable agriculture. AnnArbor Press, Michigan, USA.
<b>Course Content</b>	Case-study based analysis and discussion of ecological framework conditions (limitations) in different arid and sub-humid agrecosystems of tropical and temperate zones with a particular focus on marginal soils and/or difficult infrastructural conditions where effective nutrient cycling, integration of cropping and animal husbandry systems as well as the use of biodiversity for income generation at the farm level is of particular importance. The potential/role of organic agriculture will be discussed and a more general discussion of the potential of organic agriculture to strengthen the resilience of agrecosystems will be presented.
<b>Course Title</b>	Ecology and agroecosystems
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	-
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge in plant, soil and animal science, willingness to analyse agro-ecosystems quantitatively

<b>Module Name</b>	<b>Organic cropping systems under temperate and (sub)tropical conditions</b>
<b>Number/Code</b>	<b>P05</b>
<b>Module Coordinator</b>	Prof. Dr. A. Bürkert
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students are able to describe the principles and functions of agro-ecosystems, understand nutrient cycles and options for their improvement as an important basis of organic farming, evaluate systems of land use with a particular focus on organic modes of production and their role in agro-ecosystems, assess the role of livestock for nutrient cycling and with respect to the conservation of plant and animal biodiversity in (sub)tropical settings.
<b>Types of Courses</b>	Lecture 40h, Excursion 10h, Seminar 10h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral Examination (ca. 15 min) 70%, Presentation (ca. 20 min + ca. 10 S.) 30%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. A. Bürkert, Prof. Dr. M. Finckh and staff
<b>Types of Media</b>	
<b>Literature</b>	Altieri, M. 1987: Agroecology: the scientific basis of alternative agriculture. Westview Press, Boulder, Colorado, USA; Willer, H. et al. 2008: The World of Organic Agriculture - Statistics and Emerging Trends 2008, IFOAM, Bonn, Germany; Kristiansen et al. 2006: Organic agriculture – global perspective, CSORO Publishing, Collingwood, Australia; Current scientific literature
<b>Course Content</b>	Visits of organic farms; History of organic farming, current developments; development, evaluation and comparison of land use management systems under diverse natural, economic and socio-cultural conditions; nutrient cycling in plant-animal systems; site-specific contributions of legumes to N supply; P availability, P recycling and use of rock phosphates; modes of P supply in farming systems; EC, Australian, Japanese and North American regulations for organic farming – problems and opportunities.
<b>Course Title</b>	Organic cropping systems under temperate and (sub)tropical conditions
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, Excursion, Seminar
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Soil and water</b>
<b>Number/Code</b>	<b>P06</b>
<b>Module Coordinator</b>	Prof. Dr. T. Weber
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students understand soil - water - plant relations and basic soil physical, soil hydrological and soil (micro)biological processes. They are able to critically evaluate soil and water problems and limits of soils as a natural resource and judge soil management options for sustainable land use.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral examination (approx. 30 min) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. T. Weber
<b>Types of Media</b>	diverse
<b>Literature</b>	Brady N.C. & R. R. Weil 2008: The Nature and Properties of Soils. 14th ed., Pearson International Press; Hillel D. 1998: Environmental Soil Physics. Academic Press; Jury W. & Horton R. 2004: Soil Physics. Wiley & Sons; Lal R. & Shukla M.K. 2004: Principles of Soil Physics, Marcel Dekker Inc.; Ehlers W. & Goss M. 2003: Water Dynamics in Plant Production, CABI Publishing; Kirkham M. B. 2005: Principles of Soil and Plant Water Relations, Elsevier; Coyne M. S. 1999: Soil microbiology: an exploratory approach, Thomson Press; Paul E.A., Clark F.E. 1996: Soil microbiology and biochemistry, 2nd ed., New York Academic Press.
<b>Course Content</b>	Fundamental physical and hydrological processes; Soil water storage and transport; Physicochemical properties, Soil water in relation to mechanical processes (e.g. workability, deformation, soil strength); Soil – Water - Plant Relations (root water uptake, root growth, transpiration, soil-plant-atmosphere continuum); Field water cycle and management effects (e.g. mulching, tillage, irrigation); Irrigation principles and practices; Soil degradation and conservation (e.g. soil salinisation, compaction, acidification, contamination); Edaphon and its functions; Mycorrhiza; Rhizobia; Methods in soil biology; Indicators of soil fertility; Turnover of the soil microbial biomass; Habitat protection and ecotoxicology; Soil biology and fertility of tropical soils.
<b>Course Title</b>	Soil and water
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lectures, seminar and exercise
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Agrobiodiversity and plant genetic resources in the tropics</b>
<b>Number/Code</b>	<b>P13</b>
<b>Module Coordinator</b>	Prof. Dr. G. Backes
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students are able to understand the role of agrobiodiversity in tropical agro-ecosystems, to present approaches of functional biodiversity analysis and to discuss the needs and strategies of on-farm (in situ) and off-farm conservation of plant genetic resources.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral exam (about 15 min) 60% and presentation (about 20 min) 40%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. G. Backes, Prof. Dr. A. Bürkert and staff
<b>Types of Media</b>	
<b>Literature</b>	Altieri M. 1987: Agroecology: the scientific basis of alternative agriculture. Westview Press, Boulder, Colorado, USA; Eyzaguirre P.B., Linares, O.F. 2004: Home gardens and agrobiodiversity. Smithsonian Books, Washington, USA; Wood D., Lenne J.M. 1999: Agrobiodiversity: Characterization, utilization and management. CABI Publishing, Wallingford, UK.
<b>Course Content</b>	Case-study based analysis of the role of biodiversity for selected crops in different agro-ecosystems from the arid to the humid climate zones; importance of biodiversity for the stability / sustainability of smallholder (subsistence) versus commodity-oriented commercial agriculture in the Tropics, assessment and utilization of diversity, principles and practices in conservation of genetic resources, role of homegardens and indigenous wild fruit trees for in situ conservation of biodiversity, causes and consequences of genetic erosion, approaches of germplasm collection.
<b>Course Title</b>	Agrobiodiversity and plant genetic resources in the tropics
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge in plant and soil sciences

<b>Module Name</b>	<b>Nutrient dynamics, experimental design and statistical modelling - bilingual</b>
<b>Number/Code</b>	<b>P27M</b>
<b>Module Coordinator</b>	Prof. Dr. B. Ludwig
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students understand the advantages and disadvantages of different experimental designs in agricultural experiments. For each design, they are able to carry out correct data analyses using combined regression and analysis of variance or linear mixed effects models in R. Based on their understanding of soil nutrient dynamics and experimental designs they are able to evaluate and critically assess the significance of field and laboratory experiments for studying C, N and P dynamics and to consider all influencing variables.
<b>Types of Courses</b>	Lecture 40h, exercises 20h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral examination (ca. 30 min) 100%
<b>Number of Credits for the Module</b>	6
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. B. Ludwig and colleagues
<b>Types of Media</b>	diverse
<b>Literature</b>	Crawley M.J. 2012: The R book. 2nd edition, Wiley Everitt B., Hothorn T. P. 2011: An Introduction to Applied Multivariate Analysis with R. Springer, New York Welham S.J., Gezan S.A., Clark S.J., Mead A. 2014: Statistical Methods in Biology. Design and Analysis of Experiments and Regression, CRC Press, Boca Raton Glaz B., Yeater K.M. 2020: Applied Statistics in Agricultural, Biological, and Environmental Sciences. John Wiley & Sons
<b>Course Content</b>	<ul style="list-style-type: none"> <li>• Description of the dynamics of C, N and P (forms, transformations and availability) in arable soils</li> <li>• Experimental designs in agricultural experiments: completely randomized design, randomized complete block design, Latin square design, split-plot design and balanced incomplete block design</li> <li>• Statistical modelling: combined regression and analysis of variance and linear mixed effects models</li> <li>• Modelling of the turnover of soil organic matter using the SoilR package in R</li> <li>• Application of the statistical software R for a description of C and N dynamics</li> </ul>
<b>Course Title</b>	Nutrient dynamics: experimental design and statistical modelling - bilingual
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, exercises
<b>Module Applicability</b>	Mandatory module according to §9 (7) Examination Regulations Master AGES
<b>Duration of Module</b>	one semester
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Digitalization in agriculture</b>
<b>Number/Code</b>	<b>P28</b>
<b>Module Coordinator</b>	Dr. A. Nasirahmadi
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	The participants will have gained a holistic understanding of the machine vision, image processing and machine learning, data classification and pattern recognising and prediction methodologies around agricultural and animal farming stuffs.
<b>Types of Courses</b>	Lectures 20 h, seminar/practical 35 h, field exercise 5 h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Report (field work) 50% (max. 8 pages), practical exam 50% (software application), attendance is compulsory
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr. A. Nasirahmadi
<b>Types of Media</b>	diverse
<b>Literature</b>	Gonzalez R.C., Woods R.E. and S.L. Eddins 2010: Digital Image Processing using MATLAB. New Delhi: Tata McGraw Hill Education; Stafford S. (ed.) 2019: Precision agriculture for sustainability. Cambridge, UK: Burleigh Dodds Science Publishing
<b>Course Content</b>	<p><i>Machine vision and image processing</i></p> <ul style="list-style-type: none"> <li>• Introduction to digital images in agricultural science</li> <li>• Application and principle of optical and infrared technology for monitoring of agricultural and animal products</li> <li>• Machine vision and image processing in agricultural context</li> <li>• Developing image processing algorithms in MATLAB® software</li> </ul> <p><i>Machine learning and data processing</i></p> <ul style="list-style-type: none"> <li>• Basic techniques and functions of matrices in MATLAB®</li> <li>• Computer programming in MATLAB®</li> <li>• Development of machine learning algorithms</li> <li>• Training, validation and test set selection in machine learning models</li> <li>• Pattern recognition and object detections algorithms</li> <li>• Development of data classification and pattern forecasting models in agricultural and livestock farming datasets</li> <li>• Introduction to deep learning and artificial intelligence in agriculture</li> </ul>
<b>Course Title</b>	Digitalization in agriculture
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar, practical, exercise
<b>Module Applicability</b>	Mandatory module according to § 9(7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Biochar for environmental management</b>
<b>Number/Code</b>	<b>P31</b>
<b>Module Coordinator</b>	Dr.-Ing. K. Kaetzl
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	The students obtain basic knowledge in the areas of the production of biochar and activated carbon from residual biomass, as well as their use in agricultural and environmental applications. They develop a deeper understanding of pyrolytic processes and procedures, as well as different technological conversion processes for the production of biochar and activated carbon from biomass. They understand relationships between biomass composition, physico-chemical characteristics of biochar and activated carbons, and their potential applications. The students develop the ability to evaluate thermo-chemical conversion processes of biomasses, as well as to identify relevant influencing parameters on the quality and possible applications of biochar and activated carbon. The students have basic knowledge regarding the advantages and limitations of a material and energetic utilization of residual biomasses to produce biochar and activated carbon, as well as their use in the agricultural and environmental sector for a sustainable environmental and resource management.
<b>Types of Courses</b>	Lecture, laboratory work, seminar
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral exam (ca. 30 minutes; 60 %) and presentation (ca. 20 minutes; 40 %)
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr.-Ing. K. Kaetzl
<b>Types of Media</b>	diverse
<b>Literature</b>	Johannes Lehmann and Joseph Stephen (Eds.): Biochar for Environmental Management: Science, Technology and Implementation. Routledge, 2015. Jay Shankar Singh and Chhatarpal Singh (Eds.): Biochar Applications in Agriculture and Environment Management. Springer, 2020. Harry Marsh and Francisco Rodríguez Reinoso (Eds.) Activated Carbon. Elsevier Science, 2006. Balwant Singh, Marta Camps-Arbestain, and Johannes Lehmann (Eds.) Biochar: A Guide to Analytical Methods. Csiro Publishing, 2017. Peter Quicker and Kathrin Weber (Eds.): Biokohle: Herstellung, Eigenschaften und Verwendung von Biomassekarbonisaten. Springer Vieweg, 2016
<b>Course Content</b>	Theoretical basics of thermo-chemical conversion (pyrolysis) of biomasses to produce biochar, with a focus on the use of (agricultural) residual biomasses for sustainable resource use, as well as the production of biogenic activated carbons for the substitution of fossil activated carbons in environmental applications. Fundamentals of possible treatment processes of grass and herbaceous residual biomasses for pyrolytic utilization. Possible uses of biochar and activated carbon in agricultural and environmental applications. Material and energetic balances of thermo-chemical processes. Requirements for purity and quality of biochar and activated carbon for different fields of application. Production of biochar and activated carbon from residual biomass (incl. treatment) on laboratory scale using different processes. Laboratory work for basic analytical characterization of the produced biochar and activated carbon and evaluation of their performance for environmental management.
<b>Course Title</b>	Biochar for environmental management

<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar, practical
<b>Module Applicability</b>	Mandatory module according to § 9(7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Soil-plant interactions</b>
<b>Number/Code</b>	<b>P32M</b>
<b>Module Coordinator</b>	Prof. Dr. J. Simon
<b>Type of Module</b>	Mandatory Module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students will conduct a small research project related to an agricultural topic and learn the relevant involved steps of the process.
<b>Types of Courses</b>	Lecture 8h, Seminar 8h, Excursion 4h, Laboratory 40h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Work report (app. 15 p) 50%, Project presentation (app. 20 min) 50%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. J. Simon, staff of Section Organic plant nutrition
<b>Types of Media</b>	Various
<b>Literature</b>	Parker R. 2009: Plant & Soil Science: Fundamentals & Applications (Editor: Delmar) Literature will be provided in the framework of the course
<b>Course Content</b>	Introduction to and application of relevant up-to-date methods in plant-soil interactions in response to abiotic stress The complete operational sequence of a research project is simulated: <ul style="list-style-type: none"> <li>• sampling</li> <li>• sample preparation,</li> <li>• measurements and data collection (application of methods)</li> <li>• data processing</li> <li>• statistics and</li> <li>• drafting a manuscript</li> </ul> Up-to-date literature is presented and discussed by the students.
<b>Course Title</b>	Soil-plant interactions
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, Seminar, Excursion, Laboratory work
<b>Module Applicability</b>	Mandatory module according to §9(7) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, winter semester
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

## Mandatory module II: Society and Environment

<b>Module Name</b>	<b>Social-ecology in livestock production systems</b>
<b>Number/Code</b>	<b>A08</b>
<b>Module Coordinator</b>	Apl Prof. Dr. Brigitte Kaufmann
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students understand livestock farming systems as social-ecological systems in which livestock farmers, through their actions, establish, maintain and develop the respective production system. Consequently, these so-called human activity systems are assessed using an actor-oriented approach. Emphasis of this module is on methods that are used to analyse and improve farmers' management. This serves to understand "why farmers do what they do" and "how farmers produce". Students learn how they can make use of the knowledge of farmers to a) better understand how low external input systems function and b) co-develop innovations that fit to contextual conditions. Collaborative learning is introduced as methodology to operationalise transdisciplinary research and deals with the question of how mutual understanding between farmers and scientists can be achieved despite the different knowledge systems. Students obtain a profound insight into methods for stakeholder and gender analysis, knowledge integration and knowledge co-creation Participatory monitoring is introduced as method to learn from application of the co-developed innovations.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written exam (90 min) 70% and presentation (ca. 20 min.) 30%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Apl Prof. Dr. B. Kaufmann
<b>Types of Media</b>	Will be announced in the module
<b>Literature</b>	Kaufmann B.A. 2007: Cybernetic analysis of socio-biological systems: The case of livestock management in resource poor systems. In: Kommunikation und Beratung, Volume 81, Margraf Publishing; Kaufmann B.A., Arpke H. and A. Christinck 2013: 'From assessing knowledge to joint learning', pp. 115-142 In: Cultivate Diversity! A handbook on transdisciplinary approaches to agrobiodiversity research (edited by A. Christinck and M. Padmanabhan), Margraf Publishers: Weikersheim, Germany, pp.118-120 and 127-129. Christinck A. and B. Kaufmann 2018: Facilitating change – methodologies for collaborative learning with stakeholders. Pp. 171-190. In: Padmanabhan M. (ed.). Transdisciplinary Research and Sustainability: Collaboration, Innovation and Transformation. Routledge, Abingdon/New York.
<b>Course Content</b>	Theoretical background of the social-ecological system view: System theory, 1st and 2nd order cybernetics, complex problematic situations, human activity systems. Actor-oriented approach to understand and influence low external input systems: Local knowledge and situated practices Methodology for understanding local knowledge: Second order observation and knowledge analysis Collaborative learning: Exchange between knowledge systems, dialogue, action research, livestock farmer experimentation, participatory monitoring and evaluation
<b>Course Title</b>	Social-ecology in livestock production systems

<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Seminar
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	2 Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge of soil, plant and animal sciences

<b>Module Name</b>	<b>International organic food markets and marketing</b>
<b>Number/Code</b>	<b>E06</b>
<b>Module Coordinator</b>	Dr. B. Jahnke
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students <ul style="list-style-type: none"> <li>• are able to describe international markets for organic food</li> <li>• know about international organic regulations</li> <li>• are able to outline the steps for developing a marketing strategy</li> <li>• know how to develop a marketing concept on international markets</li> <li>• acquire personal skills for oral and written presentations in teamwork.</li> </ul>
<b>Types of Courses</b>	Lecture 30h, Seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral examination (30min) 60%, oral presentation (20min) and written report (appr. 2.000 words) 40%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. K. Zander and staff
<b>Types of Media</b>	Various
<b>Literature</b>	Armstrong G, Kotler K., Opresnik M.O. 2016: Marketing: An Introduction, 13th ed., Pearson, Harlow, UK. Hollensen S., Opresnik M.O. 2015: Marketing: A Relationship Perspective. Vahlen, Munich.
<b>Course Content</b>	<ul style="list-style-type: none"> <li>• Analysis of international markets for organic products</li> <li>• Organic regulations</li> <li>• Basics of food marketing for exporters</li> <li>• Oral and written presentation of marketing topic</li> </ul>
<b>Course Title</b>	International organic food markets and marketing
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Management and management accounting</b>
<b>Code</b>	<b>E17M</b>
<b>Module Coordinator</b>	Prof. Dr. B. König
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>The main aim of the module is to acquaint students with the theory and practice of management and management accounting, and the role of environmental, social and governance issues therein.</p> <p>Further aims of the module include:</p> <ul style="list-style-type: none"> <li>• To provide students with insights into different theoretical perspectives; an understanding of the implicit assumptions held by each perspective as well as the implications of these perspectives for management practice and research;</li> <li>• To provide students with the conceptual and practical skills necessary to effectively understand and critically analyse management/corporate practice;</li> <li>• To provide students with practical experience in and knowledge about “managing and accounting for sustainability”;</li> <li>• To enable students to understand why traditional accounting and accountability do not serve managers and other corporate stakeholders well in the light of increasing demands for social account- ability, transparency and social responsibility.</li> </ul>
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180h, of which 60 contact hours, 120 hours of independent study
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral presentation (15min.) 50%, written examination (60min) 50%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. B. König
<b>Types of Media</b>	Lecture slides, multimedia, case studies, guest lectures
<b>Literature</b>	A reading list will be provided on the e-learning platform
<b>Course Content</b>	<ul style="list-style-type: none"> <li>• The fundamentals of management practice, the roles and functions undertaken by managers;</li> <li>• The development and evolution of management theory;</li> <li>• A critical reflection on the wider responsibilities of management (incl. managing for sustainability);</li> <li>• An introduction to the traditional accounting and accountability theory and practice; key management accounting systems and concepts; performance measurement and management;</li> <li>• The developments in new accounting and accountability tools and their role (and limitations) in supporting managerial decision- making and increasing transparency on environmental, social and sustainability performance.</li> </ul>
<b>Course Title</b>	Management and management accounting
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lectures and short lectures combined with facilitated group discussion, seminars including case study-based group work and exercises
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Rural sociology</b>
<b>Number/Code</b>	<b>E21</b>
<b>Module Coordinator</b>	Prof. Dr. C. Neu
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	One of the primary objectives of this course is to introduce students to the principles of sociology in general and key concepts of rural sociology in particular. In addition, we want to provide the analytical tools for understanding the processes inherent to these concepts. Beyond that, the course aims at enhancing students' ability to identify different research perspectives and to critically discuss and analyse research strategies and methods.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 56 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Presentation (appr. 30 min) 50%, written report (appr. 8.000 words) 50%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. C. Neu
<b>Types of Media</b>	Various
<b>Literature</b>	Adequate literature is presented in the lecture; text book chapters supply basic knowledge and are complemented by scientific publications.
<b>Course Content</b>	As an introduction to rural sociology, this course is designed to give an overview of the sociological concepts of "demographic change", "social structural developments and social problems in rural areas" (deprivation, rural poverty): Lectures outline each of these issues and position them within the context of sociology. We will use seminars to debate key questions raised during lectures and to discuss selected issues based on academic publications.
<b>Course Title</b>	Rural sociology
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Modul Name</b>	<b>Critical perspectives on the global food system</b>
<b>Numer/Code</b>	<b>E39</b>
<b>Modul Koordinator</b>	Prof. Dr. Andreas Thiel
<b>Art des Moduls</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>Students</p> <ul style="list-style-type: none"> <li>• will be aware of development trends of the global food system</li> <li>• will be aware of political ecology (PE) and critical agrarian studies (CAS) as approaches to analyze the food system and natural resource extraction</li> <li>• will be familiar with food regime theory to conceptualize the global food system</li> <li>• will be familiar with different conceptions of society-nature relationships</li> <li>• will have an overview of relevant methods of CAS and PE</li> <li>• will be able to critically evaluate and apply the corresponding approaches</li> <li>• will be knowledgeable about a contextual assessment of agri-environmental change and related implications</li> <li>• will be acquainted with transition and transformation studies, including “Commoning” approaches in the food systems</li> </ul>
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral presentation (either approx. 20 min or 3 * 5-10 min) 40% and written paper (max. 2500 words) 60%; or work report (max. 2500 words) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. Andreas Thiel and staff
<b>Types of Media</b>	diverse
<b>Literature</b>	Will be announced
<b>Course Content</b>	The course provides an overview of influential critical approaches to understanding the development and problems of the global food system. At the macro level, it reflects on global food system trends from the viewpoint of food regime theory and critical agrarian studies. It continues introducing the contextual approaches and ideas of political ecology and critical agrarian studies and it exemplifies and allows critical discussion of these approaches through case illustrations and presentations. Moreover, the methods applied in political ecology and critical agrarian studies will be introduced and their application discussed. To round off the course, trending approaches to transforming the global food system are discussed and evaluated.
<b>Course Title</b>	Critical and collective perspectives on the global food system
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	-
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Background in agricultural and environmental policy and economics

<b>Module Name</b>	<b>EU policies, organic farming and food system transformation</b>
<b>Number/Code</b>	<b>E41</b>
<b>Module Coordinator</b>	Dr. J. Sanders
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	The students deal with selected key issues of food-related European agricultural, environmental and health policies that are relevant to the sustainability transformation of food systems and farming. A particular focus will be on organic agriculture and relevant support measures. They work on these policies in a project-oriented way and apply concepts and methods of knowledge integration, policy process analysis and conceptualizations of the science-policy interface. This enables them to transfer the knowledge that they have also acquired in agricultural policy and governance courses to concrete issues and to link them to particular European and international contexts. At the same time, the aim of the course is to make students from Europe and beyond familiar with the relevance of these dimensions for their future professional life and to understand European organic agriculture and food system policies through discussions from the perspectives of different regional contexts.
<b>Types of Courses</b>	Lecture 14h, seminar 12h, excursion 24h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180h, davon 60h Kontaktstunden
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Group presentation (ap. 30 min) 50%, group report (2500 words per person) 50%
<b>Number of Credits for the Module</b>	6
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr. J. Sanders, Prof. Dr. A. Thiel
<b>Types of Media</b>	Diverse
<b>Literature</b>	Literature und publications will be provided for the course; Vedung, E. 1997: Public policy and program evaluation. Transaction Publishers, New Brunswick, London; Scholz, R.W., Tietje, O. 2002: Embedded case study methods: Integrating quantitative and qualitative knowledge. Sage Publications, Thousand Oaks.
<b>Course Content</b>	Increasingly, agricultural production is being considered as part of larger food systems. Policies and governance play a core role in the structuring of these food systems and should therefore also be of core relevance to their transformation. To start with, the lecturers introduce the food system concept and the role policies and governance play in this and how these aspects are analyzed. A focus will be on organic support policies. Students then work on selected current affairs issues of European Food System governance and transformation from different perspectives in topic-related small groups which are accompanied by the lecturers. Each group first develops the project concept (definition of a research question, methodological approach). These project concepts are presented by the different groups and discussed in the plenary before the small group projects are implemented. At the end of the semester, all groups present and produce a report on their project results. Finally, the project results are discussed from both the European and the international perspective. Parallel to working on these key issues, students learn about methods of knowledge integration (e.g. system analysis, multi-criteria analysis), and policy process analysis and they are able to apply these methods. A central part of the course is the excursion to Brussels where the current affairs issues addressed during the session will be discussed with stakeholders. It enables students to get to know different perspectives and gain deeper insights for their own project work.
<b>Course Title</b>	EU policies and food system transformation

<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, project-oriented group work supervised by lecturers, excursion
<b>Module Applicability</b>	Mandatory module according to § 9 (8) PO MSc AGES
<b>Duration of Module</b>	one Semester
<b>Frequency of Module</b>	Summer semester, yearly
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Students ideally attend at least one of the Master level courses of the Section of International Agricultural Policy and Environmental Governance before they attend this course.

<b>Module Name</b>	<b>Marketing research</b>
<b>Code</b>	<b>F32</b>
<b>Module Coordinator</b>	Prof. Dr. K. Zander
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>Students</p> <ul style="list-style-type: none"> <li>• are able to describe how marketing research relates to the marketing concept</li> <li>• are able to outline the steps in the marketing research process and show how the steps are interrelated</li> <li>• know the factors to consider in defining the marketing problem or opportunity</li> <li>• are able to develop a research design</li> <li>• are able to state the specific advantages of the most important methods of data collection</li> <li>• learn how to present and report on the research results</li> <li>•</li> </ul>
<b>Types of Courses</b>	Lecture 30h, Seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	Presentation in seminar part (oral and written)
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Oral examination (30 min) 60%, oral presentation (20min) and written report (appr. 2.000 words) 40%
<b>Number of Credits for the Module</b>	6
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. K. Zander
<b>Types of Media</b>	Various
<b>Literature</b>	Aaker D.A., Kumar V., Leone R.P., Day G.S. 2013: Marketing research. 11th ed., Hoboken: Wiley; Malhotra N.K., Birks D.F., Wills P. 2012: Marketing research, 4th ed., Harlow: Pearson Education.
<b>Course Content</b>	<ul style="list-style-type: none"> <li>• Tasks and management of marketing research</li> <li>• Methods of data collection</li> <li>• Presentation of market research results for decision support</li> <li>• Methods of development prognoses</li> </ul>
<b>Course Title</b>	Marketing research
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Participatory research methods for sustainability</b>
<b>Number/Code</b>	<b>I19M</b>
<b>Module Coordinator</b>	Prof. Dr. T. Plieninger
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>This course will look at the importance of place-based, participatory and transdisciplinary research methods in sustainability science. Students will learn different participatory methods to capture the knowledge and aspirations of the different agents that operate in agricultural landscapes and will be able to integrate this knowledge in practical outcomes for sustainable land management. After successfully completing this module students should:</p> <ul style="list-style-type: none"> <li>• comprehend the fundamentals of participatory research</li> <li>• be familiar with the different types of participatory research methods</li> <li>• be able to design and implement participatory processes</li> </ul> <p>This module contributes to the following skills:</p> <ul style="list-style-type: none"> <li>• performance of transdisciplinary processes</li> <li>• integration of knowledge and aspirations of different agents towards sustainable land management</li> <li>• data collection and analysis using participatory methods</li> <li>• group work techniques (organization of working schedule, team work)</li> <li>• presentation skills and communication of main research results</li> </ul>
<b>Types of Courses</b>	Lecture 30h, seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Presentation (30 min) 50%, written report (appr. 8.000 words) 50%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. T. Plieninger and staff
<b>Types of Media</b>	diverse
<b>Literature</b>	Bergmann M. et al. 2012: Methods for Transdisciplinary Research: A Primer for Practice. Campus Verlag; Course materials to be provided.
<b>Course Content</b>	<p>The course is structured in three parts. An introductory part focuses on research principles of sustainability science, paying particular attention to the role of transdisciplinarity and ethics in the participation processes.</p> <p>A second part showcases a broad suite of different participatory research methods (e.g. photo-voice, participatory mapping, storytelling) for sustainable landscapes management and land-use conflict resolution. The full research process is addressed, from participatory process design, the approaching and involvement of participants and the organisation and facilitation of participatory activities, to the analysis, integration and presentation of the outcomes.</p> <p>In the third part of the course, students have the opportunity to choose and design a protocol for a participatory study, applied to a specific geographical location and a specific problem, and share the insights of the process with the class. The first part will be outlined in lectures, the second part will take the form of seminars and the third part will consist of group work with a final presentation to the class where the different experiences will be critically discussed.</p>
<b>Course Title</b>	Participatory research methods for sustainability
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §8 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,

<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Sustainability-oriented environmental social science</b>
<b>Number/Code</b>	<b>K01</b>
<b>Module Coordinator</b>	Prof. Dr. A. Braun
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>Students learn basic concepts of (environmental) social science. This will enable them to understand issues at the human-environment interface from a social science perspective as well. Learned qualification goals are:</p> <ul style="list-style-type: none"> <li>• Basic understanding of social scientific thinking</li> <li>• Basic understanding of social theory</li> <li>• Competencies in the psychology of environmental behavior</li> <li>• Competencies in environmental social psychology</li> <li>• Competencies in environmental sociology</li> <li>• Basic understanding of important models</li> <li>• Learning of strategies of environmental education and environmental communication</li> </ul> <p>A special goal of the module is to teach how people perceive environmental and sustainability problems on the one hand, and on the other hand, which interventions are conceivable to change environment-related behavior. The module is general from a theoretical point of view, but will be based on examples related to agriculture.</p>
<b>Types of Courses</b>	Lecture 30h, Seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written Exam (90min)
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. A. Braun and Team
<b>Types of Media</b>	Various
<b>Literature</b>	<p>Abrahamse, W. 2019: Encouraging Pro-Environmental Behaviour – What works, what doesn't, and why? London: Elsevier Academic Press.</p> <p>Clark, N., Szerszynski, B. (2020). Planetary Social Thought: The Anthropocene Challenge to the Social Science Cambridge: Polity.</p> <p>Heberlein, T.A. 2012: Navigating Environmental Attitudes. Oxford: Oxford University Press, USA</p> <p>Klößner, C.A. 2015: The Psychology of Pro-Environmental Behaviour – Beyond Standard Information Strategies. Basingstoke, UK: Palgrave MacMillan.</p> <p>Moran, E. 2010: Environmental Social Science: Human - Environment interactions and Sustainability. London: Wiley Blackwell.</p> <p>Vaccaro, I., Smith, E.A., Aswanti, S. 2019: Environmental Social Sciences: Methods and Research Design. Cambridge: Cambridge University Press.</p>
<b>Course Content</b>	<p>Fundamental theories and concepts in environmental social science with a particular emphasis on sustainability transformations. These include: psychology of pro-environmental behaviour, environmental sociology, environmental justice. The course also outlines general epistemological concepts needed to understand the environment from a social science perspective. It further delves on modern human-environmental anthropologies such as Bruno Latour and Philippe Descola. It exemplifies these issues with empirical contributions on agriculture, food production and consumption with a particular focus on the global south.</p>
<b>Course Title</b>	Sustainability-oriented environmental social science
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, Seminar, Paper-Workshops, Videocontent, Learning Games, Co-Teaching

<b>Module Applicability</b>	Mandatory module according to § 9(8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Climate change governance and one health</b>
<b>Number/Code</b>	<b>K02</b>
<b>Module Coordinator</b>	Dr. I. Sieber
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>Upon successful completion of the module a student will be able to</p> <ul style="list-style-type: none"> <li>• Understand key scientific concepts around climate change, including climate change adaptation, mitigation, resilience, tipping points, and path dependency.</li> <li>• Analyse and interpret scientific literature that engages with climate change concepts.</li> <li>• Develop critical thinking and analytical skills through close reading and discussion.</li> <li>• Cultivate interdisciplinary perspectives by integrating different scientific viewpoints.</li> <li>• understand the scientific principles and evidence behind the interrelationships between human, animal, and environmental health in agriculture, with a focus on global health implications.</li> <li>• define the concept of One Health and its relevance to agricultural systems and global health.</li> <li>• develop critical thinking on land use epidemiology: analyse the impacts of agricultural practices on crop production, livestock farming, and agroecosystems, considering the use of chemical fertilizer, pesticide, antimicrobial resistance and disease emergence.</li> <li>• Investigate the role of agricultural practices in environmental conservation and explore sustainable alternatives in the context of global health.</li> </ul>
<b>Types of Courses</b>	Lecture 30h, Seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	2 oral presentations
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Organic Agricultural Sciences, University of Kassel
<b>Module Teacher</b>	Dr. N. Nahar, Dr. I Sieber
<b>Types of Media</b>	Various
<b>Literature</b>	<p>Prata, J., A. Ribeiro, and T. Rocha-Santos, editors 2022: One Health, Integrated Approach to 21st Century Challenges to Health. 1st edition. Academic Press.</p> <p>Various scientific publications specified in the description of the respective course</p>
<b>Course Content</b>	<p>One health in agriculture: The "One Health in Agriculture" course is designed for master's students from diverse disciplinary backgrounds who are interested in the intersections of agriculture, global health, and sustainable development. This module explores the interconnectedness between human, animal, and environmental health within the agricultural context, with a specific focus on global health implications. It aims to enhance students' understanding of the impacts of agricultural practices on these interconnected systems, their contribution to global health challenges, and the role of sustainable agriculture in achieving the Sustainable Development Goals. The module incorporates theoretical concepts, case studies, and practical applications to provide students with a comprehensive understanding of the subject matter from a global health perspective.</p>

	Climate change governance: Exploring concepts and narratives: This course delves into the multidimensional aspects of climate change governance through the lens of scientific literature. Students will explore key concepts of climate change, the pillars of CC governance, mitigation, adaptation and means of implementation, drawing upon examples from agricultural sciences. Thereafter, climate change tipping points will be addressed, including adaptive pathways and their implications for policy and decision making. Through critical analysis and discussion, students will gain insights into the complexities and challenges associated with climate change and examine how literature can offer concepts that help operationalize these cross-cutting issues.
<b>Course Title</b>	Climate change governance and one health
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, case studies, documentaries and group discussions.
<b>Module Applicability</b>	Mandatory module according to §9(8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, winter semester
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Philosophy of sciences</b>
<b>Number/Code</b>	<b>K21</b>
<b>Module Coordinator</b>	Prof. Dr. Dr. Kristian Köchy
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	In view of the plural constitution of scientific cultures and the different understandings of scientificity associated with them, a reflection on the ideals of science, the conceptions of methods and the conceptions of subject matter of the individual sciences is indispensable. This is especially true against the background of a required interdisciplinary cooperation of different sciences in the face of current crisis phenomena. In this module, students will be familiarized with the basic questions of the philosophy of sciences in an exemplary way. Through this, they acquire the ability to critically assess methodological and scientific ideals in the face of a variety of different individual sciences. They will acquire the competence to apply scientific theoretical considerations to concrete cases of application in the practice of sciences. In particular, they will acquire the ability to reflect on the plurality of scientific cultures in the tension between sciences and humanities.
<b>Types of Courses</b>	Seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 30 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written report (appr. 8.000 words) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Humanities, University of Kassel
<b>Module Teacher</b>	Prof. Dr. Dr. Kristian Köchy and colleagues
<b>Types of Media</b>	diverse
<b>Literature</b>	Barberousse A., Bonnay D., Cozic M. (Ed.) 2018: The Philosophy of Science: A Companion (Oxford Studies in Philosophy of Science), Oxford University Press Newton-Smith W. H. (Ed.) 2000: A Companion to the Philosophy of Science, Oxford: Blackwell Curd M., Stathis P. (Ed.) 2013: The Routledge Companion to Philosophy of Science, New York, London: Routledge
<b>Course Content</b>	Exemplary seminar courses introduce the basic issues and positions of the philosophy of science. The relevant classical approaches (logical empiricism, critical rationalism, revolutionary transformism, research program approach, anarchistic methodology, science in context, science studies, etc.) as well as the essential dynamics (linguistic turn, practical turn, iconic turn, spatial turn, etc.) are taken into account. In methodological terms, this also means the possible thematization of different areas of methodology (observations, experiments, model building, theories, etc.). The module is explicitly adapted to the plurality of individual sciences and in this respect takes into account the issues of the two-culture problem (humanities and natural sciences, science wars).
<b>Course Title</b>	Philosophy of sciences
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, Winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Philosophy of environment and society</b>
<b>Number/Code</b>	<b>K22</b>
<b>Module Coordinator</b>	apl. Prof. Dr. D. Stederoth
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>The potential threats to our traditional ways of dealing with nature have a global dimension and are undeniably explosive. They create an urgent need for action, which, however, includes basic philosophical reflections. In all relevant fields of action, it becomes clear that the protection of the environment and the quality of human life have to be thought together. Classical oppositions such as that of nature and society must be overcome. If philosophy is challenged here, then it is under the condition that the global problems of human-nature interaction imply, on the one hand, an intimate interconnection of questions of natural and social philosophy, and, on the other hand, the interaction of approaches in environmental philosophy and environmental ethics.</p> <p>The present module responds to these challenges. It has the task of demonstrating the necessity of a critical philosophical examination of the environment and society in order to solve the aforementioned problem areas. It aims to introduce students to the relevant topics and to demonstrate the connection between the aforementioned aspects in an exemplary way.</p> <p>Furthermore, the students acquire competences</p> <ul style="list-style-type: none"> <li>-of free and independent oral reproduction</li> <li>-of analysis, argumentation, critical reflection and discussion of philosophical issues</li> </ul>
<b>Types of Courses</b>	Seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 30 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written report (appr. 8.000 words) 100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Humanities, University of Kassel
<b>Module Teacher</b>	apl. Prof. Dr. D. Stederoth and colleagues
<b>Types of Media</b>	diverse
<b>Literature</b>	<p>Jamieson D. (Ed.) 2003: A Companion to Environmental Philosophy, Oxford: Wiley-Blackwell.</p> <p>Hale B., Light A., Lawhon L. (Eds.) 2022: The Routledge Companion to Environmental Ethics, New York: Routledge</p> <p>Carolan M. 2020: Society and the Environment. Pragmatic Solutions to Ecological Issues, New York: Routledge</p>
<b>Course Content</b>	In exemplary seminars, topics of natural philosophy (e.g. the concept of nature, philosophy of the organic), environmental and bioethics (e.g. anthropocentrism, pathocentrism, biocentrism, holocentrism) and critical social theory (e.g. political economy, technological development, imperial ways of life) are reflected and discussed in their interconnectedness and interdependence on the basis of relevant texts and materials. In doing so, it is particularly important to work out the references to current crisis phenomena in the field of environment and nature (e.g. climate crisis, species extinction) as well as social developments (e.g. global exploitation relations, political polarization, gender and diversity) and to question their possible transformations.
<b>Course Title</b>	Philosophy of environment and society
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, seminar
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester

<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Global political economy and development</b>
<b>Number/Code</b>	<b>K52</b>
<b>Module Coordinator</b>	Prof. Dr. A. Ziai
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Knowledge of the relevant theories, debates and issues in Global Political Economy. Analytical skills: Categorization of theories, detection of theoretical inconsistencies, operationalization of theoretical propositions, empirical analysis of selected policy areas.
<b>Types of Courses</b>	Seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 30 contact hours
<b>Course Projects</b>	Text summary (analytical presentation of the central assumptions, theoretical approaches and methods of the text), active participation, oral presentation, learning diary, meeting minutes
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Usually group presentation (appr. 20 min)) and written report (appr. 7.000 words), other options: Book Review, Policy Briefing, Case Study.
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Social Sciences, University of Kassel
<b>Module Teacher</b>	Prof. Dr. A. Ziai and others
<b>Types of Media</b>	diverse
<b>Literature</b>	Depending on the seminar
<b>Course Content</b>	Labour in the Global Economy; Politics of Money, Debt and Finance; Issues of Post-Colonial Political Economy; Gender and Race in Globalisation; Global Governance and Development Cooperation; Global Political Ecology and Environmental Politics; European Integration and Migration Policy; Urbanization and Agrarian Studies; Postcolonial, Decolonial and Postdevelopment Theory; State, Civil Society and Social Struggles
<b>Course Title</b>	Global political economy and development
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Seminar
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	2 Semester,
<b>Frequency of Module</b>	Offers of seminars in each term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Methods of sociology and humanities</b>
<b>Number/Code</b>	<b>K53</b>
<b>Module Coordinator</b>	Prof. Dr. E. Tuider
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>Students are familiar with advanced data collection and data analysis methods as well as the necessary measures to ensure the quality of the collected data and can apply them competently and independently.</p> <p>Students are able to collect data on the basis of complex, also multi-method designs and to use them for content evaluation and analysis.</p> <p>They learn differentiated methods specifically tailored to the analysis of sustainability concepts and topics and deepen these using practical examples.</p> <p>Students acquire the ability to apply methodological procedures to a concrete problem in the field of sustainability research and to interpret the results.</p> <p>Students are competent in evaluating existing and also complex data as well as analysis results in relation to social science concepts and topics on sustainability.</p> <p>Students deepen their knowledge and learn to apply and critique e.g. one or more of the following methods and their combination:</p> <ul style="list-style-type: none"> <li>• Participatory Research</li> <li>• Survey Research</li> <li>• Attitude research (quanti + quali)</li> <li>• Multi-Sited Ethnography</li> <li>• network analysis</li> <li>• Subjectification research</li> <li>• biographical research</li> <li>• Discourse and dispositif analysis</li> <li>• Narrative Analysis</li> <li>• Archive and library research</li> <li>• hermeneutics</li> <li>• Mixed Methods</li> </ul>
<b>Types of Courses</b>	Seminar, block seminars, projects, exercises (30h)
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180h (thereof 30h contact study, 150h self-study)
<b>Course Projects</b>	A maximum of two course projects as determined by the course instructor: Essay, session supervision, facilitation, minutes, report, excerpt, essay, interviews, source critique, simulation game, reflection paper, podcast, poster, and the like.
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	At the instructor's discretion, optional written report (appr. 7,000 words) 100% or oral examination (appr. 30 min) 100% or written exam (appr. 90 min) 100% or a project presentation (x min) 100%.
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Social Science, University of Kassel
<b>Module Teacher</b>	Prof. Dr. E. Tuider (FB5), Prof. Dr. B. Langfeldt (FB5), PD Dr. M. Roscher (FB5), Prof. Dr. H. Büschel (FB5), Prof. Dr. K. Köchy (FB 02), apl Prof. Dr. D. Stederoth (FB 02), Adjunct lecturer
<b>Types of Media</b>	alternates, depending on disciplinary affiliation
<b>Literature</b>	alternates, depending on disciplinary affiliation
<b>Course Content</b>	alternates, depending on disciplinary affiliation
<b>Course Title</b>	Methods of sociology and humanities
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	alternates, depending on disciplinary affiliation

<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Annually, summer term
<b>Language</b>	English, German
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Spatial Dimensions of Sustainability Transitions: Living Labs, Experiments and Planning</b>
<b>Number/Code</b>	<b>K61</b>
<b>Module Coordinator</b>	Prof. Dr.-Ing. M. Leibenath
<b>Type of Module</b>	Compulsory Elective Module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students learn to examine the spatial dimensions of the current socio-ecological crisis as well as the implications of the urgently needed socio-ecological transformations for cities, landscapes and regions. On this basis, they will be introduced to different aspects of sustainability labs and experiments in urban, regional and landscape planning.
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Study report (<10 pages) 60%, oral presentation 40%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Architecture, Urban Planning and Landscape Planning, University of Kassel
<b>Module Teacher</b>	Prof. Dr.-Ing. M. Leibenath
<b>Types of Media</b>	diverse
<b>Literature</b>	Augenstein, K., Bachmann, B., Egermann, M., Hermelingmeier, V., Hilger, A., Jaeger-Erben, M., Kessler, A., Lam, D. P. M. et al. (2020), From niche to mainstream: the dilemmas of scaling up sustainable alternatives. <i>GAIA - Ecological Perspectives for Science and Society</i> , 29, 3, 143-147 ( <a href="https://dx.doi.org/10.14512/gaia.29.3.3">https://dx.doi.org/10.14512/gaia.29.3.3</a> ). Sonnberger, M. & Lindner, D. (2021), Participation in real-world laboratories in a new light?! Closing the gap between co-creative and deliberative participation. <i>Raumforschung und Raumordnung   Spatial Research and Planning</i> , 79, 4, 424-437 ( <a href="https://dx.doi.org/10.14512/rur.27">https://dx.doi.org/10.14512/rur.27</a> ). Wittmayer, J. M., Avelino, F., van Steenbergen, F. & Loorbach, D. (2017), Actor roles in transition: Insights from sociological perspectives. <i>Environmental Innovation and Societal Transitions</i> , 24, 45-56 ( <a href="https://dx.doi.org/10.1016/j.eist.2016.10.003">https://dx.doi.org/10.1016/j.eist.2016.10.003</a> ).
<b>Course Content</b>	The seminar consists of three parts. In the first part, the notions of planetary boundaries, Anthropocene, sustainability transitions, transformations, living labs, etc. are introduced through lectures and group discussions. The second part is dedicated to student presentations based on 1-2 international journal articles each. These will cover topics such as <ul style="list-style-type: none"> <li>• Scaling and rescaling of niche experiments,</li> <li>• Participation and social selectivity,</li> <li>• Power in transformation processes, and</li> <li>• Success factors and enabling conditions</li> </ul> Finally, in the third part, students are to prepare small case studies. The aim is to combine the findings from the international journal articles with cases (national or international) chosen individually by the participants.
<b>Course Title</b>	Spatial Dimensions of Sustainability Transitions: Laboratories, Living Labs, Experiments and Planning
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lectures and group discussions, student presentations, visits to ongoing living labs in Kassel (e.g. in the framework of the Climate Protection Council Kassel).
<b>Module Applicability</b>	Compulsory Elective module according to § 9(8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	At least every second summer term

<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Supply chain management</b>
<b>Number/Code</b>	<b>K71</b>
<b>Module Coordinator</b>	Prof. Dr. S. Seuring
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	Students will be able to distinguish between terms and theoretical lines of development of supply chain management as well as identify, evaluate and apply different approaches to the analysis and design of value chains. At the end, the students will have the necessary knowledge to be able to evaluate and apply strategies and instruments of supply chain management in a differentiated manner in research and practice.
<b>Types of Courses</b>	Lecture
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	Presentation in the context of the lecture
<b>Prerequisites for Admission to Examination</b>	Successful presentation
<b>Examination</b>	Written test (120 min)100%
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Economics and Management, University of Kassel
<b>Module Teacher</b>	Prof. Dr. S. Seuring
<b>Types of Media</b>	Will be announced in the module
<b>Literature</b>	Mentzer J.T.; DeWitt W.; Keebler J.S.; Min S.; Nix N.W.; Smith C.D. and Zacharia Z. 2001: Defining supply chain management, Journal of Business Logistics, Vol. 22, No. 2, pp. 1-25. Halldórsson A., Hsuan J., Kotzab H. 2015: Complementary theories to supply chain management revisited – from borrowing theories to theorizing, Supply Chain Management: An International Journal, Vol. 20, Issue: 6, pp.574-586. Seuring S. and Müller M. 2008: From a literature review to a conceptual framework for sustainable supply chain management, Journal of Cleaner Production, No. 16, pp. 1699-1710
<b>Course Content</b>	Introduction to SCM Terminology, Supply Chain and Operations Strategy, Supplier Management and Development, Supply Chain Risk Management, Supply Chain Performance, Digital Technologies in Supply Chains, Sustainable Supply Chain Management
<b>Course Title</b>	Supply chain management
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, exercise, self-study
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester,
<b>Frequency of Module</b>	Annually, winter term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	-

<b>Module Name</b>	<b>Sustainable behaviour and governance</b>
<b>Number/Code</b>	<b>K72</b>
<b>Module Coordinator</b>	Prof. Dr. A. Dannenberg
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	The basic orientation of the courses offered here is to enable students to apply economic theories and concepts in order to compare and analyse the behaviour of economic actors in different contexts as well as the possibility and effect of economic policy measures. Students acquire the necessary knowledge to be able to evaluate and assess behavioural patterns of economic actors, economic policy measures and methodological approaches in behavioural economics in a differentiated manner. The degree of specialization in this area is determined by how many courses from this area students choose. The focus is on applying the methodological and conceptual knowledge gained to behaviours and regulation related to sustainability.
<b>Types of Courses</b>	Seminar 30h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 30 contact hours
<b>Course Projects</b>	Depending on the assigned courses
<b>Prerequisites for Admission to Examination</b>	-
<b>Examination</b>	Written exam, presentation, term paper, depending on the assigned courses
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Economics and Management, University of Kassel
<b>Module Teacher</b>	Prof. Dr. A. Dannenberg, Prof. Dr. Frank, Prof. Dr. Bünstorf, Prof. Dr. I. Bischoff, Prof. Dr. Wetzel, Prof. Dr. Kesternich, Prof. Dr. Bonin
<b>Types of Media</b>	diverse
<b>Literature</b>	Will be announced
<b>Course Content</b>	Behavioural economics, game theory, economic policy, finance
<b>Course Title</b>	Thematically changing courses, for example <ul style="list-style-type: none"> <li>• Intermediate behavioural economics,</li> <li>• Foundations of experimental economics,</li> <li>• Intermediate public economics,</li> <li>• Impact evaluation in environmental economics using field experiments</li> <li>• Economics of entrepreneurship</li> <li>• Environmental economics</li> </ul>
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, exercise, self-study, group work, project study, teaching discussion
<b>Module Applicability</b>	Mandatory module according to §9 (8) Examination Regulations Master AGES
<b>Duration of Module</b>	2 Semester
<b>Frequency of Module</b>	Each semester, winter/summer term
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Fundamentals of Microeconomics

<b>Module Name</b>	<b>Decision Support Tools in Sustainability Management</b>
<b>Number/Code</b>	<b>K73</b>
<b>Module Coordinator</b>	Prof. Dr. S. Gold
<b>Type of Module</b>	Mandatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<p>In this seminar, students get acquainted with various tools that may support decision-making for multi-facetted sustainability performance. After a theoretical introduction on selected instruments including data envelopment analysis (DEA), decision-tree methodology, analytical hierarchy process (AHP) and system dynamics modelling, the students will gain in-depth practical experience by working with one selected tool. In the sense of a project seminar, the students successively develop a systems model for addressing a specific problem in the field of sustainability management, and then report and reflect on model-building procedure and findings.</p> <p><i>Goals and objectives</i></p> <ul style="list-style-type: none"> <li>• Get acquainted to decision support tools that are applicable for problems in the realm of sustainability management</li> <li>• Get in-depth insights and gain first experience in building a systems model</li> <li>• Reflect on the assets and limitations of various decision support tools</li> <li>• Gain experience in working in a team, in how to make decisions in a group and how to manage time and resources</li> </ul>
<b>Types of Courses</b>	Seminar 60h
<b>Prerequisites for Taking the Module</b>	-
<b>Students Workload</b>	180 hours, of which 60 contact hours
<b>Course Projects</b>	
<b>Prerequisites for Admission to Examination</b>	
<b>Examination</b>	Student presentation and seminar thesis
<b>Number of Credits for the Module</b>	6 Credits
<b>Teaching Unit</b>	Faculty of Economics and Management, University of Kassel
<b>Module Teacher</b>	Prof. Dr. S. Gold, M.Sc. A. Mies
<b>Types of Media</b>	Diverse
<b>Literature</b>	Key literature will be announced on Moodle
<b>Course Content</b>	Tools that support decision-making when targeting sustainability performance of organisations and supply chains
<b>Course Title</b>	Decision Support Tools in Sustainability Management
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Lecture, exercise, self-study, group work, teaching discussion
<b>Module Applicability</b>	Mandatory module according to § 9(8) Examination Regulations Master AGES
<b>Duration of Module</b>	1 Semester
<b>Frequency of Module</b>	Once a year
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	Basic knowledge about sustainability management

## Master Thesis and Colloquium

<b>Module Name</b>	<b>Master thesis and colloquium</b>
<b>Number/Code</b>	-
<b>Module Coordinator</b>	All lecturers
<b>Type of Module</b>	Obligatory module
<b>Educational Outcomes, Competencies, Qualification Objectives</b>	<ul style="list-style-type: none"> <li>• Independent preparation of a scientific paper in an area of agricultural sciences on a topic of the student's choice.</li> <li>• Students should combine the theories, approaches and methods learned during their studies, document methodological confidence and reflection, generate independent theses and reflect on them against the background of the international research discourse.</li> <li>• Presentation of the planning and progress of the independent research process and its methodological foundations in the study colloquium.</li> <li>• Presentation and professional discussion of the work in the final colloquium.</li> </ul>
<b>Types of Courses</b>	Own project, research and evaluation
<b>Prerequisites for Taking the Module</b>	At least 78 credits according to § 10 (2) Examination Regulations Master AGES
<b>Students Workload</b>	900 hours, contact hours vary
<b>Course Projects</b>	-
<b>Prerequisites for Admission to Examination</b>	78 credits
<b>Examination</b>	Master thesis (ca. 40.000 words) 75%, Colloquium presentation (60 min) 25%
<b>Number of Credits for the Module</b>	30 credits
<b>Teaching Unit</b>	University of Kassel
<b>Module Teacher</b>	A total of two supervisors must be selected. All teachers in the program can supervise the Master thesis. One supervisor must have a habilitation.
<b>Types of Media</b>	Diverse
<b>Literature</b>	Scientific publications on the agreed topic in consultation with the supervisors
<b>Course Content</b>	The topic and content can be chosen by the student and agreed upon with the supervisor. Some teachers also offer topics.
<b>Course Title</b>	Master thesis and colloquium
<b>Teaching and Learning Methods (Types of Teaching and Learning)</b>	Own project, research and evaluation
<b>Module Applicability</b>	Obligatory module according to §10 Examination Regulations Master AGES
<b>Duration of Module</b>	22 weeks
<b>Frequency of Module</b>	Every semester
<b>Language</b>	English
<b>Recommended (Content) Prerequisites for Taking the Module</b>	At least 78 credits according to § 10 (2) Examination Regulations Master AGES