Georg-August-Universität
Göttingen

Directory of Modules

Study Guide MSc Sustainable International Agriculture

Modules

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1) Study Guide MSc Sustainable International Agriculture

At least 120 C must be succesfully completed within the following regulations

a) Specializations

At least 90 C must be succesfully completed within a spezialization

aa) International Agribusiness and Rural Development Economics

i) Compulsory modules

The following four compulsory modules must be completed:

ii) Mandatory modules

From the following modules five mandatory modules (of which at least one module is on learning work methods with code M) must be completed:

iii) Elective modules

From the following modules (or the so far not chosen mandatory modules of the degree programme) six elective modules must be completed:

bb) International Organic Agriculture

i) Compulsory modules

The following bridging module (P07) and four compulsory modules must be completed (the bridging module can be replaced by a mandatory module on request in the case of a corresponding preparatory study):

ii) Mandatory modules

From the following modules four mandatory modules (of which at least one module is on learning work methods with Code M and one economics module with Code E) must be completed:

iii) Elective modules

From the following modules six elective modules must be completed. It is also possible to choose the mandatory modules of the degree programme so far not chosen.

cc) Tropical Agriculture

i) Compulsory modules

The following bridging module (P07) and four compulsory modules must be completed (the bridging module can be replaced by a mandatory module on request in the case of a corresponding preparatory study):

ii) Mandatory modules

From the following modules four mandatory modules (of which at least one module is on learning work methods with Code M) must be completed:

iii) Elective modules

From the following modules, six electives must be completed. It is also possible to choose the mandatory modules of the degree programme that have not already been chosen.

b) Master's thesis

Completion of the Master's thesis is worth 24 Credits.

c) Colloquium for the Master's thesis

Successful completion of the colloquium for the Master's thesis is worth 6 Credits.

Georg-August-Universität Göttingen **Module M.Agr.0053: Organisation von Wertschöpfungsketten**	6 C 4 WLH

Learning outcome, core skills: **Organization of Food Supply Chains** Students comprehend the theoretical foundations of the organizational design of food supply chains and agribusiness firms. They understand how farms and firms adapt their boundaries, structures and processes to technical and social influences from their internal and external environments. Students are able to identify and classify problems and develop solutions based on the theoretical knowledge acquired in this course.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Organisation von Wertschöpfungsketten (Lecture) *Contents*: **Organization of Food Supply Chains** Organization of food supply chains in the meat sector and other agribusiness subsectors: Transaction cost, theoretic, strategic and behavioral approaches and empirical evidence Transparency of food supply chains Stakeholder management for farms and agribusiness firms Organization structures and business process design in agribusiness firms: Decision-oriented background and practical implications	4 WLH
Examination: Entweder Klausur (90 Minuten, Gewichtung: 33%) oder Hausarbeit (max. 5 Seiten, Gewichtung: 33%) und 2x Präsentation, Referat oder Korreferat (je ca. 30 Minuten, Gewichtung: 67%)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: German	**Person responsible for module:** Prof. Dr. Ludwig Theuvsen
Course frequency: jedes Sommersemester	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 100	

Additional notes and regulations: **Literature:** Lecture based materials

Georg-August-Universität Göttingen **Module M.Agr.0056: Plant breeding methodology and genetic resources**	6 C 4 WLH

Learning outcome, core skills: Students learn the integration of classical and molecular approaches to solve present problems in plant breeding. Social aspects have to be considered. Students learn, in own presentations, to draw critical conclusions from recent research papers and to communicate these to other students.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Plant breeding methodology and genetic resources (Lecture) *Contents*: Principles of breeding methodology: Response to selection, breeding methods for clonal, line, hybrid and population cultivars. Marker assisted selection for monogenic and polygenic traits. Use of plant genetic resources: wild species, ex-situ and in-situ conservation, on-farm management. Breeding for marginal environments, demonstrated with examples from temperate and tropical regions.	4 WLH
Examination: Klausur (Gewicht: 80%, Dauer: 90 Minuten) und Präsentation, Referat oder Korreferat (Gewicht: 20%, Dauer: ca. 20 Minuten) **Examination prerequisites:** Seminar (Vortrag über 20 Min.); das Seminar ist Voraussetzung für die Prüfung, geht jedoch nicht in die Note ein.	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) in genetics and plant breeding
Language: German, English	**Person responsible for module:** apl. Prof. Dr. Wolfgang Link
Course frequency: jedes Sommersemester	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 25	

Additional notes and regulations: **Literature:** Lecture based material.

Georg-August-Universität Göttingen **Module M.Forst.1512: International forest policy and economics**	6 C 4 WLH

Learning outcome, core skills: **Global environmental and forest policy:** The objective is that students get basic knowledge of both the key policies related to forests and the application of the policy analysis on such issues. Students acquire comprehension about global forest related policy processes and factual knowledge about forest actors affecting the policy on a global level. The seminar combines a lead-in to global policy theory and its translation in practical, empirical knowledge about actors and processes of high importance in forestry. The different instruments for international policy formulation and implementation are discussed using case studies. **International forest economics:** The lecture is split in two main areas: 'International Wood Markets' and 'International Environmental and Forest Conservation'. The first part deals with the international trade with wood and wood products. International markets and the consequences of protectionism are analysed. Furthermore, aspects of international wood marketing are shown. In the second part, international environmental problems are described and possibilities as well as constraints for international co-operation are discussed. Finally, relations between environmental conservation and economic development are analysed.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Global environmental and forest policy (Seminar)	2 WLH
Examination: Written exam (60 Minuten)	3 C

Course: International forest economics (Lecture)	2 WLH
Examination: Written exam (60 Minuten)	3 C

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Dr. Christiane Hubo
Course frequency: jedes Wintersemester	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: cf. examination regulations	**Recommended semester:**
Maximum number of students: not limited	

Georg-August-Universität Göttingen **Module M.Forst.1521: Ecopedology of the tropics and suptropics**	6 C 4 WLH

Learning outcome, core skills: General understanding of the most important aspects of tropical and subtropical soils, their occurrence, genesis, geography, properties and use. Understanding the principles of the international FAO soil profile description and classification.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Ecopedology of the tropics and subtropics (Lecture) *Contents*: Part I: General introduction in soils of the tropics and subtropics, their functions, genesis, geography and properties. Objective: general understanding of the most important aspects of tropical soils, their occurrence, genesis, properties and use. The following topics will be discussed: Introduction; Climate, water and vegetation; Weathering and weathering products, clay minerals; Soil organic matter, C and N dynamic; Soil chemical reactions, variable charge; Soil forming processes and development of soils; Water and nutrient cycling of land use systems; Tropical shield areas (example: Amazon basin); Arid shields and platforms (example: West Africa); Tropical mountain areas (example: Andes); Fluvial and coastal areas in the tropics (example: coastal areas in Asia). Part II: Introduction in the description and classification of soils, using in international system (FAO). Objective: understanding the principles of the FAO soil profile description and classification. The course consists of introductory lectures in which the principles of the FAO soil description and classification will be explained. This knowledge will be practiced using examples of soil profiles from different tropical countries. The second part consists of a practical week during which soil profile descriptions and evaluations will be exercised in the field. We will visit three contrasting sites around Göttingen where a site and soil description will be made. The work will be done in small groups. Students discuss their results in a report.	4 WLH

Examination: Term paper (10 pages) and written exam (2 hours)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Edzo Veldkamp
Course frequency: jedes Sommersemester	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: cf. examination regulations	**Recommended semester:**
Maximum number of students: not limited	

Georg-August-Universität Göttingen **Module M.Forst.1604: Forest growth and disturbance in the tropics**	6 C 4 WLH

Learning outcome, core skills: Understanding of forest dynamics and growth research approaches in the tropics. Participants will become familiar with sampling, measurement, and analysis methods for age determination and increment measurement of trees and forest stands. The seminar will enable students to direct discussions on scientific topics.	**C/Weekly lecture hours in total:** Attendance time: 28 h Self-study time: 152 h

Course: Forest growth and disturbance in the tropics (Exercise, Lecture) *Contents*: The lecture include the following topics: geographical distribution of the tropics and their climatological characterization, dendrological and site characteristics of forests types, structure and dynamics of forests, status of tropical forests and situation of deforestation, climate growth relations of trees and stands, wood anatomical features of selected tree species, implications of growth studies on sustainable management systems and carbon flux estimations in tropical forests. Thes seminar focuses on the impact of natural and human perturbations on tropical forest ecosystems. Disturbances such as fire, harvesting, land-uses change and global warming to tropical forests will be evaluated. Through a series of student-led discussions founded on case studies from the lecture 'Tropical forest ecology and silviculture' and recent literature, we will address the effects of perturbations on ecological characteristics of forests such as net primary productivity, nutrient cycling and plant communities.	4 WLH

Examination: 2 Subexams: Written exam (60 minutes) and term paper (15 pages max.)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** PD Dr. Martin Worbes
Course frequency: jedes Wintersemester	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: cf. examination regulations	**Recommended semester:**
Maximum number of students: not limited	

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A01: Organic livestock farming under temperate and tropical conditions**	6 C 4 WLH

Learning outcome, core skills: Animal Welfare I: Students have a basic understanding of animal welfare, familiarize with different organic husbandry systems, practical problems and scientific concepts including how to assess animal welfare both at farm and system level. Advances in animal nutrition and animal health: Students get to know scientific tools for quantifying, assessing and evaluating problems within organic livestock production. Sustainable forage production systems: Students are able to assess the relationships between sward management and structural (yield, botanical composition) and functional (nutrient efficiency) sward characteristics. Organic livestock farming in the (sub)tropics: Students are able to decide under which conditions organic livestock farming can be introduced in (sub)tropical countries or regions.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Courses:	
1. Tierschutz und artgemäße Tierhaltung (Lecture) *Contents*: **Animal Welfare I** Principles of animal welfare in relation to organic farming; scientific methods of welfare assessment	1 WLH
2. Tierernährung und Tiergesundheit (Lecture) *Contents*: **Advances in animal nutrition and animal health** Organic livestock production in Europe; possibilities and limitations within organic farming to ensure a high level of animal health; strategies within animal nutrition to increase the efficiency in the use of limited resources; system-oriented approach versus technical approaches.	1 WLH
3. Nachhaltiger Futterbau (Lecture) *Contents*: **Sustainable forage production systems** Design and management of a sustainable forage production Management of forage quality and biodiversity on grassland Minimizing nutrient losses towards water and atmosphere	1 WLH

4. Ökologische Tierhaltung in den (Sub)Tropen (Lecture) *Contents*: **Organic livestock farming in the (sub)tropics** Characterization and evaluation of organic livestock farming systems in different southern regions/countries; Pros and cons of organic livestock farming under different bio-physical and socio-economic conditions.	1 WLH
Examination: Oral exam (ca. 30 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge of animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Albert Sundrum
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 27	

Additional notes and regulations:
Literature:

Animal Welfare I:

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

Advances in animal nutrition and animal health:

Vaarst, M., Roderick, S., Lund, V., Lockeretz, W. (eds.) 2004: Animal health and welfare in organic agriculture. CABI Publishing

Sustainable forage production systems:

Hopkins, A. 2000: Grass, its production and utilization. Blackwell Science, Oxford, UK; Cherney J.H. 1998: Grass for Dairy Cattle CABI Publishing, Exon, UK; Frame, J. 1992: Improved Grassland Management. Farming Press Books, Ipswich, UK.

Organic livestock farming in the (sub)tropics:

Diverse articles about case studies distributed via E-learning platform

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A02M: Epidemiology of international and tropical animal infectious diseases**	6 C 4 WLH

Learning outcome, core skills: Based on a scientific and practical up-to-date level, students know to evaluate and develop modern and effective livestock hygiene and husbandry concepts and to integrate them into complex quality management programs. Graduates are trained to be competent in implementing and communicating their knowledge in a multidisciplinary occupational setting that establishes epizootic control programs.	**C/Weekly lecture hours in total:** Attendance time: 84 h Self-study time: 96 h

Course: Epidemiology of international and tropical animal infectious diseases (Lecture, Internship) *Contents*: Infectious diseases play an enormous role in international animal health control. National health and veterinary authorities, as well as international organizations (WHO, FAO) are very much involved in the surveillance of epidemics and establishment of health and hygiene monitoring programs. These efforts will increase in future, because of a further globalization of international markets, and will require well-educated experts collaborating worldwide in this multidisciplinary field. This module will give a generalized view of current epidemics together with a specialized understanding of infectious diseases and hygienic programs in subtropical and tropical countries. Characteristics of the biology of relevant infectious agents like parasites, fungi and bacteria together with their toxins, viruses, and prions will be presented in detail. Some of these germs included in this unit cause severe zoonotic diseases with a lethal danger for humans. Immunological host-defence mechanisms of wild and domestic farm animals against pathogens will be discussed together with modern strategies of active and passive immunizations. Diagnostic methods presently available and new biotechnological approaches in future assay and vaccine development will be demonstrated. The adaptation of practical health and standardized quality management processes to various animal production systems (ruminants, pigs, poultry) and the corresponding management measurements will be explained. The view will deeply focus on environmental impacts (water, soil, air hygiene), epizootiology and modern tools in epizootiological research. It will include biology and eradication of vectors (insects, ticks) transmitting pathogens of animal and zoonotic diseases, as well as biological and chemical methods for vector control. In the laboratory course, this module will also communicate well-established techniques of microbiological and parasitological diagnostics. Students will be practically trained in classical methods and in modern biochemical, immunological, biotechnological and molecular biological techniques for the detection of infectious agents, toxins and noxious substances. Tissue culture procedures for vaccine or antibody development are also used. Modification of livestock-environment interactions through human management are discussed.	4 WLH

Examination: Oral exam (ca. 90 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil, plant and animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Dr. Claus-Peter Czerny
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Additional notes and regulations:

Literature:

Lecture based materials.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A03M: International and tropical food microbiology and hygiene**	6 C 4 WLH

Learning outcome, core skills: Based on a scientific and practical up-to-date level, students know to evaluate and develop modern and effective food hygiene concepts and to integrate them into complex quality management programs. Graduates are competent to implement and to communicate their knowledge in a multidisciplinary occupational area establishing epizootic control programs in food microbiology and hygiene. They are able to understand international experts of public health authorities and collaborate in international and multidisciplinary platforms including control, monitoring, and research.	**C/Weekly lecture hours in total:** Attendance time: 84 h Self-study time: 96 h

Course: International and tropical food microbiology and hygiene (Lecture, Internship) *Contents*: Infectious and toxic pathogens cause most of the food-borne impacts on human health all over the world. Global markets require an international surveillance system together with standardized food hygiene regulations. This module will give a generalized view of currently and internationally relevant food-borne zoonotic diseases, epidemics and food hygiene programs together with a specialized view on the conditions in subtropical and tropical countries. The biology of infectious agents (parasites, fungi, yeasts, bacteria, viruses, prions, together with their toxins) responsible for contaminations and intoxications of human food of animal origin will be discussed in detail. Some of these germs cause severe zoonotic diseases with a lethal potential for humans or certain age groups. Special characteristics of germ resistance in the food matrices meet, milk and eggs as well as in the corresponding products are elucidated along the complete manufacturing processes: from stable to table. Deterioration and spoilage of foodstuffs by microorganisms will be discussed as well. Diagnostic methods presently available for the detection of contaminated or spoiled nourishments and new biotechnological approaches in future assay designs will be analysed. The adaptation of practical hygiene and standardized quality management adjustment factors to various animal production systems (ruminants, pigs, poultry) as well as to the subsequent production processes will be explained together with the corresponding management measurements. This includes food conservation procedures, germ depletion and eradication techniques (cleaning, disinfection, autoclaving, sterilization). Beside negative microbial effects influencing food quality, positive effects especially of bacteria and fungi in food production will also be presented. Biotechnological aspects of genetic engineering of foodstuff supplements or directed genetic germ design will be discussed. In a laboratory course on food microbiology, this module will also communicate well-established techniques of microbiological and parasitological diagnostics in food matrices. Students will be practically trained in classical methods and in modern biochemical, immunological, biotechnological and molecular biological techniques for the detection of food-borne infectious agents, toxins and noxious substances.	4 WLH

Examination: Oral exam (ca. 90 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil, plant and animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Dr. Claus-Peter Czerny
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 20	

Additional notes and regulations:

Literature:

Lecture based materials.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A04: Livestock reproduction physiology**	6 C 4 WLH

Learning outcome, core skills: Strong foundation in reproduction physiology as well as the development of creative potential and the fostering of independent thought are of focus; Other skills students develop include gathering and integrating information on how to solve problems; effective communication skills; self learners; as well as awareness of global issues driving changes in livestock sciences.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Livestock reproduction physiology (Lecture, Internship, Excursion) *Contents*: Functional anatomy of reproduction; physiology of reproduction in livestock (hormones, growth factors, ovigenesis and fertilization, spermatogenesis, reproductive cycles, mating behaviour, fertilization, gestation, prenatal physiology, parturition, postpartum recovery, lactation); assisted reproductive technologies (artificial insemination, pregnancy diagnosis, preservation of embryos, embryo transfer, in vitro fertilization, sexing, cloning, transgenics); stem cells; ethics.	4 WLH
Examination: Written exam (90 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge of animal sciences
Language: English	**Person responsible for module:** Prof. Dr. sc. agr. Christoph Knorr
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 10	

Additional notes and regulations:

Literature:

Hafez B., Hafez, E.S.E. 2000: Reproduction in Farm Animals 7th ed. Lippincott Williams & Wilkins Publishing; Bearden, H.J., Fuquay, J.W., Willard, S.T. 2004: Applied Animal Reproduction, 6th ed. Pearson Prentice Hall Publishing; Squires, E.J. 2003: Applied Animal Endocrinology 1st ed. CABI Publishing; Pineda, M.H., Dooley, M.P. 2003: Mc Donald's Veterinary Endocrinology and Reproduction 5th ed. Blackwell Publishing.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A05: Aquaculture in the tropics and subtropics**	6 C 4 WLH

Learning outcome, core skills: Students get to know basic principles of aquaculture and the ecological and socio-economic aspects of this resource utilization. They see the functions of aquaculture in system relationships and know the distinct utilisation variants. They are capable of analysing the advantages and disadvantages of the different aquaculture systems and are able to evaluate the possibilities of a sustainable intensification of such systems in a multidisciplinary approach.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Aquaculture in the tropics and subtropics (Lecture, Internship, Excursion) *Contents*: This module provides an introduction to aquaculture in the tropics and subtropics with a focus on fresh-water fish farming. This resource can be managed independently or integrated with other ecological and socioeconomic aspects. The module covers: biological and ecological principles; aquaculture and aqua-agriculture systems; tropical fish candidates and their performance in relation to production systems; specific breeding and raising methods; functions and products of aquaculture.	4 WLH
Examination: Oral exam (ca. 20 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge of animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Gabriele Hörstgen-Schwark
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Additional notes and regulations:
Literature:

Lecture based notes.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A06: Global aquaculture production, markets and challenges**	6 C 4 WLH

Learning outcome, core skills: Students get to know the most important aquaculture organisms worldwide as well as their prevalent production systems. They learn which national and international regulatory mechanisms influence trade of aquatic products. Through the work on case studies and their presentations, students obtain the capability to evaluate problems, chances and socioeconomic impacts of a globalized and sustainable aquaculture; they are enabled to independently get acquainted with scientific subjects and to apply the acquired knowledge for the consideration of complex conflicts of interest.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Global aquaculture production, markets and challenges (Lecture, Seminar) *Contents*: The production of the world wide most important aquaculture species and ornamentals (i.e. kelp, water hyacinths, water salad, oysters, clams, carp, tilapia, salmon, trout, Litopenaeus vannamei, Penaeus monodon), their distribution channels; national and international markets and trade with aquatic products; international trading agreements, law and their compliance; national and international legislation for the protection of the aquatic environment; aquatic animal health, trade and transboundary issues. Through case studies: Trends and developments of sector management (influence of national authorities, NGOs, societies, communities); socioeconomic impact of aquaculture; contribution to national food self-sufficiency; energy and resource efficiency in aquaculture; environmental management of aquaculture.	4 WLH
Examination: Mündliche Prüfung (ca. 20 Minuten, Gewichtung: 67%) und Projektpräsentation (ca. 20 Minuten, Gewichtung: 33%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge of animal sciences and agricultural markets
Language: English	**Person responsible for module:** Prof. Dr. Gabriele Hörstgen-Schwark
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Additional notes and regulations:
Literature:

Lecture based notes.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A07: Unconventional livestock and wildlife-management, utilization and conservation**	6 C 4 WLH

Learning outcome, core skills: Based on the 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 utilisation and management and their respective potential contribution to the above conflicting objectives.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Unconventtional livestock and wildlife-management, utilization and conservation (Lecture, Internship, Seminar, Excursion) *Contents*: 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 demography and modelling of 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 utilisation 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.	4 WLH
Examination: Klausur (90 Minuten, Gewicht: 70%) und Präsentation, Referat oder Korreferat (ca. 20 Minuten, Gewicht: 30%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil, plant and animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Eva Schlecht

Course frequency: SoSe, jedes 2 jahr, alternieernd mit dem Modul M.SIA.A08; Wiitzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

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 http://www.cites.org/ (incl. appendices)

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A08: Socio-ecology in livestock production systems**	6 C 4 WLH

Learning outcome, core skills: Students understand livestock systems as socio-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 livestock farmers' management. This serves to understand "why livestock farmers do what they do" and "how livestock farmers produce". Students learn how they can make use of the knowledge of livestock farmers to better understand how low external input systems work. Collaborative learning is introduced as methodology to develop human activity systems in a transdisciplinary research approach. They deal with the question of how mutual understanding between livestock farmers and scientists can be achieved despite the different knowledge systems. Students obtain a profound insight into methods for farmer experimentations in which livestock farmers and scientists collaborate, and into using computer models as learning tools for ex-ante assessment of improvement measures in community based approaches. In "what – if" analyses, the change of action rules on the performance of socio-ecological systems is assessed.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Socio-ecology in livestock production systems (Lecture, Internship, Seminar) *Contents*: Theoretical background of the socio-ecological system view: System theory, 1st and 2nd order cybernetics, complex adaptive systems, 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 Modelling of livestock systems as tool for collaborative learning: Bio-economic modelling, multi-agent modelling, role plays.	4 WLH
Examination: Klausur (90 Minuten, Gewicht: 70%) und Präsentation, Referat oder Korreferat (ca. 20 Minuten, Gewicht: 30%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil, plant and animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Eva Schlecht

Course frequency: SoSe, jedes 2 jahr, alternieernd mit dem Modul M.SIA.A07; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

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; McCown, R.L. 2002: Changing systems for supporting farmers' decisions: problems, paradigms and prospects. Agricultural Systems 74: 179-220; Wiener, N. 1948: Cybernetics or control and communication in the animal and the machine. John Wiley, New York.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A09: Sustainability in organic livestock production under temperate conditions**	6 C 4 WLH

Learning outcome, core skills: Animal welfare II Students have an advanced understanding of the ethical and biological basis of animal welfare and of scientific animal welfare concepts and methods in relation to organic husbandry principles. System approach in livestock production Reflection on the differences between different approaches in livestock production from a scientific and from a practical perspective and their implications on the implementation of production goals in dependence on different farm types.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Courses:	
1. System-orientierter Ansatz in der Nutztierhaltung (Seminar) *Contents*: Basics of system theory; how to define an open system; how to assess the performance of a system; emergent properties of farm systems; differences between technical and systematic approaches in livestock production with respect to different production goals; possibilities and limitations of a systematic approach to improve animal health and the efficiency in the use of limited resources.	2 WLH
2. Animal Welfare II (Seminar) *Contents*: Ethics, scientific concepts in animal welfare research, reflection on the different dimensions of welfare on the basis of current scientific papers and taking into account organic principles	2 WLH
Examination: Hausarbeit (max. 30 Seiten) oder Referat (ca. 20 Minuten) (Gewichtung: 50%) und mündliche Prüfung (ca. 15 Minuten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Ute Knierim
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Additional notes and regulations:

Literature:

Animal welfare II

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 UK.

System approach in livestock production

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 UK

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A10: Livestock nutrition and breeding under (sub)tropical conditions**	6 C 4 WLH

Learning outcome, core skills: Students are able: • to describe the effects of abiotic and biotic environmental influences on behaviour and physiology of different livestock species and to discuss respective adaptation strategies of animals; • to analyse the opportunities and limitations of feeding, management and breeding strategies for an optimization of livestock production under specific agro-ecological settings; • to individually explain and discuss such topics for a selected livestock species or breed in an oral seminar presentation or written essay.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Livestock nutrition and breeding under (sub)tropical conditions (Lecture, Seminar) *Contents*: This module analyses the physiological basis of livestock husbandry in the Tropics and Subtropics. The adaptation of the most widely used livestock species (cattle, small ruminants, camelids, buffalo, poultry, pigs) to the climatic conditions and to qualitatively and quantitatively variable fodder supply is studied. Possibilities to reduce the negative impact of environmental factors on animal production through adapted management strategies are analyzed. Opportunities and limitations of breeding strategies for the improvement of animal production under the given ecological and economic conditions are discussed and evaluated. Allocation of lecturing time: 50% animal nutrition, 50% animal breeding	4 WLH
Examination: Mündlich (ca. 20 Minuten, Gewichtung: 75%) und Hausarbeit (max. 5 Seiten, Gewichtung 25%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil, plant and animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Eva Schlecht
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

Payne; W.J.A., Wilson, R.T. 1999: An Introduction to Animal Husbandry in the Tropics. Blackwell Science Ltd., Oxford, UK; Van Soest, P.J. 1994: Nutritional Ecology of the Ruminant. Cornell University Press, Ithaca, US; Wiener, G. 1994: Animal Breeding (Tropical Agriculturist). Macmillan Education, Edinburgh, UK [ISBN-13: 978-0333572986].

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A11: Tropical animal husbandry systems**	6 C 4 WLH

Learning outcome, core skills: Students are able to: understand the impact of the natural and economic environment on the evolution of different types of husbandry systems as well as on their orientation and intensity of production; gain understanding for parameters that have to be considered when aiming at the improvement of livestock husbandry systems within a given framework; individually analyse and present a specific tropical livestock production system.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Tropical animal husbandry systems (Lecture, Seminar) *Contents*: This module provides an extensive overview on the different forms of animal husbandry systems in developing and transformation countries of Africa, Asia and Latin America, ranging from camel nomadism in deserts to beef ranching and intensive dairying in tropical highlands. The system-specific strategies of livestock management are analysed in view of their ecological and economic sustainability. The (potential) interactions of livestock with other components of the farming system are explored, thereby differentiating between market and subsistence oriented systems. The role of additional factors influencing livestock production systems such as cultural, social, economical and political frame conditions are discussed.	4 WLH
Examination: Klausur (90 Minuten, Gewicht: 75%) und Präsentation, Referat oder Korreferat (ca. 15 Minuten, Gewicht: 25%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of plant and animal sciences or agricultural economics
Language: English	**Person responsible for module:** Prof. Dr. Eva Schlecht
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:
Literature:

Delgado, C., Rosegrant, M., Steinfeld, H., Ehui, S., Courbois, C. 1999: Livestock to

2020. The next food revolution. FAO Discussion Paper 28, FAO Rome, Italy; Devendra, C., Thomas, D., Jabbar, M.A. and Zerbini, E., 2000: Improvement of Livestock Production in Crop-Animal Systems in Agro-ecological Zones of South Asia. ILRI, Nairobi, Kenya; Falvey, L., Chantalakhana, C. (eds) 1999: Smallholder Dairying in the Tropics. ILRI, Nairobi, Kenya

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A12M: Multidisciplinary research in tropical production systems**	6 C 4 WLH

Learning outcome, core skills: To learn priority settings for research projects, formulation of problem statement, research objectives and hypotheses; To get acquainted with participatory tools for field research; To learn how to design experiments and analyse field data; To learn how to present research results as a poster at a conference.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Multidisciplinary research in tropical production systems (Exercise, Lecture) *Contents*: This module prepares the student for international agricultural research in the framework of their M.Sc. and Ph.D. theses, the prerequisites of which include the ability to work in a multicultural and interdisciplinary environment as well as the ability to communicate scientific results effectively and efficiently. The module emphasises the practice of research and presentation skills. Participatory tools for field research are introduced and tested, group exercises on how to design experiments and analyse experimental data are carried out. Hereby, the livestock, crop and farm household data is taken from finalized or ongoing research projects of the instructors. The communication of the results in the form of scientific posters is trained.	4 WLH
Examination: Klausur (90 Minuten, Gewicht: 50%) und Postererstellung und -präsentation (ca. 20 Minuten, Gewichtung: 50%)	

Admission requirements: M.SIA.I10M	**Recommended previous knowledge:** Basic computer skills
Language: English	**Person responsible for module:** Prof. Dr. Eva Schlecht
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

Delgado, C., Rosegrant, M., Steinfeld, H., Ehui, S., Courbois, C. 1999: Livestock to 2020. The next food revolution. FAO Discussion Paper 28, FAO Rome, Italy; Devendra, C., Thomas, D., Jabbar, M.A. and Zerbini, E., 2000: Improvement of Livestock

Production in Crop-Animal Systems in Agro-ecological Zones of South Asia. ILRI, Nairobi, Kenya; Falvey, L., Chantalakhana, C. (eds) 1999: Smallholder Dairying in the Tropics. ILRI, Nairobi, Kenya

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.A13M: Livestock-based sustainable land use**	6 C 4 WLH

Learning outcome, core skills: 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.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Livestock-based sustainable land use (Lecture, Internship) *Contents*: This module highlights the general positive and negative impacts of livestock and livestock management on the natural resources (air, water, soil vegetation) and 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 (gaseous emissions, nutrient excretion) are highlighted, and possibilities for consolidating the interests of livestock keepers with international conventions are discussed. The students are introduced, in lectures, own reading and practical field tests 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.	4 WLH
Examination: Written exam (90 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil, plant and animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Eva Schlecht
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

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.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E01: World agricultural markets and trade**	6 C 6 WLH

Learning outcome, core skills: Theoretical foundations of international trade: Ricardo, Heckscher-Ohlin-Viner; Empirical tests for different trade theories; imperfect competition in international trade; gravity theory; institutions and organisations on world agricultural markets; agricultural trade liberalisation at the multilateral (WTO) and bilateral level; specific policy measures in agricultural trade.	**C/Weekly lecture hours in total:** Attendance time: 84 h Self-study time: 96 h

Course: World agricultural markets and trade (Lecture) *Contents*: This module deals with the situation in the world agricultural markets and with the intervention of agricultural and trade policy in these markets based on an introduction into basics of the international trade theory. The students are able to discern populistic arguments against free-trade. They can estimate if there are reasons to deviate from the from the postulate of free-trade in matters of agricultural products, e.g. in order to reward the positive external effects of the agriculture, to ensure the food supply, to fend off dumping or to correct distorted world prices for agricultural products.	6 WLH
Examination: Oral exam (ca. 30 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge of agricultural economics
Language: English	**Person responsible for module:** Prof. Dr. Bernhard Brümmer
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 50	

Additional notes and regulations:

Literature:

Feenstra, R.C. 2004: Advanced international trade: Theory and evidence. Princeton University Press

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E02: Agricultural price theory**	6 C 4 WLH

Learning outcome, core skills: Significance of prices from individual and societal viewpoint, agricultural price structure, role of technical change, vertical and spatial price formation, price formation in quota markets, futures and forward contracts.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Agricultural price theory (Lecture) *Contents*: This module is designed to provide students with an introduction to the theory and measurement of price formation on agricultural markets. Students will learn about price formation and price linkages over space and time, and how prices on markets in different locations and/or for products of different levels of processing are linked with one another. They will also learn about special examples of price determination that are unique (land markets) or especially common (markets influenced by quota schemes) in agriculture. A final focus will be placed on future markets and their possible use as a risk management tool in agriculture and agribusiness.	4 WLH
Examination: Written exam (90 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Background in agricultural markets and policy recommended
Language: English	**Person responsible for module:** Prof. Dr. Bernhard Brümmer
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 60	

Additional notes and regulations:

Literature:

A script and a variety of supplemental reading will be provided.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E03: Ecological economics**	6 C 5 WLH

Learning outcome, core skills: Students are able to assess, evaluate and present the environmental im plications of econom,ic activities, the rationales behind them and possible ways to resolve perceived problems.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Ecological economics (Lecture, Seminar) *Contents*: • theoretical background • societal and philosophical backgrounds • environmental implications of economic growth • discussions of current problems with focus on agriculture	5 WLH
Examination: Klausur (120 Minuten, Gewichtung: 50%) und Präsentation, Referat oder Korreferat (ca. 20 Minuten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Background in agricultural economics and policy
Language: English	**Person responsible for module:** Prof. Dr. Beatrice Knerr
Course frequency: jedes Sommersemester; WItzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

Faber M. 1999: Ecological Economics, Springer

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E04: Changing societies, intercultural management**	6 C 4 WLH

Learning outcome, core skills: Students should become acquainted with the history of agricultural systems and nutritional habits, in order to adequately evaluate and influence the role of (organic) agriculture in the process of accelerated change, characteristic of contemporary western societies. Students are able to successfully perform in contexts where intercultural communication, co-operation and management are in demand. Based on their knowledge about the history of agricultural systems and nutritional habits they are able to adequately evaluate and influence the role of (organic) agriculture in the process of accelerated change, characteristic of contemporary western societies.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Changing societies, intercultural management (Seminar) *Contents*: 1. Intercultural management: Culture and cultural patterns; Processes of cross-cultural adaptation; Intercultural communication and dialogue; Leadership and personality in intercultural contexts; Management of change; Working with conflict and resistance. 2. Changing societies: Patterns of change in western history; The Agricultural Revolution; Intertwining reforms of the nineteenth century: social and agrarian; History of the Organic Movement; Food supply and changing nutrition habits in history. A systematic survey of agents and patterns of change in history is to be combined with a detailed view on the development of European agriculture and food supply, beginning with the history of the early Agricultural Revolution in England.	4 WLH
Examination: Präsentation, Referat oder Korreferat (ca. 10-15 Minuten) (Gewichtung: 30%) und Präsentation, Referat oder Korreferat (ca. 10-15 Minuten) mit schriftlicher Ausarbeitung (max. 10 Seiten) (Gewichtung: 70%)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** apl. Prof. Dr. Werner Troßbach
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 40	

Additional notes and regulations:
Literature:

Augsburger, I.D.W. 1992: Conflict Mediation Across Cultures. Louisville; Bennett, M. J. (ed.) 1998: Basic Concepts of Intercultural Communication. London; Hodgetts R. M., Luthans F. 2000: International Management. Culture, Strategy and Behavior. Boston; Huntington S. 1996: The Clash of Civilizations. New York; Harris P.R., Moran R. T. 1991: Managing Cultural Differences. Houston; Hall E. T. 1976: Beyond Culture. New York; Overton M. 1996: Agricultural Revolution in England. The Transformation of the Agrarian Economy 1500 – 1850. Cambridge; Conford P. 2001: The Origins of the Organic Movement. Edinburgh; Thirsk J. 1978: Economic Policy and Projects. The Development of a Consumer Society in Early Modern England, Oxford

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E05M: Marketing research**	6 C 4 WLH

Learning outcome, core skills: Students (i) are able to outline the steps in the marketing research process; (ii) are able to develop a marketing research design; (iii) know all relevant methods for data collection, analyses and prognoses with their specific advantages and problems; (iv) acquire personal skills for teamwork, oral and written presentations.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Marketing researches (Lecture, Seminar) *Contents*: Tasks and management of marketing research; methods of data collection; methods of data analysis, methods of prognoses.	4 WLH
Examination: Präsentation (ca. 24 Minuten) mit schriftlicher Ausarbeitung (max. 5 Seiten) (Gewichtung: 50%) und mündliche Prüfung (ca. 30 Minuten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge on marketing
Language: English	**Person responsible for module:** Prof. Dr. Ulrich Hamm
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 40	

Additional notes and regulations:

Literature:

Aaker, D.A., Kumar, V., Day, G.S. 2004: Marketing research, 8th ed., John Wiley, New York;
Bryman, A. 2004: Social research methods, 2nd ed. Oxford University Press; Shao, A.T. 2002: Marketing research 2nd ed., South-Western Thomson Learning, Cincinatti.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E06: International markets and marketing for organic products**	6 C 4 WLH

Learning outcome, core skills: Students are able (i) to analyse international market statistics; (ii) to describe the modes of functioning of EU import regulations for organic products; (iii) to define the necessary steps to collect and analyse market data of export markets; (iv) to develop a marketing concepts for the export of organic products; (v) to elaborate written and oral presentations in teamwork.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: International markets and marketing for organic products (Lecture, Seminar) *Contents*: Analysis of international markets and trade for organic products; import regulations of the EU; marketing strategies and instruments for the export of organic products; case studies for the export of organic products from developing countries to the EU; design of a business plan.	4 WLH
Examination: Präsentation (ca. 20 Minuten) mit schriftlicher Ausarbeitung (max. 5 Seiten) (Gewichtung: 50%) und mündliche Prüfung (ca. 30 Minuten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge on marketing
Language: English	**Person responsible for module:** Prof. Dr. Ulrich Hamm
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 25	

Additional notes and regulations:

Literature:

Jain, S.C. 2001: International marketing, 6th ed., South Western Thomson Learning, Cincinatti; Kotler, P., Keller, K.L. 2006: Marketing management, 12th ed., Pearson Prentice Hall, Upper Saddle River; Schmid, O., Hamm, U., Richter, T., Dahlke, A. 2004: A guide to successful organic marketing initiatives. Research Institute of Organic Agriculture, Frick/Switzerland; Wilson, R.M.S., Gilligan, C. 2003: Strategic marketing management, 2nd ed., Elsevier Amsterdam.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E10: Economics of biological diversity in the tropics and subtropics**	6 C 2 WLH

Learning outcome, core skills: Students acquire basic concepts of biological and economic biodiversity research. The focus is on the socio-economic importance of biological diversity. Students will be able to identify and analyse issues of the utilisation and protection of biological diversity at the level of genes, species and ecosystems. They acquire knowledge on the most important methods of the welfare economic valuation of biodiversity, its elements and the ecosystem services depending on it, and learn how to use this knowledge for analytical purposes. Furthermore, students deepen thier capcacity to (i) identify scientific literature for a given socio-economic biodiversity problem, (ii) analyse the literature in environmental and resource economics terms, and (iii) use the information gained for presentation in a written term paper.	**C/Weekly lecture hours in total:** Attendance time: 28 h Self-study time: 152 h

Course: Economics of biological diversity in the tropics and subtropics (Lecture, Seminar) *Contents*: Socio-economic importance of biodiversity, threats to it and its protection at the genetic, species and ecosystem level; design of analytic procedures for an economic quantification of the importance of biodiversity and its application to a chosen real-world case.	2 WLH
Examination: Hausarbeit (max. 15 Seiten, Gewichtung: 50%) und aufbauende Hausarbeit (max. 20 Seiten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Rainer Marggraf
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 20	

Additional notes and regulations:
Literature:

no a priori prescribed literature

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E11: Socioeconomics of Rural Development and Food Security**	6 C 4 WLH

Learning outcome, core skills: Students learn concepts of development and problem-oriented thinking in a development policy context. The identification of interdisciplinary linkages is trained. Building on problem analyses within concrete examples, course participants can pinpoint appropriate economic and social policies and assess their impacts. These qualifications can also be transferred to unfamiliar situations.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Socioeconomics of rural development and food security (Lecture) *Contents*: This module provides students with an overview of socioeconomic aspects of hunger and poverty in developing countries. Apart from more conceptual issues and development theories, policy strategies for rural development and poverty alleviation are discussed and analyzed. Special emphasis is put on problems in the small farm sector. Numerous empirical examples are used to illustrate the main topics.	4 WLH
Examination: Oral exam (ca. 30 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Prior knowledge of microeconomics at the BSc level is useful
Language: English	**Person responsible for module:** Prof. Dr. Matin Qaim
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 70	

Additional notes and regulations:

Literature:

Text books, research articles and lecture notes.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E12M: Quantitative Research Methods in Rural Development Economics**	6 C 4 WLH

Learning outcome, core skills: Students are familiar with empirical, quantitative methods in development economics. Thus, they are able to develop and implement their own research projects.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Quantitative research methods in rural development economics (Lecture) *Contents*: This module teaches and trains methodological skills for the analysis of micro data in development economics. In particular, farm and household level data are used. Apart from statistical and econometric techniques, approaches of primary data collection are covered (questionnaire development, survey sampling design). These methods are used for concrete examples in the computer lab. Moreover, students develop their own short research proposal.	4 WLH
Examination: Klausur (60 Minuten, Gewichtung: 50%) und Projektarbeit (ca. 5-7 Seiten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Contents of the lecture: Socioeconomics of Rural Development and Food Security
Language: English	**Person responsible for module:** Prof. Dr. Matin Qaim
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 40	

Additional notes and regulations:

Literature:

Text books, research articles and lecture notes.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E13M: Microeconomic Theory and Quantitative Methods of Agricultural Production**	6 C 4 WLH

Learning outcome, core skills: Microeconomic Theory of Agricultural Production Students are familiar with microeconomic approaches and can apply them to analyze issues related to agriculture and rural development. Quantitative Methods in Agricultural Business Economics Students are familiar with quantitative methods used for the analysis and planning of farms and enterprises in the agricultural sector.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Courses:	
1. Microeconomic Theory of Agricultural Production (Lecture) *Contents*: Consumer theory, producer theory, markets, monopoly situations, risk and uncertainty, economics of technical change, farm household models, sharecropping contracts.	2 WLH
2. Quantitative Methods in Agricultural Business Economics (Lecture) *Contents*: Budgeting, accounting, annual balance sheets, linear programming, finance, investment analysis	2 WLH
Examination: Written exam (120 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Matin Qaim
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 40	

Additional notes and regulations:

Literature:

Text books, research articles and lecture notes.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E14: Evaluation of rural development projects and policies**	6 C 4 WLH

Learning outcome, core skills: Students know the major methods for the evaluation of rural development projects and policies. They apply these methods for concrete project examples and thus are able to design and carry out evaluations independently.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Evaluation of rural development projects and policies (Lecture) *Contents*: This module teaches and trains the standard methods for the evaluation of rural development projects and policies. In particular, this includes impact assessment as well as cost-benefit analysis. These methods are used for concrete project and policy examples.	4 WLH
Examination: Klausur (90 Minuten, Gewichtuntg: 50%) und Präsentation, Referat oder Korreferat (ca. 25 Minuten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Knowledge of the content of the module "Socioeconomics of Rural Development and Food Security" is required.
Language: English	**Person responsible for module:** Prof. Dr. Matin Qaim
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 40	

Additional notes and regulations:
Literature:

Text books, research articles and lecture notes.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E15: Strategic management and operations**	6 C 4 WLH

Learning outcome, core skills: Students are able to: • Describe the strategic management process • Distinguish different concepts of strategic management • Apply related concepts to practical examples • Describe major decisions in operations strategy • Know several concepts from operations strategy • Apply related concepts to practical examples	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Strategic management and operations (Lecture) *Contents*: • Strategic Management Process • Market-based view • Resource-based view • Integration and diversification • Strategic Decision in Operations Management • Performance Objectives • Product-process-matrix • Decoupling point and postponement • Sourcing • Logistics management • Production planning • Distribution	4 WLH
Examination: Written exam (120 Minuten) **Examination prerequisites:** Referat, Präsentation oder Korreferat (ca. 20 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Preferable at least one module on Management related topics, e.g. Management and Management Accounting
Language: English	**Person responsible for module:** MSc Philip Beske
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 35	

Additional notes and regulations:

Literature:

Barney, J.B., Hesterley, W. 2008: Strategic Management and Competitive Advantage – Concepts and Cases, 2nd edition, Pearson Prentice Hall, Upper Saddle River.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E16: Supply chain management**	6 C 4 WLH

Learning outcome, core skills: Students are able to: • understand the importance of supply chainsdescribe the processes and related material and information flows in a supply chain know basic concepts of supply chain management • understand the relevance of sustainability initiatives in supply chain managementdistinguish alternative approaches to sustainable supply chain management apply related concepts to practical examples	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Courses:	
1. Strategisches Produktionsmanagement (Lecture, Seminar) *Contents*: • Basics of sustainable development and sustainability management • Strategies for sustainable supply chain management • Environmental and social standards • Green processes in the supply chain • Greening products	2 WLH
2. Strategisches Management (Lecture, Seminar) *Contents*: • Introduction to terminology • Supply chain and operations strategy • Supply chain processes • Supplier selection and evaluation • Logistics and distribution management • Supply chain performance	2 WLH
Examination: Mündliche Prüfung (ca. 30 Minuten) oder Klausur (120 Minuten) (Gewichtung 60%) und Hausarbeit (max. 15 Seiten) oder Präsentation, Referat oder Korreferat (ca. 20 Minuten) (Gewichtung 40%)	

Admission requirements: M.SIA.E15, M.SIA.E17M	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** MSc Philip Beske
Course frequency: jedes Wintersemester; Witzenhausen/ Kassel	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 40	

Additional notes and regulations:
Literature:

Sustainable Supply Chain Management

Seuring, S. 2007: Sustainability & Supply Chain Management, University of Lüneburg, Germany

Supply Chain Management

Wisner, J.D., Leong, G.K., Tan, K.-C. 2005: Principles of Supply Chain Management – A Balanced Approach, Thompson, Mason; Fawcett, S.E., Ellram, L.M., Ogden, J.A. 2007: Supply Chain Management – From Vision to Implementation, Pearson Prentice Hall, Upper Saddle River

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E17M: Management and management accounting**	6 C 4 WLH

Learning outcome, core skills: Students are able to • understand the role of management in organisations, • know basic terminology and concepts in management and know about their interrelation • understand the role of management accounting in organisations • know basic terms and concept of management accounting and control • understand concepts of management accounting and performance management • describe challenges of international management	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Management and management accounting (Lecture) *Contents*: Key concepts and terminology in management Planning; Organising; Leading; Controlling; Key concepts and terminology in management accounting; Instruments in management accounting ; Traditional cost assignment; Activity based costing; Performance management; Management control systems; Management accounting in an international context; Basics of international management	4 WLH
Examination: Written exam (120 Minuten) **Examination prerequisites:** Präsentation, Referat oder Korreferat (ca. 20 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** MSc Philip Beske
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 35	

Additional notes and regulations:
Literature:

Lussier, R.N. 2006: Management fundamentals – Concepts, Applications, Skill Development, Thomson, London, UK; Robbins, S.P., Coulter, M. 2007: Management, 9th edition, Pearson, Upper Saddle River; Drury, C. 2005: Management Accounting for Business, Thomson, London, UK; Atkinson, A.A., Kaplan, R.S., Young, S.M. 2004:

Management Accounting, 4th Edition, Upper Saddle River.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E19: Market integration and price transmission I**	6 C 4 WLH

Learning outcome, core skills: Students gain insight into the functioning of the price mechanisms on agricultural markets and into the determinants of market integration. They learn to apply econometric analysis methods to the study of horizontal and vertical price transmission processes (time series methods, cointegration, including non-linear cointegration and non-linear error correction models).	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Market integration and price transmission I (Lecture) *Contents*: Theory and empirical analysis of agricultural market integration	4 WLH
Examination: Written exam (60 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge of econometrics
Language: English	**Person responsible for module:** Prof. Dr. Stephan von Cramon-Taubadel
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Additional notes and regulations:
Literature:

A list of seminar papers (Garnder, Ravallion, Goodwin, Fackler, Barrett) will be circulated to students, together with a list of recent applications.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E20: Agricultural policy seminar**	6 C 4 WLH

Learning outcome, core skills: Students apply economic concepts and methods to selected issues in the field of agricultural policy and agricultural market analysis. By writing and orally presenting a seminar paper, the students practise how to carry out literature searches, properly and independently write a scientific paper and improve presentation skills.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Agricultural policy seminar (Seminar) *Contents*: Seminar focus changes every year according to key issues and developments in international agriculture. Agricultural measures in the EU and other countries of interest; national and international agricultural markets (trends, changes etc.).	4 WLH
Examination: Präsentation, Referat oder Korreferat (ca. 45 Minuten, Gewichtung: 50%) und Hausarbeit (max. 15 Seiten bzw. 3600 Wörter, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Introductory economics at the Bachelors level recommended.
Language: English	**Person responsible for module:** Prof. Dr. Stephan von Cramon-Taubadel
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Additional notes and regulations:

Literature:

Appropriate sources and an effective literature search strategy are discussed with each student individually, depending on the topic that he/she will be writing on. Chapters from textbooks provide background material and are supplemented by journal articles and other more detailed studies.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E21: Rural Sociology**	6 C 4 WLH

Learning outcome, core skills: One of the primary objectives of this course is to introduce students to the principles of sociology in general and key concepts of environmental and 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 analyze research strategies and methods.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Rural Sociology (Lecture, Seminar) *Contents*: As an introduction to environmental and rural sociology, this course is designed to give an overview of the sociological concepts on "nature-society relations", "social structural developments and social problems in rural areas", "social networks and social capital in communities", "social dilemmas and sustainability", "social movements and the environment", and "environmental justice". 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.	4 WLH
Examination: Paper (max. 20 Seiten)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Jun.-Prof. Dr. Ulf Liebe
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 25	

Additional notes and regulations:

Literature:

Adequate literature is presented in the lecture; text book chapters supply basic knowledge and are complemented by scientific publications.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E23: Global agricultural value chains and developing countries**	6 C 4 WLH

Learning outcome, core skills: The students will become familiar with the application of these models through empirical examples and the discussion of journal articles.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Global Agricultural Value Chains and Developing Countries (Lecture) *Contents*: This lecture deals with the impacts of restructured and globalized agricultural markets on small-scale farmers and traders in developing countries. Current developments and changes on agricultural markets are analyzed and the implications for developing countries discussed. Approaches of the value chain analysis and the promotion of pro-poor value chains are explained. Emphasis will be laid on the roles of institutions for the performance of markets in developing countries, especially against the background of recent developments. Models of contract theory, institutional and transaction costs economics are conveyed and used to analyze the situation in developing countries.	4 WLH
Examination: Präsentation, Referat oder Korreferat und Klausur (ca. 30 Minuten, Gewichtung: 50%) und Klausur (60 Minuten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Jun.-Prof. Dr. Meike Wollni
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:
Literature:

Selected articles from academic journals and book chapters

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E24: Topics in Rural Development Economics I**	6 C 4 WLH

Learning outcome, core skills: The objective of this course is to acquaint Master students with the reading and understanding of scientific journal articles on relevant topics of rural development economics. Student should learn how to develop a scientific research question, choose appropriate research methods and strucutre a scientific article.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Topics in Rural Development Economics I (Lecture) *Contents*: This course will provide Master Students with an overview of relevant topics in rural development economics, which will also enable them to develop own research questions and study approaches in this field. The module is structured as a reading course, building on selected articles from relevant international journals. Students are required to read announced articles before the classroom sessions, in order to enable a critical debate in class. The articles selected for the course are clustered around key topics relevant to rural development economics, such as listed below. Tentative Topics 1. The food system transformation and smallholder farmers 2. Rural livelihood strategies and income diversification 3. Adoption and impact of modern agricultural technology 4. Economics of nutrition and health 5. Gender and intra-household resource allocation	4 WLH
Examination: Präsentation, Referat oder Korreferat (ca. 10 Minuten, Gewichtung: 50%) und Hausarbeit (max. 4 Seiten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Jun.-Prof. Dr. Meike Wollni
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:
Literature:

Selected articles from academic journals and book chapters

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E27: Labour Mobility, Migration, and Rural Development**	6 C 5 WLH

Learning outcome, core skills: 1. The global context of rural out-migration – facts and figures 2. Causes and rural-urban and rural-international co-development- theoretical background 3. Consequences of rural out-migration: Loss of labor force and inflow of remittances 4. Role of migration in poverty reduction 5. Role of migration in economic growth	**C/Weekly lecture hours in total:** Attendance time: 70 h Self-study time: 110 h

Course: Labour Mobility, Migration, and Rural Development (Lecture, Seminar) *Contents*: The course presents theoretical and empirical knowledge about the causes and consequences of labour mobility, with a special view on the context of rural regions. It covers internal mobility (including, e.g., multi-functionality and off-farm work) as well as different forms and dimension of migration, from rural-to-urban up to international, as well as remittances (financial, human capital, social). Causes and consequences are analyzed at the international, national, regional, community and household level.	5 WLH
Examination: Klausur (120 Minuten, Gewichtung: 50%) und Präsentation, Referat oder Korreferat (ca. 20 Minuten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in economics
Language: English	**Person responsible for module:** Prof. Dr. Beatrice Knerr
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

Weil, D.N. 2005: Economic Growth. Addison- Wesley; Todaro, M.P. 2007: Economic Development. FT Prentice Hall; selected journal articles.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E28: Regional Modelling**	6 C 4 WLH

Learning outcome, core skills: This module will teach the students the basic and advance knowledge of secondary data bases. Students will gain knowledge and experience in static as well as in system dynamic regional modelling	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Regional Modelling (Exercise, Lecture) *Contents*: This lecture will teach basic and advanced knowledge on how to analyse regional effects of development instruments and investments. In the exercises accompanying the lectures, students will practice the basics of modelling with a number of examples.	4 WLH
Examination: Präsentation, Referat oder Korreferat (ca. 20 Minuten, Gewichtung: 50%) und schriftlicher Ausarbeitung (max. 20 Seiten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge of regional economics and regional statistical data bases
Language: German, English	**Person responsible for module:** Dr. sc. agr. Holger Bergmann
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 20	

Additional notes and regulations:
Literature:

Bryden, J.M. et al., 2010. Towards Sustainable Rural Regions in Europe Exploring Interrelationships between Rural Policies, Farming, Environment, Demographics, Regional Economies and Quality of Life using System Dynamics, London: Routledge

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.E29: Selected Topics on International Development Economics and Rural Development**	6 C 4 WLH

Learning outcome, core skills: The aim of this module is to acquaint students with scientific work and research activities in the field of international development economics, with a focus on rural development related to multifunctionality, agrarian production, natural resources, rural-urban linkages and labour mobility. Based on that, they will be in a position to assess the quality and scope of publications on different topics, to write their own proposals, and to compose well-founded research papers.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Selected Topics on International Development Economics and Rural Development (Seminar) *Contents*: The seminar consists of two parts: first, the students will be introduced into various research projects of which they receive an abstract of five to 10 pages for critical review and a presentation 20 to 30 minutes which they are expected to comment. In the second part of the seminar they write their own research paper on a selected topic, which will be closely monitored by the supervisor. Ideally at the end of the seminar we will have a draft of a research paper created a team work of the participants.	4 WLH
Examination: Korreferat (ca. 50 Minuten, Gewichtung: 40%) und Research Paper (max. 6 Seiten, Gewichtung: 60%)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Beatrice Knerr
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I01M: Ecological modelling and GIS**	6 C 4 WLH

Learning outcome, core skills: Ecological modeling: Basic understanding of the mathematics used in ecological modelling (e.g. ordinary and partial differential equations, state and time events, including numerical aspects); basic experiences in modelling and simulation; knowledge about the possibilities and limits of modelling and simulation in ecology. GIS: 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, field data survey with GPS and remote sensing images as well as the spatial analysis of site conditions. Finally a particular view on GIS in organic farm management and Precision Farming is given.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Courses:	
1. GIS (Geographische InformationsSysteme) (Lecture) *Contents*: Principles of geodetics; georeferencing; data types, -import and -management; methods of data manipulation and analysis (aggregation, (re)classification, interpolation, buffers, overlays, network analysis, image analysis; remote sensing techniques; practical exercises with GIS and GPS, explained under consideration of applications in (organic) farm management and precision farming.	2 WLH
2. Modellierung in der Ökologie (Lecture) *Contents*: Introduction to common mathematical concepts used in ecology; basic steps of modelling (conceptual modelling, translation of ecological knowledge into mathematical concepts, implementation, verification; concepts of simulation, specific methods (nonlinear parameter estimation, sensitvity analysis); introduction to modelling and simulation packages; modelling of important ecological processes: Transport, nutrient cycles, dynamics of soilwater, growth, population dynamics.	2 WLH
Examination: Mündliche Prüfung (2x ca. 15 Minuten) oder Präsentation, Referat oder Korreferat (ca. 30 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in ecology, mathematics and computer science
Language:	**Person responsible for module:**

English	Dr. Thomas Fricke
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 15	

Additional notes and regulations:

Literature:

Lecture notes, online tutorials.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I02: Management of (sub-)tropical landuse systems**	6 C

Learning outcome, core skills: 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.	**C/Weekly lecture hours in total:** Attendance time: 28 h Self-study time: 152 h

Course: Management of (sub-)tropical landuse systems (Lecture, Block course) *Contents*: Kassel: 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 agro-ecosystems. 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.	
Examination: Written exam (90 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Knowledge in plant, soil and animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Andreas Bürkert
Course frequency: WiSe 13/14, einmal in 2 jahren, alternierend mit Modul I07; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 25	

Additional notes and regulations:
Literature:

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.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I03: Food quality and organic food processing**	6 C 4 WLH

Learning outcome, core skills: Students will be able to define food quality and quality systems in agriculture and food industry discuss principles of organic food production (agriculture, processing) according to EEC 2092/91) discuss and evaluate food processing techniques and quality assessment methods	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Food quality and organic food processing (Lecture) *Contents*: European and international legislation for organically produced agricultural commodities (focussing : Annex II, Annex VI EEC 2092/91; contracting, quality standards, product handling) Quality standard setting and the Organic Guarantee System Certification systems for organic and conventional products (overview, principles, concept, certification) Accreditation and accreditation agencies Process and product orientated food quality concepts and assessments; “holistic” quality definitions Processing techniques for organic food processing (different product groups) Quality assessment methods for small and medium-size enterprises	4 WLH
Examination: Präsentation, Referat oder Korreferat (ca. 20 Minuten, Gewichtung: 50%) und Projektarbeit (max. 20 Seiten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowlegde in chemistry
Language: English	**Person responsible for module:** PD Dr. rer. nat. Johannes KAHL
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 40	

Additional notes and regulations:
Literature:

Florkowski et al. 2000: Integrated View of Fruit and Vegetable Quality, Technomic;

Welti-Chanes et al. 2001: International Congress on Engineering and Food, Volume I and II, Technomic; Luning et al. 2002: Food quality management, Wageningen Pers; Lawless et al. 1999: Sensory evaluation of Food, Kluwer; Kent et al.1994: Technology of cereals, Pergamon; Bidlack et al. 2000: Phytochemicals as bioactive agents, Technomic; Linden et al. 1994: New ingredients in food processing, CRC; Souci et al. 2000: Nutrition Tables, Medpharm

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I06M: Exercise on the quality of tropical and subtropical products**	6 C 4 WLH

Learning outcome, core skills: Students are able (i) to analyze and discuss experimental data considering economics and consumer expectations, (ii) to work with scientific primary literature, (iii) to elaborate written presentations in teamwork, (iv) to exchange their opinions about sensorial evaluation.	**C/Weekly lecture hours in total:** Attendance time: 40 h Self-study time: 140 h

Course: Exercise on the quality of tropical and subtropical products (Internship) *Contents*: Exercises on quality properties of wheat, rice, potatoes, fruits and vegetables: Starch and protein quality of baking wheat; dough and baking properties of wheat, sensors of baking goods, rheological properties of rice flour and other starch containing products, cooking and frying properties of potatoes; consumer acceptance of potatoes; Marketing properties of fruits and vegetables; texture, ripeness, inner quality properties of fruit and vegetable (e.g. sugar/acid ratio, nitrate in leaf vegetable), sensors of fruit and vegetable juices.	4 WLH
Examination: Projektarbeit (max. 20 Seiten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge on agriculture production and chemistry
Language: English	**Person responsible for module:** Prof. Dr. Elke Pawelzik
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 24	

Additional notes and regulations:

Literature:

Belitz, Grosch, Schieberle 2004: Food Chemistry, 3rd rev. ed., Springer Berlin.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I07: International land use systems research - an interdisciplinary study tour**	6 C 8,5 WLH

Learning outcome, core skills: To gain multi- and interdisciplinary insight into (international) approaches towards opportunities and challenges of agro-silvo-pastoral production systems, sustainable resource use and agricultural development interventions To familiarize participants with theoretical and practical questions of field research in an international context	**C/Weekly lecture hours in total:** Attendance time: 119 h Self-study time: 61 h

Course: International land use systems research - an interdisciplinary study tour (Lecture, Seminar, Excursion) *Contents*: Through the combination of one semester of preparatory impulse lectures and student seminars and the 12-14 day excursion to a (sub)tropical country, this module provides participants with interdisciplinary insights into the bio-physical and socio-economic components of agro-silvo-pastoral systems in the global context. The small- to large-size farm enterprises, processing plants and marketing organisations to be visited during the excursion exemplify the opportunities and challenges of agricultural activities in their specific context, whereby particular attention is paid to aspects of sustainability and environmental safety. The excursion targets regions where the two universities conduct research programmes, and also includes visits to partner universities and (inter)national research institutions. This will allow the MSc students to gain a first impression of how field research is organized and carried out in (sub)tropical countries. Up-to-date research approaches are presented to the participants and questions targeting the sustainable use of natural resources as well as questions of development cooperation are discussed in an international and interdisciplinary context.	8,5 WLH
Examination: Mündliche Prüfung (ca. 20 Minuten, Gewichtung: 50%) und Präsentation, Referat oder Korreferat (ca. 20 Minuten) mit schriftlicher Ausarbeitung (max. 4 Seiten) (Gewichtung: 50%) **Examination prerequisites:** Protokoll (Tagesbericht) max. 2 Seiten	

Admission requirements: none	**Recommended previous knowledge:** Study focus on international agriculture and development policy
Language: English	**Person responsible for module:** Prof. Dr. Eva Schlecht
Course frequency: WiSe, einmal in 2 jahren, alternierend mit Modul I02; Witzenhausen	**Duration:** 1 Semester[s]

Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 25	

Additional notes and regulations:

Literature:

Specific general and scientific articles dealing with the excursion country, distributed in the course.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I08: Organic farming under European conditions**	6 C 4 WLH

Learning outcome, core skills: Students understand and are able to evaluate farming systems and their underlying multifunctional objectives. Students are able to discuss and judge standards of organic agriculture.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Organic farming under European conditions (Lecture, Seminar) *Contents*: • Presentation and discussion of selected literature • Definition of farming systems, multifunctional objectives • Methods for testing and improving the set of objectives • Comparison of standards of organic agriculture (IFOAM, EU, AGOEL)	4 WLH
Examination: Mündliche Prüfung (ca. 20 Minuten, Gewichtung: 50%) und Präsentation, Referat oder Korreferat (ca. 15-20 Minuten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in soil and plant sciences
Language: English	**Person responsible for module:** apl. Prof. Dr. Peter von Fragstein
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

Lecture based materials.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I09: Sustainable nutrition**	6 C 6 WLH

Learning outcome, core skills: Students are able to describe the role of nutrition in human health use databases for RDA describe the influence of nutrition (from farm to fork) on environmental parameters (soil, water, atmosphere, biodiversity) understand tools to measure “sustainability” in nutrition systems.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Sustainabe nutrition (Lecture, Excursion) *Contents*: • Culture and cultural patterns of nutrition • Interactions of food quality and lifestyle on human health • Recommended Dietary Allowances (RDA), tools to evaluate nutritional and health status • Product flow in the food supply chain (world wide and from farm to fork) • Databases and tools to describe nutrition systems (e.g. Life cycle assessment) • Greenwashing or real green? Logos, guidelines, legal aspects	6 WLH
Examination: Präsentation, Referat oder Korreferat (ca. 15 Minuten, Gewichtung: 50%) mit schriftlicher Ausarbeitung (max. 15 Seiten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge on biochemistry, statistics and environmental issues
Language: English	**Person responsible for module:** Prof. Dr. agr. Angelika Ploeger
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 40	

Additional notes and regulations:
Literature:

Will be provides via the system2teach platform.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I10M: Applied statistical modelling**	6 C 4 WLH

Learning outcome, core skills: The aim of the course is to make students familiar with the basic concepts of 'linear models', the 'Generalized linear models' and 'non-parametric estimation procedures', which now belong to the standard methods in applied statistics. Furthermore, the practical application of the methods are taught using the statistical software package R.	**C/Weekly lecture hours in total:** Attendance time: 84 h Self-study time: 96 h

Course: Applied statistical modelling (Lecture, Internship) *Contents*: Statistical analysis in the agricultural sciences are based primarily on the use of linear models rer. They cover a wide range of applications concerning the distribution of the data and model assumptions, and ultimately allow the simultaneous estimation of fixed and random effects in mixed-th models. The understanding and application of mixed linear model implies detailed knowledge of matrix algebra, which will begin the course. The students are at the beginning of the course put in a position to formulate statistical models. Furthermore, the who-teaches the basics of programming in R, which is used for homework exercises used. Different types of linear models are built up gradually and learn how regression models, classification models, and finally mixed models with fixed and random effects. Other questions focus on multicollinearity, model selection criteria and the same model experiments, the corrected estimate mean values and the testing of hypotheses. Linear models are developed for generalized linear mixed models with link function for categorical distributed data or data that follow a Poisson distribution (count variable). Similarly, knowledge about non-parametric test procedures are taught. A variety of examples and exercises to deepen the theory learned permanently. Students are motivated on the basis of sample data sets to work on problems independently. This module generates a substantial understanding and basic knowledge about statistical Datenanalyse, which can be used for future scientific work in the context of master's or doctoral theses.	4 WLH
Examination: Klausur (90 Minuten, Gewichtuntg: 50%) und Hausarbeit (max. 5 Seiten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Mathematics (linear algebra), Statistics
Language: English	**Person responsible for module:** Prof. Dr. Sven König
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**

Maximum number of students: 25	

Additional notes and regulations:

Literature:

Lecture notes

Searle S. R. (1982) Matrix Algebra Useful for Statistics, Wiley Series in Probability and Statistics.

Mrode R. A. (2005) Linear Models for the Prediction of Animal Breeding Values, CABI Publishing.

Dobson A. & Barnett A. (2008) An Introduction to Generalized Linear Models, Chapman & Hall.

Wood S. (2006) http://www.amazon.co.uk/Generalized-Additive-Models-Introduction-R/dp/1584884746/ref=sr_1_6?ie=UTF8&s=books&qid=1228725710&sr=1-6Generalized Additive Models: An Introduction with R , Chapman & Hall..

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I11M: Free Project**	6 C

Learning outcome, core skills: Students are able to plan and carry out a scientific project. This includes critical evaluation of publications and the ability to apply gained knowledge on problems in the field or in economic or scial sciences. Students are also able to present results and discuss them on the basis of their knowledge.	**C/Weekly lecture hours in total:** Attendance time: 0 h Self-study time: 180 h

Course: Free project *Contents*: A topic for a project is chosen in agreement with the instructor. The aim of the project is to gain profound scientific knowledge on the chosen topic. This can include experimental work. The result of the project can be a written thesis, an oral presentation and/ or an electronically secured result.	
Examination: Üblicher Weise Projektarbeit (ca. 15 Seiten bzw. 4000 Wörter)	

Admission requirements: Written agreement with instructor on topic, form and time frame for the project.	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Stephan von Cramon-Taubadel
Course frequency: jedes Semester; Göttingen oder Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:
Literature:

Scientific publications on the topic agreed upon with the instructor.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.I12: Sustainable International Agriculture: basic principles and approaches**	6 C 4 WLH

Learning outcome, core skills: Students • are able to describe the main bio-physical and socio-economic drivers shaping agricultural production systems and land and resource use strategies; • have knowledge of relevant ecological, economic and social indicators • can describe and apply integrated approaches of indicator use for the evaluation of a system's sustainability	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Sustainable International Agriculture: basic principles and approaches (Lecture, Seminar) *Contents*: In view of global change spanning from population growth, migration, and urbanization to climate change, land degradation and water scarcity, the sustainable use of human and natural resources for the continued provision of quantitatively and qualitatively adequate food poses a major challenge to all stakeholders involved in agricultural production worldwide. This module therefore addresses the basic concepts and principles of sustainability and sustainable agriculture, in its ecological, economic and social dimensions. Approaches to determine the bio-physical and socio-economic sustainability of a land use systems and of agricultural value chains are evaluated, and possibilities to implement sustainable management strategies along the continuum of water, soils, plants, animals, producers and consumers are discussed, thereby also accounting for relevant temporal and spatial scales.	4 WLH
Examination: Written exam (90 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Eva Schlecht
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:
Literature:

Lecture notes and reading materials distributed during the module;

Bell, S. & Morse, S., 2003. Measuring sustainability: learning by doing; Earthscan, London, UK. Bell, S. & Morse, S., 2008. Sustainability indicators: measuring the immeasurable? Earthscan, London, UK.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P01: Ecology and agroecosystems**	6 C 4 WLH

Learning outcome, core skills: 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	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Ecology and agroecosystems (Lecture, Seminar) *Contents*: Case-study based analysis and discussion of ecological framework conditions (limitations) in different arid and sub-humid agro-ecosystems 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 agro-ecosystems will be presented.	4 WLH
Examination: Mündliche Prüfung (ca. 15 Minuten, Gewichtung: 60%) und Präsentation, Referat oder Korreferat (ca. 20 Minuten, Gewichtung: 40%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in plant, soil and animal science, willingness to analyse agro-ecosystems quantitatively
Language: English	**Person responsible for module:** Prof. Dr. Andreas Bürkert
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

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. Ann Arbor Press, Michigan, USA.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P02: Energetic and technical use of agricultural crops**	6 C 4 WLH

Learning outcome, core skills: Based on the data presented, students are able to identify and calculate potentials and limits of energy and raw material production from renewable plant resources.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Energetic and technical use of agricultural crops (Lecture, Excursion) *Contents*: Management of agricultural crops for energetic use. Energy scenario and potentials, emission of greenhouse gases, sources of energy from biomass and waste material, selecting and processing biomass as a fuel. Biogas, fermentation process and plant technology. Vegetable oil, biodiesel. Processing of alcohol esters from triglycerides and free-fatty-acids. Ethanol fermentation process, distillation and dehydration, thermo-chemical processes. Gasification, Fischer-Tropsch-Process. Management of agricultural crops for technical use. Technologies of processing biomasses to produce technical raw materials (fibres, colours, proteins, lipids, etc.). Benefits and restrictions by the replacement of fossil fuel-based materials through biomass-based products.	4 WLH
Examination: Oral exam (ca. 30 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowlege in soi land plant sciences, physics and chemistry
Language: English	**Person responsible for module:** Prof. Dr. Michael Wachendorf
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 20	

Additional notes and regulations:

Literature:

Klass, D. 1998: Biomass for Renewable Energy, Fuels, and Chemicals, Academic Press; Sims, R. 2002: The Brilliance of Bioenergy. James & James, London, UK; Rosillo-Calle, F. 2007: The Biomass Assessment Handbook. Earthscan; London, UK

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P03: Ecological soil microbiology**	6 C 4 WLH

Learning outcome, core skills: Students learn to use microbiological methods and to interpret the obtained data. Students develop a consciousness for the complexity of soil fertility and soil quality and see the difficulties in diagnosing it.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Ecological soil microbiology (Lecture, Seminar, Excursion) *Contents*: Introduction to, and application of important up-to-date methods in soil-microbiology to determine the activity, biomass and community structure of soil- microorganisms. The complete operational sequence of a research project is simulated: (1) sampling, (2) sample preparation, (3) measurements and data collection (application of methods), (4) data processing, (5) statistics and (6) drafting a manuscript. Up-to-date literature is presented and discussed by the students.	4 WLH
Examination: Projektarbeit (max. 12 Seiten) **Examination prerequisites:** Zwei Präsentationen, Referate oder Korreferate je ca. 20 Minuten	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in biology, chemistry, and soil sciences. To do an experimental Master's thesis in soil sciences or plant nutrition this module is compulsory.
Language: English	**Person responsible for module:** Prof. Dr. R.G. Jörgensen
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 12	

Additional notes and regulations:

Literature:

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; papers to be presented in the course are provided.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P04: Plant nutrition in the tropics and subtropics**	6 C 4 WLH

Learning outcome, core skills: Students are able to find solutions for specific problems of tropical plant nutrition. They learn to prepare and present a scientific oral presentation.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Plant nutrition in the tropics and subtropics (Lecture,) *Contents*: Aspects of plant nutrition in humid, subhumid and arid tropics; cropping systems and their influence on soil fertility; fertilization of lowland rice.	4 WLH
Examination: Oral exam (ca. 20 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Baisc knowledge in soil and plant sciences
Language: English	**Person responsible for module:** Dr. Bernd Steingrobe
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Additional notes and regulations:
Literature:

Will be given during the lecture.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P05: Organic cropping systems under temperate and (sub)tropical conditions**	6 C 4 WLH

Learning outcome, core skills: 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.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Organic cropping systems under temperate and (sub)tropical conditions (Lecture, Seminar, Excursion) *Contents*: Visits of organic farms; case studies of livestock-oriented organic farming under different environmental conditions and constraints; 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.	4 WLH
Examination: Mündliche Prüfung (ca. 20 Minuten, Gewichtung: 60%) und Präsentation, Referat oder Korreferat (ca. 15-20 Minuten, Gewichtung: 40%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in plant, soil and animal sciences
Language: English	**Person responsible for module:** apl. Prof. Dr. Peter von Fragstein
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

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.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P06: Soil and water**	6 C 4 WLH

Learning outcome, core skills: Students are able to critically evaluate soil and water problems and the limits of natural resources.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Soil and water (Lecture, Internship) *Contents*: Soil quality, processes and functions (Org. matter turnover, interactions between soil organisms, soil fertility) Soil degradation and conservation (erosion, acidification, compaction, contamination), soil and water salinity Water management (basics of water ecology and landscape water household, evaluation and development of waters) in national and international context Water lifting and conveyance, surface irrigation, sprinklers, micro-irrigation	4 WLH
Examination: Oral exam (ca. 20 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Module Soil and plant science or equivalent, Fundamentals on water ecology and management
Language: English	**Person responsible for module:** N. N.
Course frequency: jedes Sommersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

Wild, A. 1993: Soils and the Environment. Cambridge University Press; Achtnich, W. 1998: Bewässerungslandbau. Ulmer Verlag, Germany; 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; Lampert, W. 1997: Limnoecology. Oxford University Press; Naiman, R.J. (ed.) 1998: River Ecology and Management. Springer; Wetzel, R.G. 1983: Limnology. Saunders College Publishing.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P07: Soil and plant science**	6 C 4 WLH

Learning outcome, core skills: 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.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Soil and plant science (Lecture, Seminar) *Contents*: Fundamentals of soil science: Physical properties (texture, soil water, pore space), chemical properties (buffering, exchange capacity, nutrients), biological properties (organic matter, edaphon), soil formation and classification Plant nutrition: Role of major and minor elements in plants, nutrient availability and nutrient mobilisation, plant nutrients and food quality Plant breeding and genetics: 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 Plant protection: principles of plant pathology and entomology, genetics of plant diseases, epidemiology, plant defence mechanisms; insect physiology and ecology	4 WLH
Examination: Klausur (120 Minuten) oder Fachgespräch (ca. 20 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Maria Renate Finckh
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

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.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P08: Pests and diseases of tropical crops**	6 C 6 WLH

Learning outcome, core skills: Students should become familiar with the causes of diseases (abiotic & biotic diseases), with the taxonomy of disease agents (bacteria, fungi, virus) and insect pests, with basics of integrated pest management (approaches, economic threshold, epidemiology), and biological, cultural control (cultivars, crop rotation, planting term, manual control), and chemical control options (toxicology, fungicides, insecticides) of the main crops in subtropical and tropical regions	**C/Weekly lecture hours in total:** Attendance time: 84 h Self-study time: 96 h

Course: Pests and diseases of tropical crops (Lecture, Seminar) *Contents*: Pests and diseases of selected crops are treated together for each crop including approaches to integrated control. The following crops will be presented: rice, maize, cotton, cocoa, coffee, cassava, phaseolus beans, bananas, and others. For each crop, a short introduction to botanical and agronomic features (as far as they concern disease or pest control) is given, together with an overview of the main diseases world-wide. The economic importance of diseases and pests in different geographical areas is discussed. The most important diseases and pests of die crop are treated in detail and die possibilities for integrated control are discussed. Short introductions (reviews) on basic subjects of plant protection are given, these include: causes of diseases (abiotic & biotic diseases), taxonomy of disease agents (bacteria, fungi, viruses) and insect pests, integrated pest management (approaches, economic threshold), biological control (diseases, pests), cultural control (varieties, crop rotation, planting term, manual control), and chemical control (toxicology, fungicides, insecticides). Students will give seminars on related topics.	6 WLH
Examination: Klausur (60 Minuten, Gewichtung: 67%) und Referat (ca. 20 Minuten, Gewichtung: 33%) **Examination prerequisites:** Seminarvortrag	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) in agricultural entomology, plant diseases and plant production
Language: English	**Person responsible for module:** Prof. Dr. Stefan Vidal
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Additional notes and regulations:

Literature:

Lecture based materials; details provided during lectures.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P09: Biological control and biodiversity**	6 C 6 WLH

Learning outcome, core skills: Gain an understanding of what biological control is and how it can be used effectively as part of an IPM system and how biodiversity contributes to control of pest populations and other ecosystem services.	**C/Weekly lecture hours in total:** Attendance time: 85 h Self-study time: 95 h

Course: Biological control and biodiversity (Lecture, Internship, Seminar) *Contents*: Theoretical foundations of biological control Natural enemy behaviour and biological control success Biodiversity and ecosystem services in agroecosystems Practical examples of biological control projects Plant-herbivore-predator-interactions Principles of population dynamics Biological weed control	6 WLH
Examination: Klausur (60 Minuten, Gewichtung: 70%) und Referat (ca. 20 Minuten, Gewichtung: 30%)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Stefan Vidal
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 14	

Additional notes and regulations:
Literature:

Lecture based materials; details provided during lectures.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P10: Tropical agro-ecosystem functions**	6 C 4 WLH

Learning outcome, core skills: Knowledge of the processes of soil degradation as well as of the measures for their control or prevention in selected land use systems of the tropics and subtropics; knowledge of ecological system functions and their synthesis in agronomic concepts for the adaptation to unfavourable climatic and pedological conditions in the tropics and subtropics.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Tropical agro-ecosystem functions (Lecture, Seminar) *Contents*: Introduction to and overview of agronomy-based land use systems in the tropics and subtropics taking into account ecological points of view. Analysis of the sustainability of plant production under special consideration of the physical, chemical and biological soil quality as well as the efficient water use in the seasonal tropics.	4 WLH
Examination: Präsentation, Referat oder Korreferat (ca. 30 Minuten, Gewichtung: 50%) und mündliche Prüfung (ca. 30 Minuten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil and plant sciences
Language: English	**Person responsible for module:** Dr. sc. agr. Ronald Franz Kühne
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 15	

Additional notes and regulations:

Literature:

Lecture notes and handouts, selected chapters from textbooks; copies of PowerPoint presentations

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P12: Crops and production systems in the tropics**	6 C 4 WLH

Learning outcome, core skills: Knowledge of botanical, ecological and economical facts of crops and cropping systems. The students should be able to classify crops and cropping systems in relation to site conditions and undertake system-orientated evaluation of sustainable production.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Crops and production systems in the tropics (Lecture) *Contents*: Presentation of the most important crops with respect to: botany, morphology, origin, climatic and ecological requirements. Crop production, harvest significance in local farming systems, utilisation as food, feed, raw materials and as bioenergy source. Discussion of specific cropping systems in the tropics and subtropics und specific management systems for the sustainable improvement of productivity.	4 WLH
Examination: Klausur (90 Minuten) oder mündliche Prüfung (ca. 30 Minuten) je nach gewählten Termin	

Admission requirements: Basic knowledge on plant production (BSc-level)	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Dr. sc. agr. Ronald Franz Kühne
Course frequency: jedes Wintersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Additional notes and regulations:
exam on the first examination, oral exam on the second examination

Literature:

Rehm, S., Espig, G. 1991: The Cultivated Plants of the Tropics and Subtropics. Verlag Josef Margraf. Weikersheim, Germany; lecture notes

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P13: Agrobiodiversity and plant genetic resources in the tropics**	6 C 4 WLH

Learning outcome, core skills: 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.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Agrobiodiversity and plant genetic resources in the tropics (Lecture, Seminar) *Contents*: 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.	4 WLH
Examination: Mündliche Prüfung (ca. 15 Minuten, Gewichtung: 60%) und Präsentation, Referat oder Korreferat (ca. 20 Minuten, Gewichtung: 40%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in plant and soil sciences
Language: English	**Person responsible for module:** Prof. Dr. Andreas Bürkert
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

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. Smithsonia Books, Washington, USA; Wood, D., Lenne, J.M. 1999: Agrobiodiversity: Characterization, utilization and management. CABI Publishing, Wallingford, UK.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P15M: Methods and advances in plant protection**	6 C 4 WLH

Learning outcome, core skills: Students are able to critically evaluate published results and apply this knowledge to actual problems in the field. They are also able to deal with problems in the field: Identification and measurements, design of experimental and analytical approaches to problems.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Methods and advances in plant protection (Lecture, Internship, Excursion) *Contents*: Advanced course in plant pathology and entomology. Methodology and evaluation methods in plant protection. Case studies of specific plant protection issues in organic farming in the form of lectures, seminars and practical courses.	4 WLH
Examination: Klausur (120 Minuten) oder Fachgespräch (ca. 20 Minuten) (Gewichtung: 70%) und Protokoll (max. 3 Seiten) oder Referat (ca. 10 Minuten) (Gewichtung: 30%)	

Admission requirements: Introductory course in plant protection (entomology and pathology, at least 6 ECTS or equivalent) or bridging module M.SIA.P07 Soil and Plant Science	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Maria Renate Finckh
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Additional notes and regulations:

Literature:

Agrios, G.N. 2005: Plant Pathology, 5th edition Academic Press, New York; Pedigo, L.P. 2002: Entomology and Pest Management, 4th edition, Macmillen Pub Co.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P16M: Crop Modelling for Risk Management**	6 C 4 WLH

Learning outcome, core skills: Teamwork based and independent development, reporting, presentation and discussion of a simulation experiment depicting selected problems from climate change, land-use planning, agro-ecological zoning, or optimization of input factor productivity.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Crop Modelling for Risk Management (Lecture, Internship, Seminar) *Contents*: Overview on important modelling concepts of crop growth and development. Introduction to mathematical, statistical and process-oriented modelling approaches of plant growth. Extension of basic approaches to develop interfaces for plot- and landscape based modelling of soil-plant-systems. Exercises in work groups on the use of DSSAT and CERES-MAIZE software with the computing facilities of the institute.	4 WLH
Examination: Präsentation, Referat oder Korreferat (ca. 20 Minuten, Gewichtung: 50%) und Protokoll (max. 20 Seiten, Gewichtung: 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil and plant sciences, computer literacy
Language: English	**Person responsible for module:** Dr. sc. agr. Ronald Franz Kühne
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 15	

Additional notes and regulations:
Literature:

Lecture notes and handouts, selected chapters from textbooks, software manuals.

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P17M: Nutrient dynamics: long-term experiments and modelling**	6 C 4 WLH

Learning outcome, core skills: Students are able to use established models and to critically evaluate the underlying ecological processes. Based on their understanding of soil nutrient dynamics they are able to evaluate and critically assess the significance of long-term experiments and considering all influencing variables.	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Course: Nutrient dynamics: long-term experiments and modelling (Lecture, Internship) *Contents*: • Explanation of the dynamics of C, N and P in arable soils • Presentation of the results of existing long-term experiments with emphasis on the variables and variants influencing these results • Modelling of the turnover of soil organic matter and soil nitrogen using the models "Rothamsted Carbon Model" and "DNDC" • Simulation of pH buffering and nutrient transport in soils using the model "PHREEQC"	4 WLH
Examination: Oral exam (ca. 30 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil and plant sciences
Language: English	**Person responsible for module:** Prof. Dr. Bernard Ludwig
Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 20	

Additional notes and regulations:

Literature:

Blume H.-P. et al. 2002: Lehrbuch der Bodenkunde, 15. Auflage, Spektrum, Heidelberg; Merbach, W. et al. 2000: The long-term fertilization experiments in Halle (Saale), Germany - introduction and surveys. Journal of Soil Science and Plant Nutrition 163. 629-638; Coleman, K., Jenkinson, D.S 1996: RothC-26.3 - A model for the turnover of carbon in soil. In: Powlson, D.S., Smith, P., Smith J.U. (eds.): Evaluation of soil organic matter models. Springer, Berlin; Li, C. 1996: The DNDC model. In: Powlson, D.S., Smith, P. Smith, J.U. (eds.) 1996: Evaluation of Soil Organic Matter Models. Springer, Berlin

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P19M: Experimental Techniques in Tropical Agronomy**	6 C 4 WLH

Learning outcome, core skills: Knowledge of the botanical, ecological and agronomic facts of the introduced crop plants and multiplication techniques, scientifically correct interpretation and discussion of results from a greenhouse experiment, limitations and potentials of the interpretation of measuring procedures for the description of physiological state variables in tropical crop plants.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Experimental Techniques in Tropical Agronomy (Lecture, Internship, Seminar) *Contents*: Basics of and practical exercises on vegetative and generative multiplication techniques in the greenhouse of the department, introduction to statistical experimental design and analyses of greenhouse experiments, theory and practise of ecophsyiological measurements of water status as well as gas change/photosynthesis rates of tropical crop plants.	4 WLH
Examination: Präsentation, Referat oder Korreferat (ca. 30 Minuten, Gewichtung: 50%) und Protokoll (max. 20 Seiten, Gewichtung: 50%)	

Admission requirements: M.SIA.P12	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of plant sciences
Language: English	**Person responsible for module:** Prof. Dr. Anthony Whitbread
Course frequency: jedes Sommersemester; Göttingen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 15	

Additional notes and regulations:
Literature:

Copies of PowerPoint presentations, selected chapters from textbooks

Georg-August-Universität Göttingen **Universität Kassel/Witzenhausen** **Module M.SIA.P20: Plant Nematology**	6 C 4 WLH

Learning outcome, core skills: Students will gain advanced insight in plant nematology, nematode interactions with other plant pathogens, and management strategies; hands-on training will be provided on nematode sampling, processing, identification and disease evaluation Students having taken this module will be able to detect nematode damage and identify plant-parasitic nematodes to genus.	**C/Weekly lecture hours in total:** Attendance time: 60 h Self-study time: 120 h

Course: Plant Nematology (Lecture, Internship, Seminar) *Contents*: Introduction: History (first records, evolution, phylogeny), General function of nematodes (nutrient cycling, beneficial nematodes, parasites of plants and animals), Biology (anatomy, classification, life cycle, reproduction, feeding behaviour, parasitism strategies), Ecology (spread, population dynamics, distribution in soil, survival strategies, worldwide occurrence, interaction with other pathogens), Symptoms (aboveground/ belowground,), Plant-Nematode Interactions (feeding sites, plant defence mechanisms, nematode survival), Economic importance (quantitative/qualitative yield losses, main damaging genera, most vulnerable crops) Methodology: Sampling procedures (sampling depth, number of cores per sample, total sample volume), Sample processing for (a) cysts from soil (Fenwick can, centrifugal/ flotation, elutriation), for (b) mobile stages from soil (Baermann funnel, sieving, flotation, elutriation), for (c) mobile stages from plant material (Baermann funnel, direct preparation, mistifier), Staining of nematodes (in roots, egg masses), Scoring root damage (gall index) Nematode identification: fishing of nematodes, fixation, mounting, permanent slides, identification keys, preparation of vulval cones (cyst nematodes) and perineums (root-knot nematodes) Management: Threshold levels, Quarantine, Crop rotation (hosts, non-host-plants, trap crops, antagonistic crops, fallow), Resistance/tolerance (classical breeding, molecular approaches), Organic amendments (compost, green manure), Biological Control (antagonistic microorganisms, suppressive soils), Physical Control (heat, steam, flooding, radiation), Chemical control (nematicides, fumigants)	4 WLH
Examination: Referat (ca. 15 Minuten, Gewichtung: 50%) und entweder mündliche Prüfung (ca. 20 Minuten) oder Klausur (120 Minuten) (Gewichtung 50%)	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge (B.Sc. level) of soil, plant and animal sciences
Language: English	**Person responsible for module:** Prof. Dr. Maria Renate Finckh

Course frequency: jedes Wintersemester; Witzenhausen	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 15	

Additional notes and regulations:

Literature:

Perry, N.R., Moens, M. 2006: Plant Nematology, CAB International. Luc. M., Sikora, R.A., Bridge, J. 2005: Plant parasitic nematodes in subtropical and tropical agriculture, 2nd edition. Ciancio, A., Mukerji, K.G. 2008: Integrated Management and Biocontrol of Vegetable and Grain Crops Nematodes, Springer-Verlag. Perry, R.N., Moens, M., Starr, J.L. 2009: Root-Knot Nematodes, CAB International. Agrios, G.N. 2005: Plant Pathology, 5th edition. Berg, R.H., Taylor, C.G. 2009: Cell Biology of Plant Nematode Parasitism. Springer-Verlag. Ferraz, L.C.C.B., Brown, D.J.F. 2002: An Introduction to Nemtaodes: Plant Nematology, Pensoft. Weischer, B., Brown, D.J.F. 2000: An Introduction to Nematodes: General Nematology, Pensoft, Shurtleff, M.C., Averre III, C.W. 2000: Diagnosing plant diseases caused by nematodes, APS Press

Georg-August-Universität Göttingen **Module M.WIWI-QMW.0004: Econometrics I** *English title: Econometrics I*	6 C 4 WLH

Learning outcome, core skills: none	**C/Weekly lecture hours in total:** Attendance time: 56 h Self-study time: 124 h

Courses:	
1. Econometrics I (Lecture)	2 WLH
2. Econometrics I (Exercise)	2 WLH

Examination: Written exam (90 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** N. N.
Course frequency: jedes Wintersemester	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 1 - 2
Maximum number of students: not limited	

Georg-August-Universität Göttingen **Module M.WIWI-VWL.0008: Development Economics I: Macro Issues in Economic Development** *English title: Development Economics I*	6 C 4 WLH

Learning outcome, core skills: none	**C/Weekly lecture hours in total:** Attendance time: 42 h Self-study time: 138 h

Course: Tutorial	2 WLH

Course: Lecture	2 WLH
Examination: Final Exam (90 Minuten)	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Stephan Klasen
Course frequency: jedes Wintersemester	**Duration:** 1 Semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 1 - 2
Maximum number of students: not limited	