



GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN

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Amtliche Mitteilungen II

Herausgegeben von der Präsidentin der Georg-August-Universität Göttingen

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Abteilung Wissenschaftsrecht
und Trägerstiftung

Von-Siebold-Str. 2
37075 Göttingen

Telefon:
+49 551/39-24496

E-Mail:
am-redaktion@zvw.uni-goettingen.de
Internet:
www.uni-goettingen.de/de/sh/6800.html

Fakultät für Agrarwissenschaften:

Nach Beschlüssen des Fachbereichsrates des Fachbereichs Ökologische Agrarwissenschaften der Universität Kassel vom 25.10.2017 sowie des Fakultätsrats der Fakultät für Agrarwissenschaften der Georg-August-Universität Göttingen vom 15.06.2017 sowie nach Zustimmung des Senats der Universität Kassel vom 06.12.2017 haben das Präsidium der Universität Kassel am 12.01.2018 und das Präsidium der Georg-August-Universität Göttingen am 22.05.2018 die Neufassung des Modulverzeichnisses zur Prüfungs- und Studienordnung für den konsekutiven Master-Studiengang „Sustainable International Agriculture“ in der Fassung der Bekanntmachung vom 22.09.2011 (Amtliche Mitteilungen I Nr. 6/2011 S. 177), zuletzt geändert durch Beschluss des Präsidiums der Universität Kassel vom 13.01.2017 und des Präsidiums der Georg-August-Universität Göttingen vom 09.01.2017 (Amtliche Mitteilungen I Nr. 3/2017 S. 34), genehmigt (§ 44 Abs. 1 Satz 2 Nr. 1 Hessisches Hochschulgesetz (HHG) in der Fassung der Bekanntmachung vom 14.12.2009 (Hess. GVBl. I S. 666), zuletzt geändert durch Artikel 1 des Gesetzes vom 30.11.2015 (Hess. GVBl. I S. 510), und § 44 Abs. 1 Satz 2 Niedersächsisches Hochschulgesetz (NHG) in der Fassung der Bekanntmachung vom 26.02.2007 (Nds. GVBl. S. 69), zuletzt geändert durch Artikel 4 des Gesetzes vom 15.06.2017 (Nds. GVBl. S. 172); § 36 Abs. 2 Satz 1 Nr. 5 HHG; § 41 Abs. 2 Satz 2 NHG; § 37 Abs. 5 Satz 1 HHG; §§ 37 Abs. 1 Satz 3 Nr. 5 b), 44 Abs. 1 Satz 3 NHG).

Die Neufassung des Modulverzeichnisses tritt nach seiner Bekanntmachung in den Amtlichen Mitteilungen II rückwirkend zum 01.04.2018 in Kraft.

Directory of Modules

**zu der Prüfungs- und Studienordnung für
den konsekutiven Master-Studiengang
"Sustainable International Agriculture" (Amtliche
Mitteilungen I 6/2011, zuletzt geändert durch
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I. MSc Sustainable International Agriculture (English)

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

1. Specializations

At least 90 C must be successfully completed within a specialization

a. International Agribusiness and Rural Development Economics

aa. Compulsory modules

The following four compulsory modules must be completed:

M.Agr.0086: World agriculture markets and trade (6 C, 6 SWS).....	5667
M.SIA.E11: Socioeconomics of rural development and food security (6 C, 4 SWS).....	5708
M.SIA.I12: Sustainable international agriculture: basic principles and approaches (6 C, 4 SWS).....	5748
M.WIWI-QMW.0004: Econometrics I (6 C, 4 SWS).....	5784

bb. 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:

M.Agr.0124: Environmental Economics and Policy (6 C, 4 SWS).....	5670
M.SIA.E05M: Marketing research (6 C, 4 SWS).....	5704
M.SIA.E12M: Quantitative research methods in rural development economics (6 C, 4 SWS).....	5709
M.SIA.E13M: Microeconomic theory and quantitative methods of agricultural production (6 C, 4 SWS).....	5710
M.SIA.E14: Evaluation of rural development projects and policies (6 C, 4 SWS).....	5711
M.SIA.E18: Organization of food supply chains (6 C, 4 SWS).....	5714
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M.SIA.E34: Economic valuation of ecosystem services in developing countries (6 C, 4 SWS).....	5726
M.SIA.E37: Agricultural policy analysis (6 C, 6 SWS).....	5732
M.SIA.E38: Scientific writing in Agricultural Economics (6 C, 4 SWS).....	5734
M.WIWI-VWL.0008: Development Economics I: Macro Issues in Economic Development (6 C, 4 SWS).....	5785

cc. Elective modules

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

M.Agr.0106: China Economic Development: From an agricultural economy to an emerging economy (6 C, 4 SWS).....	5668
M.Agr.0118: Applied Microeconometrics (6 C, 4 SWS).....	5669
M.SIA.A01: Organic livestock farming under temperate and tropical conditions (6 C, 4 SWS).....	5676
M.SIA.A05: Aquaculture in the tropics and subtropics (6 C, 4 SWS).....	5685
M.SIA.A06: Global aquaculture production, markets and challenges (6 C, 4 SWS).....	5687
M.SIA.A07: Unconventional livestock and wildlife-management, utilization and conservation (6 C, SWS).....	5689
M.SIA.A08: Social-ecology in livestock production systems (6 C, 4 SWS).....	5691
M.SIA.A11: Tropical animal husbandry systems (6 C, 4 SWS).....	5695
M.SIA.A12M: Multidisciplinary research in tropical production systems (6 C, 4 SWS).....	5697
M.SIA.E02: Agricultural price theory (6 C, 4 SWS).....	5703
M.SIA.E06: International markets and marketing for organic Products (6 C, 4 SWS).....	5706
M.SIA.E17M: Management and management accounting (6 C, 4 SWS).....	5712
M.SIA.E19: Market integration and price transmission I (6 C, 4 SWS).....	5716
M.SIA.E28: Regional modelling (6 C, 4 SWS).....	5721
M.SIA.E35: Institutional ecological economics (6 C, 4 SWS).....	5728
M.SIA.E36: Institutions and the food system (6 C, 4 SWS).....	5730
M.SIA.I02: Management of (sub-)tropical landuse systems (6 C).....	5736
M.SIA.I03: Food quality and organic food processing (6 C, 4 SWS).....	5738
M.SIA.I07: International land use systems research - an interdisciplinary study tour (6 C, 8,5 SWS).....	5742
M.SIA.I09: Sustainable nutrition (6 C, 6 SWS).....	5744
M.SIA.I11M: Free Project (6 C).....	5747

M.SIA.I14M: GIS and remote sensing in agriculture (6 C, 4 SWS).....	5750
M.SIA.P05: Organic cropping systems under temperate and (sub)tropical conditions (6 C, 4 SWS).....	5760
M.SIA.P21: Energetic use of agricultural crops and Field forage production (6 C, 4 SWS)....	5780
M.SIA.P22: Management of tropical plant production systems (6 C, 4 SWS).....	5782

b. International Organic Agriculture

aa. Compulsory modules

The following bridging module (P07) and four compulsory modules comprising 30 C must be successfully completed. The preparatory module can be replaced on request by a mandatory module if corresponding module has been successfully completed.

M.SIA.A01: Organic livestock farming under temperate and tropical conditions (6 C, 4 SWS).....	5676
M.SIA.I10M: Applied statistical modelling (6 C, 4 SWS).....	5745
M.SIA.I12: Sustainable international agriculture: basic principles and approaches (6 C, 4 SWS).....	5748
M.SIA.P05: Organic cropping systems under temperate and (sub)tropical conditions (6 C, 4 SWS).....	5760
M.SIA.P07: Soil and plant science (6 C, 4 SWS).....	5764

bb. 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:

M.Agr.0009: Biological control and biodiversity (6 C, 6 SWS).....	5665
M.Agr.0056: Plant breeding methodology and genetic resources (6 C, 4 SWS).....	5666
M.SIA.A10: Livestock nutrition and breeding under (sub)tropical conditions (6 C, 4 SWS)....	5693
M.SIA.A12M: Multidisciplinary research in tropical production systems (6 C, 4 SWS).....	5697
M.SIA.E05M: Marketing research (6 C, 4 SWS).....	5704
M.SIA.E06: International markets and marketing for organic Products (6 C, 4 SWS).....	5706
M.SIA.E11: Socioeconomics of rural development and food security (6 C, 4 SWS).....	5708
M.SIA.E14: Evaluation of rural development projects and policies (6 C, 4 SWS).....	5711
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M.SIA.I09: Sustainable nutrition (6 C, 6 SWS).....	5744

M.SIA.I14M: GIS and remote sensing in agriculture (6 C, 4 SWS).....	5750
M.SIA.P01: Ecology and agroecosystems (6 C, 4 SWS).....	5754
M.SIA.P03: Ecological soil microbiology (6 C, 4 SWS).....	5756
M.SIA.P06: Soil and water (6 C, 4 SWS).....	5762
M.SIA.P13: Agrobiodiversity and plant genetic resources in the tropics (6 C, 4 SWS).....	5769
M.SIA.P15M: Methods and advances in plant protection (6 C, 4 SWS).....	5771
M.SIA.P16M: Crop modelling for risk management (6 C, 4 SWS).....	5772
M.SIA.P17M: Nutrient dynamics: long-term experiments and modelling (6 C, 4 SWS).....	5774
M.SIA.P20: Plant nematology (6 C, 4 SWS).....	5778

cc. 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.

M.Agr.0086: World agriculture markets and trade (6 C, 6 SWS).....	5667
M.Agr.0124: Environmental Economics and Policy (6 C, 4 SWS).....	5670
M.Forst.1512: International Forest Policy and Economics (6 C, 4 SWS).....	5672
M.Forst.1521: Ecopedology of the tropics and subtropics (6 C, 4 SWS).....	5674
M.Forst.1615: Forest growth and tree-based land use in the tropics (6 C, 4 SWS).....	5675
M.SIA.A02M: Epidemiology of international and tropical animal infectious diseases (6 C, 4 SWS).....	5679
M.SIA.A03M: International and tropical food microbiology and hygiene (6 C, 4 SWS).....	5681
M.SIA.A04: Livestock reproduction physiology (6 C, 4 SWS).....	5683
M.SIA.A05: Aquaculture in the tropics and subtropics (6 C, 4 SWS).....	5685
M.SIA.A06: Global aquaculture production, markets and challenges (6 C, 4 SWS).....	5687
M.SIA.A07: Unconventional livestock and wildlife-management, utilization and conservation (6 C, 4 SWS).....	5689
M.SIA.A08: Social-ecology in livestock production systems (6 C, 4 SWS).....	5691
M.SIA.A11: Tropical animal husbandry systems (6 C, 4 SWS).....	5695
M.SIA.A13M: Livestock-based sustainable land use (6 C, 4 SWS).....	5699
M.SIA.E02: Agricultural price theory (6 C, 4 SWS).....	5703
M.SIA.E12M: Quantitative research methods in rural development economics (6 C, 4 SWS).....	5709
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M.SIA.E36: Institutions and the food system (6 C, 4 SWS).....	5730
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M.SIA.P19M: Experimental techniques in tropical agronomy (6 C, 4 SWS).....	5776
M.SIA.P21: Energetic use of agricultural crops and Field forage production (6 C, 4 SWS)....	5780
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c. Tropical Agricultural and Agroecosystems Sciences

aa. 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):

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M.SIA.I10M: Applied statistical modelling (6 C, 4 SWS).....	5745
M.SIA.I12: Sustainable international agriculture: basic principles and approaches (6 C, 4 SWS).....	5748
M.SIA.P07: Soil and plant science (6 C, 4 SWS).....	5764

M.SIA.P22: Management of tropical plant production systems (6 C, 4 SWS).....	5782
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bb. 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:

M.Agr.0056: Plant breeding methodology and genetic resources (6 C, 4 SWS).....	5666
M.Forst.1521: Ecopedology of the tropics and subtropics (6 C, 4 SWS).....	5674
M.SIA.A02M: Epidemiology of international and tropical animal infectious diseases (6 C, 4 SWS).....	5679
M.SIA.A03M: International and tropical food microbiology and hygiene (6 C, 4 SWS).....	5681
M.SIA.A04: Livestock reproduction physiology (6 C, 4 SWS).....	5683
M.SIA.A05: Aquaculture in the tropics and subtropics (6 C, 4 SWS).....	5685
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M.SIA.A10: Livestock nutrition and breeding under (sub)tropical conditions (6 C, 4 SWS)....	5693
M.SIA.A12M: Multidisciplinary research in tropical production systems (6 C, 4 SWS).....	5697
M.SIA.A13M: Livestock-based sustainable land use (6 C, 4 SWS).....	5699
M.SIA.E11: Socioeconomics of rural development and food security (6 C, 4 SWS).....	5708
M.SIA.I06M: Exercise on the quality of tropical and subtropical products (6 C, 4 SWS).....	5740
M.SIA.I14M: GIS and remote sensing in agriculture (6 C, 4 SWS).....	5750
M.SIA.P01: Ecology and agroecosystems (6 C, 4 SWS).....	5754
M.SIA.P04: Plant nutrition in the tropics and subtropics (6 C, 4 SWS).....	5758
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M.SIA.P10: Tropical agro-ecosystem functions (6 C, 4 SWS).....	5768
M.SIA.P13: Agrobiodiversity and plant genetic resources in the tropics (6 C, 4 SWS).....	5769
M.SIA.P15M: Methods and advances in plant protection (6 C, 4 SWS).....	5771
M.SIA.P16M: Crop modelling for risk management (6 C, 4 SWS).....	5772
M.SIA.P17M: Nutrient dynamics: long-term experiments and modelling (6 C, 4 SWS).....	5774
M.SIA.P19M: Experimental techniques in tropical agronomy (6 C, 4 SWS).....	5776

cc. 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.

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M.SIA.A01: Organic livestock farming under temperate and tropical conditions (6 C, 4 SWS).....	5676
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M.SIA.P06: Soil and water (6 C, 4 SWS).....	5762
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M.WIWI-VWL.0008: Development Economics I: Macro Issues in Economic Development (6 C, 4 SWS).....	5785

2. Master's thesis

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

3. Colloquium for the Master's thesis

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

II. Supplementary Modules for Student of the double degree program with the University of Talca

1. Study programme at the universities of Kassel and Goettingen in the first and second semester

a. Studium an den Universitäten Kassel und Göttingen

Students must complete during the first two semesters at the University of Göttingen and Kassel:

aa. Compulsory modules

The following four compulsory modules must be successfully completed:

M.Agr.0086: World agriculture markets and trade (6 C, 6 SWS).....	5667
M.SIA.E11: Socioeconomics of rural development and food security (6 C, 4 SWS).....	5708
M.SIA.I12: Sustainable international agriculture: basic principles and approaches (6 C, 4 SWS).....	5748
M.WIWI-QMW.0004: Econometrics I (6 C, 4 SWS).....	5784

bb. Mandatory modules

From the following three mandatory modules must be successfully completed:

M.Agr.0124: Environmental Economics and Policy (6 C, 4 SWS).....	5670
M.Agr.0148: Policy analysis of international agri-environmental schemes (6 C, 4 SWS).....	5671

M.SIA.E05M: Marketing research (6 C, 4 SWS).....	5704
M.SIA.E12M: Quantitative research methods in rural development economics (6 C, 4 SWS).....	5709
M.SIA.E13M: Microeconomic theory and quantitative methods of agricultural production (6 C, 4 SWS).....	5710
M.SIA.E14: Evaluation of rural development projects and policies (6 C, 4 SWS).....	5711
M.SIA.E18: Organization of food supply chains (6 C, 4 SWS).....	5714
M.SIA.E21: Rural sociology (6 C, 4 SWS).....	5717
M.SIA.E23: Global agricultural value chains and developing countries (6 C, 4 SWS).....	5718
M.SIA.E31: Strategic management (6 C, 4 SWS).....	5722
M.SIA.E33: Responsible and sustainable food business in global contexts (6 C, 4 SWS).....	5724
M.SIA.E34: Economic valuation of ecosystem services in developing countries (6 C, 4 SWS).....	5726
M.SIA.E37: Agricultural policy analysis (6 C, 6 SWS).....	5732
M.SIA.E38: Scientific writing in Agricultural Economics (6 C, 4 SWS).....	5734
M.WIWI-VWL.0008: Development Economics I: Macro Issues in Economic Development (6 C, 4 SWS).....	5785

cc. Elective Modules

From the following modules (or so far not chosen elective modules of the major field of study) three elective modules must be successfully completed:

M.Agr.0106: China Economic Development: From an agricultural economy to an emerging economy (6 C, 4 SWS).....	5668
M.Agr.0118: Applied Microeconometrics (6 C, 4 SWS).....	5669
M.SIA.A05: Aquaculture in the tropics and subtropics (6 C, 4 SWS).....	5685
M.SIA.A06: Global aquaculture production, markets and challenges (6 C, 4 SWS).....	5687
M.SIA.A07: Unconventional livestock and wildlife-management, utilization and conservation (6 C, 4 SWS).....	5689
M.SIA.A08: Social-ecology in livestock production systems (6 C, 4 SWS).....	5691
M.SIA.A11: Tropical animal husbandry systems (6 C, 4 SWS).....	5695
M.SIA.A12M: Multidisciplinary research in tropical production systems (6 C, 4 SWS).....	5697
M.SIA.A14: Organic livestock farming under temperate conditions (6 C, 4 SWS).....	5701
M.SIA.E02: Agricultural price theory (6 C, 4 SWS).....	5703
M.SIA.E06: International markets and marketing for organic Products (6 C, 4 SWS).....	5706
M.SIA.E17M: Management and management accounting (6 C, 4 SWS).....	5712

M.SIA.E19: Market integration and price transmission I (6 C, 4 SWS).....	5716
M.SIA.E28: Regional modelling (6 C, 4 SWS).....	5721
M.SIA.E35: Institutional ecological economics (6 C, 4 SWS).....	5728
M.SIA.I02: Management of (sub-)tropical landuse systems (6 C).....	5736
M.SIA.I03: Food quality and organic food processing (6 C, 4 SWS).....	5738
M.SIA.I07: International land use systems research - an interdisciplinary study tour (6 C, 8,5 SWS).....	5742
M.SIA.I09: Sustainable nutrition (6 C, 6 SWS).....	5744
M.SIA.I11M: Free Project (6 C).....	5747
M.SIA.I14M: GIS and remote sensing in agriculture (6 C, 4 SWS).....	5750
M.SIA.I15: Analysis and management of social-ecological systems in agricultural landscapes (6 C, 4 SWS).....	5752
M.SIA.P05: Organic cropping systems under temperate and (sub)tropical conditions (6 C, 4 SWS).....	5760
M.SIA.P21: Energetic use of agricultural crops and Field forage production (6 C, 4 SWS)....	5780
M.SIA.P22: Management of tropical plant production systems (6 C, 4 SWS).....	5782

b. Study programme at the university of Talca

During the last two semesters at the University of Talca, students must complete a range of modules from the following modules program:

aa. Mandatory modules

See examination and study regulations

bb. Elective Modules

See examination and study regulations

2. Study programme at the universities of Kassel and Goettingen first and fourth semester

First semester at the Universities of Göttingen and Kassel, two semesters at the University of Talca and the last semester at Göttingen and Kassel.

a. Study programme at the universities of Kassel and Goettingen

Students must complete during the first semester at the Universities of Göttingen and Kassel:

aa. Compulsory Modules

The following three compulsory modules must be successfully completed

M.SIA.E11: Socioeconomics of rural development and food security (6 C, 4 SWS).....	5708
M.SIA.I12: Sustainable international agriculture: basic principles and approaches (6 C, 4 SWS).....	5748
M.WIWI-QMW.0004: Econometrics I (6 C, 4 SWS).....	5784

bb. Mandatory modules

From the following one mandatory module must be successfully completed

M.Agr.0124: Environmental Economics and Policy (6 C, 4 SWS).....	5670
M.Agr.0148: Policy analysis of international agri-environmental schemes (6 C, 4 SWS).....	5671
M.SIA.E05M: Marketing research (6 C, 4 SWS).....	5704
M.SIA.E12M: Quantitative research methods in rural development economics (6 C, 4 SWS).....	5709
M.SIA.E13M: Microeconomic theory and quantitative methods of agricultural production (6 C, 4 SWS).....	5710
M.SIA.E14: Evaluation of rural development projects and policies (6 C, 4 SWS).....	5711
M.SIA.E18: Organization of food supply chains (6 C, 4 SWS).....	5714
M.SIA.E21: Rural sociology (6 C, 4 SWS).....	5717
M.SIA.E23: Global agricultural value chains and developing countries (6 C, 4 SWS).....	5718
M.SIA.E31: Strategic management (6 C, 4 SWS).....	5722
M.SIA.E33: Responsible and sustainable food business in global contexts (6 C, 4 SWS).....	5724
M.SIA.E34: Economic valuation of ecosystem services in developing countries (6 C, 4 SWS).....	5726
M.SIA.E36: Institutions and the food system (6 C, 4 SWS).....	5730
M.SIA.E37: Agricultural policy analysis (6 C, 6 SWS).....	5732
M.SIA.E38: Scientific writing in Agricultural Economics (6 C, 4 SWS).....	5734
M.WIWI-VWL.0008: Development Economics I: Macro Issues in Economic Development (6 C, 4 SWS).....	5785

cc. Elective Modules

From the following one elective module must be successfully completed

M.Agr.0106: China Economic Development: From an agricultural economy to an emerging economy (6 C, 4 SWS).....	5668
M.Agr.0118: Applied Microeconometrics (6 C, 4 SWS).....	5669
M.SIA.A05: Aquaculture in the tropics and subtropics (6 C, 4 SWS).....	5685
M.SIA.A06: Global aquaculture production, markets and challenges (6 C, 4 SWS).....	5687

M.SIA.A07: Unconventional livestock and wildlife-management, utilization and conservation (6 C, SWS).....	5689
M.SIA.A08: Social-ecology in livestock production systems (6 C, 4 SWS).....	5691
M.SIA.A11: Tropical animal husbandry systems (6 C, 4 SWS).....	5695
M.SIA.A12M: Multidisciplinary research in tropical production systems (6 C, 4 SWS).....	5697
M.SIA.A14: Organic livestock farming under temperate conditions (6 C, 4 SWS).....	5701
M.SIA.E02: Agricultural price theory (6 C, 4 SWS).....	5703
M.SIA.E06: International markets and marketing for organic Products (6 C, 4 SWS).....	5706
M.SIA.E17M: Management and management accounting (6 C, 4 SWS).....	5712
M.SIA.E19: Market integration and price transmission I (6 C, 4 SWS).....	5716
M.SIA.E28: Regional modelling (6 C, 4 SWS).....	5721
M.SIA.E35: Institutional ecological economics (6 C, 4 SWS).....	5728
M.SIA.I02: Management of (sub-)tropical landuse systems (6 C).....	5736
M.SIA.I03: Food quality and organic food processing (6 C, 4 SWS).....	5738
M.SIA.I07: International land use systems research - an interdisciplinary study tour (6 C, 8,5 SWS).....	5742
M.SIA.I09: Sustainable nutrition (6 C, 6 SWS).....	5744
M.SIA.I11M: Free Project (6 C).....	5747
M.SIA.I14M: GIS and remote sensing in agriculture (6 C, 4 SWS).....	5750
M.SIA.I15: Analysis and management of social-ecological systems in agricultural landscapes (6 C, 4 SWS).....	5752
M.SIA.P05: Organic cropping systems under temperate and (sub)tropical conditions (6 C, 4 SWS).....	5760
M.SIA.P21: Energetic use of agricultural crops and Field forage production (6 C, 4 SWS)....	5780
M.SIA.P22: Management of tropical plant production systems (6 C, 4 SWS).....	5782

b. Study programme at the university Talca

During the two semesters at the University of Talca, students must complete a range of modules from the following modules program:

aa. Compulsory Modules

The following compulsory module must be successfully completed:

M.Agr.0086: World agriculture markets and trade (6 C, 6 SWS).....	5667
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bb. Mandatory modules

See examination and study regulations

cc. Elective Modules

See examination and study regulations

3. Study programme at the universities of Kassel and Goettingen during the third and fourth semester

Studierende, die im Rahmen des Double-Degree-Programms mit der Universität Talca studieren, absolvieren während der ersten zwei Studiensemester an der Universität Talca nachfolgendes Studienprogramm.

a. Study programme at the university Talca

Students who study under the double degree program with the University of Talca must complete during the first two semesters at the University of Talca:

aa. Compulsory Modules

The following one module must be successfully completed:

M.Agr.0086: World agriculture markets and trade (6 C, 6 SWS).....5667

bb. Mandatory modules

See examination and study regulations

cc. Elective Modules

See examination and study regulations

b. Study programme at the universities of Kassel and Göttingen

During the semester at the University of Kassel and Göttingen, students must complete range of modules from the following modules programme:

aa. Compulsory Modules

The following three compulsory modules must be successfully completed:

M.SIA.E11: Socioeconomics of rural development and food security (6 C, 4 SWS)..... 5708

M.SIA.I12: Sustainable international agriculture: basic principles and approaches (6 C, 4 SWS)..... 5748

M.WIWI-QMW.0004: Econometrics I (6 C, 4 SWS)..... 5784

bb. Mandatory modules

From the following modules one mandatory module must be successfully completed:

M.Agr.0124: Environmental Economics and Policy (6 C, 4 SWS).....5670

M.Agr.0148: Policy analysis of international agri-environmental schemes (6 C, 4 SWS)..... 5671

M.SIA.E05M: Marketing research (6 C, 4 SWS).....	5704
M.SIA.E12M: Quantitative research methods in rural development economics (6 C, 4 SWS).....	5709
M.SIA.E13M: Microeconomic theory and quantitative methods of agricultural production (6 C, 4 SWS).....	5710
M.SIA.E14: Evaluation of rural development projects and policies (6 C, 4 SWS).....	5711
M.SIA.E18: Organization of food supply chains (6 C, 4 SWS).....	5714
M.SIA.E21: Rural sociology (6 C, 4 SWS).....	5717
M.SIA.E23: Global agricultural value chains and developing countries (6 C, 4 SWS).....	5718
M.SIA.E24: Topics in rural development economics I (6 C, 4 SWS).....	5719
M.SIA.E31: Strategic management (6 C, 4 SWS).....	5722
M.SIA.E33: Responsible and sustainable food business in global contexts (6 C, 4 SWS).....	5724
M.SIA.E34: Economic valuation of ecosystem services in developing countries (6 C, 4 SWS).....	5726
M.SIA.E36: Institutions and the food system (6 C, 4 SWS).....	5730
M.SIA.E37: Agricultural policy analysis (6 C, 6 SWS).....	5732
M.SIA.E38: Scientific writing in Agricultural Economics (6 C, 4 SWS).....	5734
M.WIWI-VWL.0008: Development Economics I: Macro Issues in Economic Development (6 C, 4 SWS).....	5785

cc. Elective Modules

From the following modules (or so far not chosen elective modules of the major field of study) one elective module must be successfully completed:

M.Agr.0106: China Economic Development: From an agricultural economy to an emerging economy (6 C, 4 SWS).....	5668
M.Agr.0118: Applied Microeconometrics (6 C, 4 SWS).....	5669
M.Forst.1512: International Forest Policy and Economics (6 C, 4 SWS).....	5672
M.SIA.A05: Aquaculture in the tropics and subtropics (6 C, 4 SWS).....	5685
M.SIA.A06: Global aquaculture production, markets and challenges (6 C, 4 SWS).....	5687
M.SIA.A07: Unconventional livestock and wildlife-management, utilization and conservation (6 C, SWS).....	5689
M.SIA.A08: Social-ecology in livestock production systems (6 C, 4 SWS).....	5691
M.SIA.A11: Tropical animal husbandry systems (6 C, 4 SWS).....	5695
M.SIA.A12M: Multidisciplinary research in tropical production systems (6 C, 4 SWS).....	5697
M.SIA.A14: Organic livestock farming under temperate conditions (6 C, 4 SWS).....	5701

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M.SIA.E06: International markets and marketing for organic Products (6 C, 4 SWS).....	5706
M.SIA.E17M: Management and management accounting (6 C, 4 SWS).....	5712
M.SIA.E19: Market integration and price transmission I (6 C, 4 SWS).....	5716
M.SIA.E28: Regional modelling (6 C, 4 SWS).....	5721
M.SIA.E35: Institutional ecological economics (6 C, 4 SWS).....	5728
M.SIA.I02: Management of (sub-)tropical landuse systems (6 C).....	5736
M.SIA.I03: Food quality and organic food processing (6 C, 4 SWS).....	5738
M.SIA.I07: International land use systems research - an interdisciplinary study tour (6 C, 8,5 SWS).....	5742
M.SIA.I09: Sustainable nutrition (6 C, 6 SWS).....	5744
M.SIA.I11M: Free Project (6 C).....	5747
M.SIA.I14M: GIS and remote sensing in agriculture (6 C, 4 SWS).....	5750
M.SIA.I15: Analysis and management of social-ecological systems in agricultural landscapes (6 C, 4 SWS).....	5752
M.SIA.P05: Organic cropping systems under temperate and (sub)tropical conditions (6 C, 4 SWS).....	5760
M.SIA.P21: Energetic use of agricultural crops and Field forage production (6 C, 4 SWS)....	5780
M.SIA.P22: Management of tropical plant production systems (6 C, 4 SWS).....	5782

Georg-August-Universität Göttingen		6 C
Module M.Agr.0009: Biological control and biodiversity		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.		Workload: Attendance time: 84 h Self-study time: 96 h
Course: Biological Control and Biodiversity (Lecture, Exercise, Seminar) <i>Contents:</i> <ul style="list-style-type: none"> • 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: Written exam (70%; 45 minutes) and presentation (30%; approx. 20 minutes) Examination prerequisites: regular attendance at seminar and exercise and presentation of a seminar talk Examination requirements: Basic knowledge of the mechanisms of biological control of herbivorous insects; methodological approaches based on case examples; role of biodiversity for ecosystem processes and the population dynamic of herbivorous insects, multitrophic interactions between plants, herbivorous insects and their natural enemies; biodiversity and services of ecosystems.		6 C
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Stefan Vidal	
Course frequency: each winter semester; Göttingen	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 12		
Additional notes and regulations: Lecture based materials; details provided during lectures.		

Georg-August-Universität Göttingen		6 C 4 WLH
Module M.Agr.0056: Plant breeding methodology and genetic resources		
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.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Plant breeding methodology and genetic resources (Lecture) <i>Contents:</i> 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: Written exam (90 minutes, 80%) and presentation (approx. 20 minutes, 20%) Examination requirements: Population Genetics, Application of Markers in Plant Breeding, Concepts of using genetic resources in plant breeding. Good knowledge on: 'Pre-Breeding', categories and methods in Plant Breeding.		6 C
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: each summer semester	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		6 C
Module M.Agr.0086: World agriculture markets and trade		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.		Workload: Attendance time: 84 h Self-study time: 96 h
Course: World agricultural markets and trade (Lecture, Exercise) <i>Contents:</i> 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 populist arguments against free-trade. They can estimate if there are reasons to deviate 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 examination (approx. 30 minutes) Examination requirements: Handelstheoretische Grundlagen: Ricardo, Heckscher-Ohlin-Vanek, Viner; Empirische Tests von Handelstheorien; unvollkommener Wettbewerb auf internationalen Märkten; Grundlagen von Gravitätsgleichungen; Institutionen und Organisationen auf Weltagrarmärkten; Agrarhandelsliberalisierung auf multilateraler (WTO) und bilateraler Ebene; spezielle Politikmaßnahmen im internationalen Agrarhandel		6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge of agricultural economics	
Language: English, German	Person responsible for module: Prof. Dr. Bernhard Brümmer	
Course frequency: each summer semester; Göttingen	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 90		
Additional notes and regulations: Literature: Feenstra, R.C. 2004: Advanced international trade: Theory and evidence. Princeton University Press		

Georg-August-Universität Göttingen Module M.Agr.0106: China Economic Development: From an agricultural economy to an emerging economy		6 C 4 WLH
Learning outcome, core skills: The students learn more about the specificities of China's economic transformation as well as the underlying economic concepts.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: China Economic Development: From an agricultural economy to an emerging economy (Lecture, Seminar) <i>Contents:</i> The lecture is designed for master students enrolled at the University of Göttingen. The course covers experiences and lessons to be drawn from China's economic transformation, by explaining the root causes for a shift from an agriculturally dominated to an emerging economy.		4 WLH
Examination: Presentation (about 25 minutes, 50%) and homework (max 15 pages, 50%) Examination requirements: Presentation and critical discussion of a scientific aspect of China's economic transformation.		6 C
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Xiaohua Yu	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 25		

Georg-August-Universität Göttingen		6 C 4 WLH
Module M.Agr.0118: Applied Microeconometrics		
Learning outcome, core skills: Learn the basic logics behind each econometric model, understand the tests for model specification, and appropriately explain the model outputs in connection to economic theories.		Workload: Attendance time: 40 h Self-study time: 140 h
Course: Applied Microeconometrics" (Internship, Lecture, Seminar) <i>Contents:</i> This course mainly teaches how to correctly apply basic econometric models to studying specific research questions for master level students in agricultural economics, agribusiness, and related programs at the University of Goettingen. The main software package used in this course will be STATA.		4 WLH
Examination: Written examination (120 minutes, 70%) and Homework (max. 12 pages, 30%) Examination requirements: 1. Understand the econometric models taught in the class 2. Use Stata skillfully		6 C
Admission requirements: Ökonometrie I / Econometrics I	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Xiaohua Yu	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 25		

Georg-August-Universität Göttingen		6 C 4 WLH
Module M.Agr.0124: Environmental Economics and Policy		
Learning outcome, core skills: This module provides students with an overview of environmental and natural resource economics and in-depth knowledge of selected issues. Students will learn the basic theoretic concepts and methods applied in environmental economics. They will also learn to evaluate environmental policies. A special focus is placed on international and global environmental issues (e.g. climate change).		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Environmental Economics and Policy (Lecture, Exercise) <i>Contents:</i> <ul style="list-style-type: none"> • Property rights, externalities and the environment • Efficiency and sustainability • Valuing the environment • Selected topics of natural resource economics (land, common-pool resources) • Perspectives on environmental policy (command&control versus incentives) • Global environmental issues (climate change) • Development and the environment 		4 WLH
Examination: Written examination (90 minutes) Examination requirements: Students have acquired in-depth knowledge on the above mentioned topics. They can explain and apply the theoretical concepts and methods taught in this course. They can evaluate environmental policies.		6 C
Admission requirements: Basic knowledge in agricultural economics and/or microeconomics	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Meike Wollni	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 60		
Additional notes and regulations: The exam can be done in german.		

Georg-August-Universität Göttingen Module M.Agr.0148: Policy analysis of international agri-environmental schemes	6 C 4 WLH
Learning outcome, core skills: Students gain essential knowledge on the analysis of policy instruments in agri-environmental systems and are capable to apply selected methods and criteria for policy analysis.	Workload: Attendance time: 40 h Self-study time: 140 h
Course: Policy analysis of international agri-environmental schemes (Seminar) <i>Contents:</i> This module is aimed at analyzing public policies in agri-environmental schemes. The module will <ul style="list-style-type: none"> • Outline the role of agriculture for positive and negative environmental externalities, e.g. biodiversity loss, climate change, multi-functionality of agriculture • Introduce into governance and policy processes of agri-environmental schemes • Give an overview of policy instruments, such as economic incentives and environmental standards and regulation • Present criteria and methodologies to conduct policy analysis Students will subsequently conduct a small policy analysis of their own interest in the field of agri-environmental policy and incentive instruments (national, EU-level or international level), e.g. EU-CAP, PES schemes, carbon markets in agriculture, sustainability standards, environmental financing, or land-use planning.	4 WLH
Examination: Presentation (approx. 25 min; 30%) and Homework (max. 20 pages; 70%) Examination requirements: Students write a seminar paper on the analysis of specific agri-environmental policy measures applying selected evaluation criteria and methods. Subsequently, they present and discuss their findings in class	6 C
Admission requirements: none	Recommended previous knowledge: M.Agr.0079 Environmental Economics and Policy
Language: English	Person responsible for module: Prof. Dr. Meike Wollni
Course frequency: each winter semester; Göttingen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 30	

Georg-August-Universität Göttingen		6 C 4 WLH
Module M.Forst.1512: International Forest Policy and Economics		
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.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Global environmental and forest policy (Seminar)		2 WLH
Examination: Written examination (60 minutes) Examination requirements: <ul style="list-style-type: none"> • Knowledge about political theories on forest and environmental policies • Application of the policy analysis on forest and environmental policies 		3 C
Course: International forest economics (Lecture)		2 WLH
Examination: Written examination (60 minutes) Examination requirements: <ul style="list-style-type: none"> • Knowledge about international wood markets, international trade with wood, wood products, aspects of international wood marketing and the consequences of protectionism. • Knowledge about international environmental problems and economic approaches towards their solution as well as knowledge about the relations between forest conservation and economic development. 		3 C
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Dr. Christiane Hubo	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted:	Recommended semester:	

cf. examination regulations	
Maximum number of students: not limited	

Georg-August-Universität Göttingen		6 C 4 WLH
Module M.Forst.1521: Ecopedology of the tropics and subtropics		
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.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Ecopedology of the tropics and subtropics (Lecture) <i>Contents:</i> 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 max.) and written exam (2 hours)		6 C
Examination requirements: Kenntnis der beschriebenen Lehrinhalte, Erreichung der festgelegten Lernziele und Nachweis der angestrebten Kompetenzen.		
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Edzo Veldkamp	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: cf. examination regulations	Recommended semester:	
Maximum number of students: not limited		

Georg-August-Universität Göttingen		6 C 4 WLH
Module M.Forst.1615: Forest growth and tree-based land use in the tropics		
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.		Workload: Attendance time: 28 h Self-study time: 152 h
Course: Forest growth and tree-based land use in the tropics (Lecture, Exercise) <i>Contents:</i> 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. This 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.)		6 C
Examination requirements: Kenntnis der beschriebenen Lehrinhalte, Erreichung der festgelegten Lernziele und Nachweis der angestrebten Kompetenzen.		
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Dr. Sophie Graefe	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: cf. examination regulations	Recommended semester:	
Maximum number of students: not limited		

<p>Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.A01: Organic livestock farming under temperate and tropical conditions</p>	<p>6 C 4 WLH</p>
<p>Learning outcome, core skills: Animal Welfare I: Students should acquire a basic understanding of animal welfare, familiarize with practical problems and scientific concepts including how to assess animal health and welfare at different process levels. Advances in animal nutrition and animal health: Students are introduced in scientific methods and approaches, appropriate to estimate and assess problems within organic livestock production in relation to imbalances in nutrient supply and production diseases. Sustainable forage production systems: Students are able to assess relationships between sward management and structural (yield, botanic) and functional (nutrient efficiency) sward characteristics. Organic livestock farming in the (sub)tropics: Students are able to discuss under which conditions organic livestock farming can be introduced in (sub)tropical countries or regions.</p>	<p>Workload: Attendance time: 60 h Self-study time: 120 h</p>
<p>Courses: 1. Animal Welfare I (Lecture) <i>Contents:</i> Principles of animal welfare in organic livestock farming; scientific methods to assess animal health and welfare. 2. Advances in animal nutrition and animal health (Lecture) <i>Contents:</i> Advances in animal nutrition and animal health; possibilities and limitations within organic livestock 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. 3. Sustainable forage production systems (Lecture) <i>Contents:</i> 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. 4. Organic livestock farming in the (sub)tropics (Lecture) <i>Contents:</i> Characterization and evaluation of organic livestock farming systems in different locations of southern regions/countries; pros and cons of organic livestock farming under different bio-physical and socioeconomic conditions.</p>	<p>1 WLH 1 WLH 1 WLH 1 WLH</p>

Publikationen zu Fallstudien werden über eine E-learning Plattform bereitgestellt	
Examination: Written examination (120 minutes) Examination requirements: Animal Welfare (Prof. Dr. Knierim) Basic knowledge in scientific concepts of animal health and welfare and in organic livestock farming; scientific methods to assess animal welfare. Animal nutrition and Animal health (Prof. Dr. Sundrum) Basic knowledge regarding organic cattle and pig production in Europe and possibilities and limitations within organic livestock farming to ensure a high level of animal health; strategies within animal nutrition to increase the efficiency in the use of limited resources in a system-oriented approach. Sustainable forage production (Prof. Dr. Wachendorf) Knowledge in the function of the sustainable development of forage crops, productivity and quality of grassland in relation to local conditions and management. Organic livestock farming in the (sub)tropics (Prof. Dr. Schlecht) Knowledge about the characterization and evaluation of organic livestock farming systems under (sub)tropical conditions; bio-physical and socioeconomic pros and cons of organic livestock farming in different regions.	6 C

Admission requirements: none	Recommended previous knowledge: Basic knowledge of animal sciences
Language: English	Person responsible for module: Prof. Dr. Albert Sundrum
Course frequency: each summer semester; 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:
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Sundrum, A. (2012): "Healthy food" from healthy cows. In: Konvalina, P. (ed.), Organic Farming and Food Production. InTech Book, p. 95-120.

Sundrum, A. (2012): Health and welfare of organic livestock and its challenges. In J. Ricke & O'Bryan (ed.), Organic meat production and processing. Wiley-Blackwell p. 89-112.

Sundrum, A. (2007): Quality production in organic, low-input and conventional pig production. In: Cooper, J., U. Niggli, C. Leifert (eds.). Handbook of Organic Food Safety and Quality. Woodhead Publishing, p. 144-177.

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:

Different publications of case studies are provided via an 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.	Workload: Attendance time: 84 h Self-study time: 96 h
Course: Epidemiology of international and tropical animal infectious diseases (Lecture, Exercise) <i>Contents:</i> 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 examination (approx. 90 minutes)	6 C

Examination requirements: Knowledge of current veterinary epidemic and infectious diseases inclusive emerging diseases. Background of hygiene and eradication programs. Profound knowledge in important infectious agents (parasites, fungi, bacteria, viruses) as well as toxins and prions. Skills in immunologic defense mechanisms of wildlife, zoo and domesticated animals in connection with modern active and passive vaccination strategies and biotechnological vaccine development. Knowledge in modern diagnostic tools as well as in biology and control of biological vectors (ticks, midges).	
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: each winter semester; 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.	Workload: Attendance time: 84 h Self-study time: 96 h
Course: International and tropical food microbiology and hygiene (Lecture, Exercise) <i>Contents:</i> 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

Vorlesungsbegleitende Materialien		
Examination: Oral examination (approx. 90 minutes) Examination requirements: Knowledge in current food-borne zoonoses, programs in food hygiene and requirements for their implementation in tropical and subtropical countries. Background of the biology of infectious agents, tenacity of special microorganisms and microbial spoilage of foodstuffs, available diagnostic tools for detection of contaminated or spoiled foodstuffs and about new biotechnological diagnostic assays. Skills in practical hygiene norms, normative documents and standardized international quality management systems, foodstuff conservation, germ depletion and inactivation as well as in positive influences of bacteria and fungi on foodstuff production.		6 C
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: each summer semester; 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.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Livestock reproduction physiology (Lecture, Excursion, Exercise) <i>Contents:</i> Functional anatomy of reproduction; physiology of reproduction in livestock (hormones, growth factors, ovogenesis 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. 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. Senger P.L. (2003): Pathways to pregnancy and parturition (2nd edition). Current conceptions, Inc.	4 WLH
Examination: Oral examination (approx. 30 minutes, 70%) and written report (max. 10 pages, 30%) Examination requirements: The examinee should show her/his potential to understand the principles of reproductive physiology and to illustrate profound differences among various livestock species. Special focus will also be laid on the species-specific application of advanced assisted reproductive technologies.	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge of animal sciences
Language: English	Person responsible for module: Prof. Christoph Knorr
Course frequency: each summer semester; Göttingen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:

Maximum number of students:	
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Additional notes and regulations:

After successful conclusion of M.Agr.0069, M.Agr.0070 and B.Agr.0331 students can not complete M.SIA.A04

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. Senger P.L. (2003): Pathways to pregnancy and parturition (2nd edition). Current conceptions, Inc.

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.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Aquaculture in the tropics and subtropics (Lecture, Excursion, Exercise) <i>Contents:</i> 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: <ul style="list-style-type: none"> • 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. Vorlesungsbegleitende Materialien	4 WLH
Examination: Oral examination (approx. 20 minutes) Examination requirements: Knowledge of the biological and ecological aquaculture in the tropics, the various aquaculture systems, as well as integrated agri-aquaculture systems. Knowledge about tropical fish species and their production efficiency in relation to production systems, as well as knowledge of specific breeding and husbandry practices and socio-economic functions and products of aquaculture.	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge of animal sciences
Language: English	Person responsible for module: Prof. Dr. Gabriele Hörstgen-Schwark
Course frequency: each summer semester; 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.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Global aquaculture production, markets and challenges (Lecture, Seminar) <i>Contents:</i> 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. <i>Literature:</i> Lecture based notes. <i>Course frequency:</i> each winter semester	4 WLH
Examination: Oral examination (approx. 20 minutes) Examination prerequisites: Project presentation (ca. 20 minutes) Examination requirements: Knowledge of the most important aquaculture organisms, their distribution structures, and the national and international markets and trade of aquatic products. Knowledge of the laws, national and international rules to protect the aquatic environment and the standards of hygiene and fish health in cross-border trade.	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge of animal sciences and agricultural markets
Language:	Person responsible for module:

English	Prof. Dr. Gabriele Hörstgen-Schwark
Course frequency: every 4th semester; Start WS 15/16; Göttingen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 30	

<p>Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.A07: Unconventional livestock and wildlife-management, utilization and conservation</p>	6 C
<p>Learning outcome, core skills: Based on the historical development of agriculture, particularly the domestication of animals, students know the differences between livestock and wildlife and the importance and potential of unconventional livestock and wildlife for rural development and human livelihoods in different regions of the world. Students obtain an overview over the wide variety of unconventional livestock, their adaptive features, biology and ecology and the various production systems under which they are kept. Students familiarize with the variety of wildlife species, their biology, ecology, and population dynamics and the potential of their exploitation. They know the major international conventions pertaining to wildlife conservation and are familiar with the nature and magnitude of human/wildlife conflicts. They know about costs and benefits associated with human-wildlife-co-existence and understand the dilemma between (inter)national conservation objectives and local household livelihood objectives. Students obtain an overview over different terminal and non-terminal options of wildlife utilisation and management and their respective potential contribution to the above conflicting objectives.</p>	<p>Workload: Attendance time: 60 h Self-study time: 120 h</p>
<p>Course: Unconventional livestock and wildlife-management, utilization and conservation (Block course, Excursion, Seminar) <i>Contents:</i> 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. 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)</p>	WLH

<p>Examination: Written exam (90 minutes, 70%) and oral seminar presentation (ca. 20 minutes, 30%)</p> <p>Examination requirements: Domestication / taming; unconventional domesticated animals: Biology, management, husbandry, economic potential. Wildlife: Biology, population dynamics, modelling of population dynamics; human-wildlife conflicts, international conventions on biodiversity and species conservation. Wildlife utilization: Tourism, game ranching, game hunting, trophy hunting.</p>	6 C
<p>Admission requirements: none</p>	<p>Recommended previous knowledge: Basic knowledge (B.Sc. level) of soil, plant and animal sciences</p>
<p>Language: English</p>	<p>Person responsible for module: Prof. Dr. Eva Schlecht</p>
<p>Course frequency: SoSe, jedes 2 Jahr, alternierend mit dem Modul M.SIA.A08; Witzenhausen</p>	<p>Duration: 1 semester[s]</p>
<p>Number of repeat examinations permitted: twice</p>	<p>Recommended semester:</p>
<p>Maximum number of students: not limited</p>	
<p>Additional notes and regulations:</p> <p>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)</p>	

Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.A08: Social-ecology in livestock production systems	6 C 4 WLH
<p>Learning outcome, core skills:</p> <p>Students understand livestock systems as social-ecological systems in which livestock farmers, through their actions, establish, maintain and develop the respective production system. Consequently, these so-called human activity systems are assessed using an actor-oriented approach. Emphasis of this module is on methods that are used to analyse and improve 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.</p>	<p>Workload:</p> <p>Attendance time: 60 h</p> <p>Self-study time: 120 h</p>
<p>Course: Social-ecology in livestock production systems (Block course, Lecture, Seminar)</p> <p><i>Contents:</i></p> <p>Theoretical background of the social-ecological system view: System theory, 1st and 2nd order cybernetics, complex adaptive systems, human activity systems.</p> <p>Actor-oriented approach to understand and influence low external input systems: Local knowledge and situated practices</p> <p>Methodology for understanding local knowledge: Second order observation and knowledge analysis</p> <p>Collaborative learning: Exchange between knowledge systems, dialogue, action research, livestock farmer experimentation, participatory monitoring and evaluation</p> <p>Modelling of livestock systems as tool for collaborative learning: Bio-economic modelling, multi-agent modelling, role plays.</p> <p>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.</p>	WLH
<p>Examination: Written exam (90 minutes, 70%) and presentation (ca. 20 minutes, 30%)</p>	6 C

Examination requirements: Social-ecological systems analysis; systems theory, cybernetic, complex adaptive systems, human activity systems. Local knowledge and situated practices; analysis of local knowledge; cooperative learning; modelling of livestock husbandry systems.	
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. Brigitte Kaufmann
Course frequency: SoSe, jedes 2 Jahr, alternierend mit dem Modul M.SIA.A07; Witzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 30	
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.A10: Livestock nutrition and breeding under (sub)tropical conditions	6 C 4 WLH
Learning outcome, core skills: Students are able: <ul style="list-style-type: none"> • 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. 	Workload: Attendance time: 60 h Self-study time: 120 h
Course: Livestock nutrition and breeding under (sub)tropical conditions (Lecture, Seminar) <i>Contents:</i> 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 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].	4 WLH
Examination: Oral exam (ca. 20 minutes, 75%) and homework (max. 5 pages, 25%) Examination requirements: Nutrition part (10 minutes, 50% weight): basics of animal nutrition in (sub-)tropical environments; macro- and micro-nutrients, digestive physiology, feed conversion; interdependency between animal nutrition and health, concept of nutritional wisdom. Breeding part (10 minutes, 50% weight): basics of animal breeding in (sub-)tropical environments; production traits, secondary traits, lifetime productivity, heritability, breeding value, methods to determine breeding value; breeding strategies for the most important livestock species in (sub-)tropical counties.	6 C
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: each winter semester; 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.	Workload: Attendance time: 60 h Self-study time: 120 h
Course: Tropical animal husbandry systems (Lecture, Seminar) <i>Contents:</i> 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. 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	4 WLH
Examination: Written exam (90 minutes, 75%) and oral seminar presentation (ca. 15 minutes, 25%) Examination requirements: abiotic and biotic conditions of animal husbandry in the (sub-)Tropics; characteristics, opportunities/constraints of pastoral, agro-pastoral, silvo-pastoral, aquatic, industrial and urban systems; species-specific management and production (cattle, sheep, goat, camel, yak, pig, poultry).	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge (B.Sc. level) of plant and animal sciences or agricultural economics
Language:	Person responsible for module:

English	Prof. Dr. Eva Schlecht
Course frequency: each winter semester; 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 Zerbin, 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.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Multidisciplinary research in tropical production systems (Lecture, Exercise) <i>Contents:</i> This module prepares the students 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. 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	4 WLH
Examination: Written exam (90 minutes, 50%) and poster presentation and presentation (ca. 20 minutes, 50%) Examination requirements: Knowledge on methods, applications, advantages and disadvantages of participatory research tools (Participatory Rural Appraisal, Rapid Rural Appraisal, etc.); critical-innovative mathematical/statistical analysis of field data gained through participatory approaches and their graphical depiction; evaluation of contents and layout of a scientific poster.	6 C
Admission requirements: none	Recommended previous knowledge: Basic computer skills
Language: English	Person responsible for module: Prof. Dr. Eva Schlecht

Course frequency: each summer semester; Göttingen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 25	

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.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Livestock-based sustainable land use (Lecture, Exercise) <i>Contents:</i> This module highlights the general positive and negative impacts of livestock and livestock management on the natural resources (air, water, soil vegetation), specifically under (sub)tropical conditions, at the plot to the watershed scale. It discusses options for sustainable livestock-based land use, thereby building upon the beneficial impacts of animals on soils and plants. Management options for reducing negative environmental effects of livestock (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. 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.	4 WLH
Examination: Written examination (90 minutes) Examination requirements: Influences of animal husbandry / the individual animal on its environment: soil fertility and soil erosion, pasture vegetation, nutrient transfers, greenhouse gas emissions; livestock keeping versus nature conservation; methods for assessing quality and quantity of pasture vegetation; methods to determine the animal's behavior at pasture and its feed intake.	6 C
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: each summer semester; Witzenhausen	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.A14: Organic livestock farming under temperate conditions	6 C 4 WLH
<p>Learning outcome, core skills: <i>Advances in animal nutrition and animal health:</i> Students get to know scientific tools for quantifying, assessing and evaluating problems within organic livestock production.</p> <p><i>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.</p> <p><i>Sustainable forage production systems:</i> Students are able to assess the relationships between sward management and structural (yield, botanical composition) and functional (nutrient efficiency) sward characteristics.</p>	<p>Workload: Attendance time: 60 h Self-study time: 120 h</p>
<p>Courses:</p> <p>1. Animal Welfare (Lecture) <i>Contents:</i></p> <ul style="list-style-type: none"> • Principles of animal welfare in relation to organic farming; scientific methods of welfare assessment <p>2. Advances in animal nutrition and animal health (Lecture) <i>Contents:</i></p> <ul style="list-style-type: none"> • 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 versus technical approaches <p>3. Sustainable forage production systems (Lecture) <i>Contents:</i></p> <ul style="list-style-type: none"> • Design and management of a sustainable forage production • Management of forage quality and biodiversity on grassland • Minimizing nutrient losses towards water and atmosphere 	<p>1,33 WLH</p> <p>1,33 WLH</p> <p>1,33 WLH</p>
<p>Examination: Written examination (90 minutes) Examination requirements: Knowledge of basic terms relevant to organic livestock systems; insights into aspects of feeding, healthcare, welfare, forage production and forage quality assessment; linkages and interdependencies between the discussed fields.</p>	6 C

One written exam with all three parts.	
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Admission requirements: none	Recommended previous knowledge: Basic knowledge (B.Sc. level) of animal sciences
Language: English	Person responsible for module: Prof. Dr. Albert Sundrum
Course frequency: each summer semester; Witzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 35	

Additional notes and regulations:
Literature:
<i>Advances in animal nutrition and animal health:</i>
<ul style="list-style-type: none"> • Vaarst, M., Roderick, S., Lund, V., Lockeretz, W. (eds.) 2004: Animal health and welfare in organic agriculture. CABI Publishing
<i>Animal welfare:</i>
<ul style="list-style-type: none"> • 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
<i>Sustainable forage production systems:</i>
<ul style="list-style-type: none"> • 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.

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.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Agricultural price theory (Lecture) <i>Contents:</i> 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. Vorlesungsbegleitende Materialien	4 WLH
Examination: Written examination (90 minutes) Examination requirements: Knowledge of impact of prices from an individual and macroeconomic point of view, of agricultural price structure as well as the importance of the technical progress, vertical and spatial price formation, price formation in the farm land market and the quoted market, as well as of commodities future markets	6 C
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: each winter semester; 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.E05M: Marketing research	6 C 4 WLH
Learning outcome, core skills: Students (i) are able to outline the steps in a marketing research process; (ii) are able to develop a marketing research design; (iii) know all relevant methods for data collection, analysis and prognosis with their specific advantages and problems; (iv) elaborate written and oral presentations in teamwork.	Workload: Attendance time: 60 h Self-study time: 120 h
Course: Marketing researches (Lecture, Seminar) <i>Contents:</i> Tasks and management of marketing research; methods of data collection; methods of data analysis, methods of prognoses. - Aaker, D.A., Kumar, V., Day, G.S. (2011): Marketing research. 10thed., Hoboken, NJ: Wiley. - Bryman, A. (2008): Social Research Methods. 3rded., Oxford: Oxford University Press. - Burns, A.C., Bush, R.F. (2006): Marketing Research. 5thed., Upper Saddle River, NJ, et al.: Prentice Hall. - Denzin, N.K., Lincoln, Y.S. (2008): Strategies of qualitative inquiry. 3rded., Los Angeles, CA, et al.: Sage Publications. - Churchill, G.A., Brown, T.J. (2007): Basic marketing research. 6thed., Mason, OH: Thomson South Western. - Dillman, D.A., Smyth, J.D., Christian, L.M. (2009): Internet, mail, and mixed-mode surveys. 3rded., Hoboken, NJ: Wiley. - Greenbaum, T.L. (2000): Moderating focus groups. A practical guide for group facilitation. Thousand Oaks, CA, et al.: Sage Publications. - Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2009): Multivariate data analysis, 7thed., Upper Saddle River, NJ, et al.: Prentice Hall. - Malhotra, N.K., Birks, D.F., Wills, P. (2012): Marketing research, 4thed., Harlow, Pearson. - McQuarrie, F. (1996): The marketresearchtoolbox:aconciseguideforbeginners. Thousand Oaks, CA, et al.: Sage Publications. - Ritchie, J., Lewis, J. (2006): Qualitative research practice: A guide for social science students and researchers. London et al.: Sage Publications. - Shao, A.T., Zhou, K.Z. (2007): Marketing research. 3rded., London et al.: Thomson Learning. - Webb, J.R. (2005): Understanding and designing marketing research. 2nded., London: Thomson Learning. - Wooldridge, J.M. (2006): Introductory econometrics – a modern approach. 3rded., Mason, OH, et al.: Thomson South Western.	4 WLH

Examination: Presentation (ca. 20 minutes) with written outline (max. 5 pages) (50%) and oral exam (ca. 30 minutes) (50%) Examination requirements: Knowledge of tasks and management of marketing research; methods of data collection; methods of data analysis, methods of prognoses.	6 C
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Admission requirements: none	Recommended previous knowledge: Basic knowledge on marketing
Language: English	Person responsible for module: Prof. Dr. Ulrich Hamm
Course frequency: each winter semester; 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. (2013): Marketing research. 11th ed., Hoboken, NJ: Wiley. - Bryman, A. (2008): Social Research Methods. 3rd ed., Oxford: Oxford University Press. - Burns, A.C., Bush, R.F. (2010): Marketing Research. 6th ed., Upper Saddle River, NJ, et al.: Prentice Hall. - Denzin, N.K., Lincoln, Y.S. (2008): Strategies of qualitative inquiry. 3rd ed., Los Angeles, CA, et al.: Sage Publications. - Churchill, G.A., Brown, T.J. (2007): Basic marketing research. 6th ed., Mason, OH: Thomson South Western. - Dillman, D.A., Smyth, J.D., Christian, L.M. (2009): Internet, mail, and mixed-mode surveys. 3rd ed., Hoboken, NJ: Wiley. - Greenbaum, T.L. (2000): Moderating focus groups. A practical guide for group facilitation. Thousand Oaks, CA, et al.: Sage Publications. - Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2009): Multivariate data analysis, 7th ed., Upper Saddle River, NJ, et al.: Prentice Hall. - Malhotra, N.K., Birks, D.F., Wills, P. (2012): Marketing research, 4th ed., Harlow, Pearson. - McQuarrie, F. (1996): The market research toolbox: a concise guide for beginners. Thousand Oaks, CA, et al.: Sage Publications. - Ritchie, J., Lewis, J. (2006): Qualitative research practice: A guide for social science students and researchers. London et al.: Sage Publications. - Shao, A.T., Zhou, K.Z. (2007): Marketing research. 3rd ed., London et al.: Thomson Learning. - Webb, J.R. (2005): Understanding and designing marketing research. 2nd ed., London: Thomson Learning. - Wooldridge, J.M. (2006): Introductory econometrics – a modern approach. 3rd ed., Mason, OH, et al.: Thomson South Western.
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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: (i) Analysis of international markets for organic products; International trade (ii) Import regulations for organic products in different countries; (iii) Import regulations for agricultural products in the EU; (iv) Export market research and analysis from the viewpoint of developing countries; (v) Marketing strategies for the export of organic products; (vi) Marketing measures for the export of organic products; (vii) Case study for export of organic products from a developing country to the EU.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: International markets and marketing for organic products (Lecture, Seminar) <i>Contents:</i> (i) Analysis of international markets for organic products; International trade (ii) Import regulations for organic products in different countries; (iii) Import regulations for agricultural products in the EU; (iv) Export market research and analysis from the viewpoint of developing countries; (v) Marketing strategies for the export of organic products; (vi) Marketing measures for the export of organic products; (vii) Case study for export of organic products from a developing country to the EU Jain, S.C. 2001: International marketing, 6th ed., South Western Thomson Learning, Cincinnati; 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.		4 WLH
Examination: Presentation (ca. 20 minutes) with written outline (max. 5 pages) (50%) and oral exam (approx. 30 minutes) (50%) Examination requirements: Knowledge of tasks and approaches in market research as well as knowledge of data survey methods, prognosis methods and analysis methods.		6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge on marketing	
Language: English	Person responsible for module: Prof. Dr. Ulrich Hamm	
Course frequency: each summer semester; Witzenhausen	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 25		

Additional notes and regulations:**Literature:**

Literature: Development of organic agriculture world wide - Lockeretz, W. (ed.) (2007): Organic farming: An international history. CABI, Wallingford/UK. - Willer, H. and Kilcher, L. (eds.) (2012): The world of organic agriculture. Frick/Switzerland. - <http://www.soel.de> - <http://www.ifoam.org> - <http://www.fao.org> - <http://www.orgprints.org> General political framework for imports of organic products in the EU - <http://eur-lex.europa.eu/en/legis/20110301/chap03.htm> Marketing concepts - Armstrong, G., Kotler, P., Harker, M. and Brennan, R. (2009): Marketing. An Introduction. 9th ed., Pearson Education, Harlow/England (European version) - Doyle, P. and Stern, P. (2006): Marketing management and strategy. 4th ed., FT Prentice Hall, Hemel Hempstead/UK - Jain, S. C. (2001): International marketing management. 6th ed., South Western, Cincinnati, Ohio/USA - Kotler, P. and Keller, K. L. (2006): Marketing management. 12th ed., Prentice-Hall Pearson, Upper Saddle River, New Jersey/USA - Schmid, O., Hamm, U., Richter, T. and Dahlke, A. (2004): A guide to successful organic marketing initiatives. Organic marketing initiatives and rural development vol. 6, Research Institute of Organic Agriculture, Frick/Switzerland - Wilson, R. M. S. and Gilligan, C. (2005): Strategic marketing management. 3rd ed., Butterworth-Heinemann, Oxford/UK - Zander, K., Hamm, U., Freyer, B., Gössinger, K., Hametter, M., Naspetti, S., Padel, S., Stolz, H., Stolze, M. and Zanolli, R. (2010): Farmer Consumer Partnerships – How to successfully communicate the values of organic food consumers. University of Kassel. http://orgprints.org/17852/1/CORE_FCP_Handbook_en_2010.pdf

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 case-study analyses, course participants can pinpoint appropriate economic and social policies and assess their impacts. These qualifications can also be transferred to unfamiliar situations.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Socioeconomics of rural development and food security (Lecture) <i>Contents:</i> 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: Written examination (90 minutes) Examination requirements: Concepts and measurement of hunger and poverty; development theory; classification and evaluation of rural development policies		6 C
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: each winter semester; Göttingen	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 120		
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 rural development economics. Thus, they are able to develop and implement their own research projects.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Quantitative research methods in rural development economics (Lecture) <i>Contents:</i> This module teaches and trains methodological skills for the analysis of micro data in rural 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.	4 WLH
Examination: Written examination (90 minutes) Examination requirements: Use and interpretation of descriptive statistics and standard econometric methods; hypothesis testing; data management; sampling design.	6 C
Admission requirements: Familiarity with the contents of the module "Socioeconomics of Rural Development and Food Security" is assumed.	Recommended previous knowledge: none
Language: English	Person responsible for module: Prof. Dr. Matin Qaim
Course frequency: each summer semester; 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.	Workload: Attendance time: 56 h Self-study time: 124 h
Courses: 1. Microeconomic theory of agricultural production (Lecture) <i>Contents:</i> Consumer theory, producer theory, markets, monopoly situations, risk and uncertainty, economics of technical change, farm household models, sharecropping contracts. 2. Quantitative methods in agricultural business economics (Lecture) <i>Contents:</i> Budgeting, accounting, annual balance sheets, linear programming, finance, investment analysis	2 WLH 2 WLH
Examination: Written examination (120 minutes) Examination requirements: Consumer theory; producer theory; risk; technological progress; farm household models; budgeting and accounting; linear programming; finance; investment analysis	6 C
Admission requirements: none	Recommended previous knowledge: none
Language: English	Person responsible for module: Prof. Dr. Matin Qaim
Course frequency: each winter semester; 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. After successful conclusion of M.Agr.0060 students can not complete M.SIA.E13M	

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 understand the standard methods in the economic analysis and evaluation of development projects and policies. They are able to design and perform cost-benefit analysis as well as project evaluations independently.		Workload: Attendance time: 40 h Self-study time: 140 h
Course: Evaluation of rural development projects and policies (Lecture) <i>Contents:</i> This module teaches standard methods in the economic analysis and evaluation of development projects and policies. It covers the economic and financial assessment of rural development projects (in particular cost-benefit analysis), as well as experimental and quasi-experimental impact evaluation methods. These methods are illustrated with examples and students learn to apply these methods in different exercises.		4 WLH
Examination: Written exam (90 minutes, 70%) and homework (max. 10 pages, 30%) Examination requirements: Cost-benefit analysis; impact evaluation		6 C
Admission requirements: none	Recommended previous knowledge: Knowledge of the content of the module "Socioeconomics of Rural Development and Food Security" and "Econometrics I" is required.	
Language: English	Person responsible for module: Prof. Dr. Matin Qaim	
Course frequency: each summer semester; Göttingen	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 45		
Additional notes and regulations: Literature: Text books, research articles and lecture notes.		

<p>Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.E17M: Management and management accounting</p>	<p>6 C 4 WLH</p>
<p>Learning outcome, core skills: The main aim of the module is to acquaint students with the theory and practice of management and management accounting/control, and the role of environmental, social and governance issues therein. More specifically, the aims of the module are:</p> <ul style="list-style-type: none"> • To provide students with insights into different theoretical perspectives; an understanding of the implicit assumptions held by each perspective as well as the implications of these perspectives for management practice and research; • To provide students with the conceptual and practical skills necessary to effectively understand and critically analyse management/corporate practice; • To provide students with practical experience in and knowledge about “managing and accounting for sustainability”; • To enable students to understand why traditional accounting and accountability do not serve managers and other corporate stakeholders well in the light of increasing demands for social accountability, transparency and social responsibility 	<p>Workload: Attendance time: 60 h Self-study time: 120 h</p>
<p>Course: Management and management accounting (Lecture, Seminar) <i>Contents:</i></p> <ul style="list-style-type: none"> • The fundamentals of management practice, the roles and functions undertaken by managers; • The development and evolution of management theory; • A critical reflection on the wider responsibilities of management (incl. moral decision-making, managing for sustainability); • An introduction to the traditional accounting and accountability theory and practice; key management accounting and control systems and concepts; performance measurement and management; • The developments in new accounting and accountability tools and their role (and limitations) in supporting managerial decision making and increasing transparency on environmental, social and sustainability performance. <p>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.</p>	<p>4 WLH</p>
<p>Examination: Presentation (ca. 15 minutes, 50%) and written examination (90 minutes, 50%) Examination requirements: Students should demonstrate a sound understanding of the management / management accounting concepts and frameworks (written exam). Students are also expected to apply the knowledge acquired in class to a case study company and to present and discuss their findings with others (workshops incl. role play and group work).</p>	<p>6 C</p>

Admission requirements: none	Recommended previous knowledge: none
Language: English	Person responsible for module: Prof. Dr. Christian Herzig
Course frequency: each winter semester; Witzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 35	
Additional notes and regulations: Literature: Lectures and short lectures combined with facilitated group discussion; seminars include case study-based group work and exercises	

Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.E18: Organization of food supply chains		6 C 4 WLH
Learning outcome, core skills: Students are introduced into various issues of the organizational design of food supply chains and agribusiness firms. Students learn to write a seminar paper and they are also able to independently acquire additional knowledge by advanced literature search. The preparation and presentation of selected topics as well as the contribution to oral discussions during seminar sessions will be examined. The comprehensive overview of various organizational theories enables the students to identify and classify complex organizational problems in food supply chains and develop solutions.		Workload: Attendance time: 68 h Self-study time: 112 h
Course: Organization of food supply chains (Seminar) <i>Contents:</i> The module introduces into basic concepts of organizational design in food supply chains and the agribusiness sector. The students write a paper based on the combination of a selected organizational theory and a practical example. The students present their papers and discuss the various organizational issues with high importance for the food and agribusiness sector. Key aspects of the lecture are: - Stakeholder management for farms and agribusiness firms - Efficient organizational design of food supply chains: Contracts, open markets, vertical integration - Competitive strategy and the organizational design of food supply chains - Certification schemes from an organizational perspective - Cooperatives and the organization of food supply chains - Transparency of food supply chains The seminar makes use of various organizational theories and provides students with insights into the practical implications of these theories. Vorlesungsbegleitende Materialien		4 WLH
Examination: Homework (max. 15 pages, 65%) and 2 presentations (about 45 min, 20% and about 15 min, 15%) Examination requirements: Ability to write a paper based on the combination of a selected organizational theory and a practical example, to present the paper, serve as a discussant of the paper of another group and discuss the various organizational issues with high importance for the food and agribusiness sector. 1. Presentation: ca. 45 minutes presenting the contents of the own homework; 2. Presentation: ca. 15 minutes discussing the homework of another group of participants.		6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge food supply chains and agribusiness management	
Language: English	Person responsible for module: Dr. Verena Otter	

Course frequency: each summer semester; Göttingen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 21	
Additional notes and regulations: Students are not allowed to take the module M.Agr.0053 if they have passed M.SIA.E18.	

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).		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Market integration and price transmission I (Lecture) <i>Contents:</i> Theory and empirical analysis of agricultural market integration		4 WLH
Examination: Written examination (60 minutes) Examination requirements: Students are able to explain the economic theory of price transmission and market integration (e.g. how can we explain the prevalence of asymmetric price transmission on agricultural markets), and are able to apply the most important methods of empirical price transmission analysis (in particular the econometric estimation of error correction models).		6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge of econometrics	
Language: English	Person responsible for module: Prof. Dr. Stephan von Cramon-Taubadel	
Course frequency: each summer semester; 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.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 rural sociology in particular. In addition, we want to provide the analytical tools for understanding the processes inherent to these concepts. Beyond that, the course aims at enhancing students' ability to identify different research perspectives and to critically discuss and analyse research strategies and methods.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Rural Sociology (Lecture, Seminar) <i>Contents:</i> As an introduction to rural sociology, this course is designed to give an overview of the sociological concepts of "demographic change", "social structural developments and social problems in rural areas" (deprivation, rural poverty): Lectures outline each of these issues and position them within the context of sociology. We will use seminars to debate key questions raised during lectures and to discuss selected issues based on academic publications.		4 WLH
Examination: Homework (max. 20 pages, 50%) and presentation (approx. 30 minutes, 50%) Examination requirements: Presentation of and critical discussion on concepts and methods in the field of rural- and agricultural sociology.		6 C
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Claudia Neu	
Course frequency: each summer semester; 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.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Global Agricultural Value Chains and Developing Countries (Lecture) <i>Contents:</i> 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: Presentation (ca. 30 minutes, 50%) and written exam (45 minutes, 50%) Examination requirements: Specific knowledge of contract theory, economics of transaction costs and institutions as well as the application of the concepts to current aspects with the context of developing countries. Understanding of the role of institutions regarding the mechanism of agricultural markets.	6 C
Admission requirements: none	Recommended previous knowledge: none
Language: English	Person responsible for module: Prof. Dr. Meike Wollni
Course frequency: each winter semester; 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 structure a scientific article.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Topics in Rural Development Economics I (Lecture) <i>Contents:</i> 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 <ol style="list-style-type: none"> 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 Master students will have to write a summary of a selected journal article. Furthermore, the course should enable them to develop own research questions and study approaches in the field of rural development economics.	4 WLH
Examination: Presentation (approx. 10 minutes, 40%) and homework (max. 4 pages, 60%) Examination requirements: Constructive participation in the discussion during the lectures, which requires the reading of the articles indicated. In both the written and the oral assignments, students are supposed to demonstrate that they are able to identify the most relevant aspects of the articles and to critically evaluate the research questions, the methods and the results of the studies.	6 C
Admission requirements: none	Recommended previous knowledge: none
Language: English	Person responsible for module: Prof. Dr. Meike Wollni
Course frequency:	Duration:

each summer semester; Göttingen	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.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	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Regional Modelling (Lecture, Exercise) <i>Contents:</i> 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. 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	4 WLH
Examination: Presentation (ca. 20 minutes, 50%) with written outline (max. 20 pages, 50%) Examination requirements: Grund- und fortgeschrittene Kenntnisse der Analyse von Regionalen Effekten von Investitionen und der Entwicklung von Regionen.	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge of regional economics and regional statistical data bases
Language: German, English	Person responsible for module: Dr. Holger Bergmann
Course frequency: each winter semester; 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.E31: Strategic management		6 C 4 WLH
Learning outcome, core skills: The aims of the module are: <ul style="list-style-type: none"> • To deepen the students' understanding of the unique aspects of food and agricultural production, processing, distribution, wholesaling and markets and their relationship with strategy; • To familiarise students with the development of strategies within a changing environment, to meet stakeholders' interests; • To provide students with the knowledge and confidence to make strategic business decisions; • To raise critical awareness of strategic decision-making in agrifood organisations. 		Workload: Attendance time: 60 h Self-study time: 120 h
Course: Strategic management (Lecture, Seminar) <i>Contents:</i> <ul style="list-style-type: none"> • Concepts and frameworks used in strategic management; • The importance of values and purpose in defining an organisation's strategic goals; • The analysis of the complex environment of agrifood organisations and how it shapes the strategic behaviour of members of the value chain and an organisation's competitive environment; • A critical review of strategic frameworks (e.g. Porter's five forces, life cycle analysis); • The analysis of the internal environment (value creating activities, capabilities and resources); • An introduction to organisational and business strategies; • The management of stakeholder relations; • The relationship between organisation and strategy; • The management of strategic change and the role of strategic leadership. 		4 WLH
Examination: Presentation (ca. 20 minutes) with hand-out (max. 2 pages) (30%) and written report (max. 30 pages, 70%) Examination requirements: Students should demonstrate a sound understanding of the strategic management concepts and frameworks. Further requirements include: development of a research design to contribute to the development of a scenario analysis; collection and analysis of data in groups.		6 C
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Christian Herzig	
Course frequency: each summer semester; Witzenhausen	Duration: 1 semester[s]	

Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: not limited	
Additional notes and regulations: Lectures and short lectures combined with facilitated group discussion; seminars include research based learning elements such as case studies and research activities involving students (e.g. scenario analysis).	

Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.E33: Responsible and sustainable food business in global contexts		6 C 4 WLH
Learning outcome, core skills: The aims of the module are: <ul style="list-style-type: none"> • To deepen the students' understanding of the role of food business in society and the social responsibility and accountability issues that arise in a global business setting; • To familiarise students with the concepts and frameworks used in responsible and sustainable food business, the development of business principles for responsible food businesses, to meet stakeholders' interests; To provide students with the knowledge and confidence to critically reflect corporate practice; • To raise awareness for different perspectives which provide contrasting and competing ways of making sense of responsible food business practices. 		Workload: Attendance time: 60 h Self-study time: 120 h
Course: Responsible and sustainable food business in global contexts (Lecture, Seminar) <i>Contents:</i> This module explores issues related to responsible and sustainable food business in global contexts. Individual themes include: <ul style="list-style-type: none"> • The process of globalisation and its impact on the agrifood sector; • Corporate social responsibility, governance and accountability; • The role of transparency of products and markets in the context of an increasingly globalised world; • The scope, nature and types of international operations (and their managerial implications); • The management of global supply chains in the agrifood sector; • The management and reporting of environmental and social information in complex organisational settings (such as multinational food businesses); • The contrasting perspectives in social responsibility and accountability of business across borders. 		4 WLH
Examination: Written report (in the form of a learning journal; 60%) and oral presentation (40%)		6 C
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Christian Herzig	
Course frequency: each winter semester; Witzenhausen/Kassel	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	

Maximum number of students:	
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Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.E34: Economic valuation of ecosystem services in developing countries		6 C 4 WLH
Learning outcome, core skills: Students get introduced to the essential concepts and methods of interdisciplinary Ecosystem Services (ES) research. Special emphasis will be put on the integrated and systematic assessment of ES, including their dependencies of and impacts on biodiversity, climate change and development. Students will familiarize themselves with common methods of economic valuation of ES and learn about different examples of practical implementation in developing countries. Within the scope of a presentation and a term paper, students will review and evaluate selected scientific literature, process the findings in an environmental-economic analysis and compile results and derived policy recommendations for better maintenance, sustainable use and integration of ES into development planning.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Economic Valuation of Ecosystem Services in Developing Countries (Seminar) <i>Contents:</i> <ul style="list-style-type: none"> • Integrated and interdisciplinary analysis of ES • Dynamic linkages between ES, biodiversity, climate change and development • Methods and applications of economic valuation of ES • Implementation examples from developing countries • Integration of ES in development planning (entry points to the policy cycle) • Practical application in a case study (literature work, monetary quantification) 		4 WLH
Examination: Homework (max. 20 pages, 70%) and oral presentation (approx. 30 minutes, 30%) Examination requirements: For a given case study students will develop appropriate analytical strategies and implement them with the help of identified scientific literature. Methodological knowledge provided during the lectures will be essential for the case work. Most relevant results will be summarized in a presentation. The compilation of the term paper requires basic techniques of scientific literature research.		6 C
Admission requirements: none	Recommended previous knowledge: M.Agr.0079 Environmental Economics and Policy or similar skills	
Language: English	Person responsible for module: Prof. Dr. Meike Wollni	
Course frequency: each winter semester; Göttingen	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	

Maximum number of students:	
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<p>Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.E35: Institutional ecological economics</p>	<p>6 C 4 WLH</p>
<p>Learning outcome, core skills:</p> <ul style="list-style-type: none"> • Will become familiar with the basic understandings of ecological economics and their relation to the role of institutions and governance • Will become familiar with mainstream and critical approaches related to understandings of collective action and co-production involving higher levels of state authority in relation to regulating social ecological systems • Will be aware of prominent research designs and methods for analyzing the role of institutions in social-ecological systems (SES) • Will be able to illustrate their capacities in the context of discussing and developing research on the role of institutions and governance in empirical settings 	<p>Workload: Attendance time: 56 h Self-study time: 124 h</p>
<p>Course: Institutional Ecological Economics (Lecture, Excursion, Seminar) <i>Contents:</i> The regulation of stocks and flows is core in Ecological Economics in order to maintain economies sustainable. This module engages specifically with regulations containing institutions and governance that shape collective action and co-production in relation to complex adaptive Social-ecological Systems. The module starts out with introducing the ecological economic model of the economy. In a detailed fashion it introduces the perspective of the Bloomington School of Political Economy for the analysis of institutions and governance of social-ecological systems. Core aspects here are the determinants of success and failure in collective action and co-production and related perspectives of co-management, collaborative management, polycentricity, adaptive governance, resilience, etc.. Subsequently, it treats some of the main criticisms of these kinds of approaches before it introduces the principal research designs and methods for analysing the role of institutions and governance in complex-adaptive social-ecological systems. Finally, knowledge is brought together in the context of developing research proposals addressing concrete empirical issues that are introduced by students or the excursion.</p>	<p>4 WLH</p>
<p>Examination: Term Paper (max. 12 pages) and presentation (about 10 minutes) (40%) and Term Paper (max. 17 pages) (60%) Examination requirements:</p> <ul style="list-style-type: none"> • Basic understandings of ecological economics and their relation to the role of institutions and governance • Understanding and reflection of mainstream and critical approaches related to understandings of collective action and co-production involving higher levels of state authority in relation to regulating social ecological systems • Knowledge of prominent research designs and methods for analyzing the role of institutions in social-ecological systems (SES) 	<p>6 C</p>
<p>Admission requirements: none</p>	<p>Recommended previous knowledge:</p>

	Background in agricultural and environmental policy and economics
Language: English	Person responsible for module: Prof.Dr. Andreas Thiel
Course frequency: each summer semester; Witzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: not limited	
<p>Additional notes and regulations:</p> <p>Further examination prerequisites:</p> <p>Participation in the excursion and its preparation and evaluation</p> <p>Literature:</p> <p>Ostrom, E., 2005. Understanding institutional diversity. Princeton Univ. Press, Princeton, NJ.; further seminar papers will be circulated to students</p>	

Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.E36: Institutions and the food system	6 C 4 WLH
Learning outcome, core skills: <ul style="list-style-type: none"> • Will become familiar with the role of institutions and governance in the food system • Will be familiar with public choice and political science approaches to the analysis of constitutions and policies and their change • Will be familiar with theories of decentral and central institutional change in the traditions of economics, political science and sociology • Will apply this conceptual knowledge concerning the role, performance and change of institutions and governance of a variety of aspects of food systems in different countries in and outside Europe • Will review global drivers of change of food and agricultural production systems 	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Institutions and the food system (Lecture, Excursion, Seminar) <i>Contents:</i> Institutions are core elements structuring economic exchange in the food system. The course starts out with a discussion of what institutions are and what roles a stratified, multi-disciplinary concept of institutions has in food and agricultural systems and their change. Approaches will cover the study of institutions in classical and new institutional economics, in evolutionary economics, in economic sociology and in political sciences. Subsequently, discussions will be organized along public choice and constructivist approaches to understanding centrally driven institutional change on the one hand and economic and constructivist approaches to understanding decentral institutional change on the other. Discussions of the role of institutions for performance of the food and agricultural sectors and their change will be illustrated through ample recourse to examples drawn from studies of the food and agricultural production systems in and outside of Europe. That way, principal drivers of the change of food systems will be reviewed. In this regard, as far as possible examples will be drawn from one particular cultural, national or regional context. Ending the module, potentials and limits of researching the role of institutions in the food and agricultural sectors will be evaluated and corresponding research designs will be discussed.	4 WLH
Examination: Oral exam (about 25 min., 60%) and term paper (max. 15 pages, 40%) Examination requirements: <ul style="list-style-type: none"> • Understanding of the role of institutions and governance in the food system • Knowledge of public choice and political science approaches to the analysis of constitutions and policies and their change • Knowledge of theories of decentral and central institutional change in the traditions of economics, political science and sociology • Application of conceptual knowledge concerning the role, performance and change of institutions and governance to a variety of aspects of food systems in different countries in and outside Europe • Knowledge of global drivers of change of food and agricultural production systems 	6 C

Admission requirements: none	Recommended previous knowledge: Background in agricultural and environmental policy and economics
Language: English	Person responsible for module: Prof. Dr. Andreas Thiel
Course frequency: each winter semester; Witzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: not limited	
Additional notes and regulations: Further examination prerequisites: Participation in the excursion/ thematic day and its preparation/ evaluation Literature: Literature and seminar papers will be circulated to students at the beginning of term	

Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.E37: Agricultural policy analysis	6 C 6 WLH
Learning outcome, core skills: <ul style="list-style-type: none"> • Students get an overview on EU institutions and the history of the EU's common agricultural policy (CAP) • Students learn different theories and methods for the analysis of agricultural policies • Students learn how to analyse different policy measures and instruments and evaluate them 	Workload: Attendance time: 84 h Self-study time: 96 h
Course: Agricultural policy analysis (Lecture, Exercise) <i>Contents:</i> 1. Introduction into Economic Policy and Economic Theory Definition of agricultural policy, Analytical framework of economic analysis, Objectives, measures, institutions, The coordination process, a model for the economic process 2. Market Failure Public Goods & externalities, Market power & monopolistic behavior, State intervention due to Instability of markets, State intervention & government failure, principal-agent theory 3. The European Union – A short introduction History of the EU, the importance of the agricultural sector in the EU, institutions and political structure of the EU, decision-process in the EU, 4. The EU's common agricultural policy: Description and Analysis The history and analysis of the Common Agricultural Policy (CAP) of the EU 5. Introduction into Environmental policy Objectives, measures and analysis and interaction with agricultural policy Literatur: B. Hill (2013): Understanding the Common Agricultural Policy, Earthscan A. Cunha & A. Swinbank (2011): An Inside View of the CAP Reform Process, Oxford University Press A. Oskam, G. Meester & H. Silvis (2011): EU policy for agriculture, food and rural areas, Wageningen, University Press Swinnen, Johan F.M. (2008): The Perfect Storm – the political Economy of the Fischler Reforms of the Common Agricultural Policy, Centre for European Policy Studies, Brussels Krugman, P.R., M. Obstfeld & M.J. Melitz (2011), International Economics (9.Ed.), Pearson	6 WLH
Examination: Written examination (90 minutes)	6 C

Examination requirements:	
<ul style="list-style-type: none"> • Fundamental knowledge of EU institutions and the EU's common agricultural Policy (CAP) • Knowledge of different theories and methods to analyze agricultural policies • Analysis of different measures and instruments of the EU's common agricultural policy (CAP) 	
Admission requirements: none	Recommended previous knowledge: Microeconomics
Language: English	Person responsible for module: Dr. Sebastian Lakner
Course frequency: each winter semester; Göttingen	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.E38: Scientific writing in Agricultural Economics	6 C 4 WLH
Learning outcome, core skills: Students have a deep understanding of the following aspects of scientific writing and good academic practice and are prepared to apply them appropriately <ul style="list-style-type: none"> • Scientific writing and structuring • Literature search • Good academic practice, citation and avoidance of plagiarism • Use of citation software • Structuring and preparation of primary and secondary datasets • Result illustration • Presentation of academic content 	Workload: Attendance time: 48 h Self-study time: 132 h
Course: Scientific writing in Agricultural Economics (Lecture, Exercise) <i>Contents:</i> The lecture comprises the following three main topics: 1) Structure and writing: An introduction is given on structuring seminar-papers and master-theses, literature search in various literature databases, formulating precise research-questions/-objectives and research -motivation. Thereby, the basic principles of writing referring to Orwell (year) and other standard literature are covered. Students practice structuring and writing during different practical assignments like creating a commented outline of a paper, a reference list or writing an introduction and conclusion for a seminar-paper or a thesis. 2) Citation and plagiarism: An introduction is given on the rules of “good academic practice” according to the standards of the German Research Association (DFG) and the Georg-August-University. In addition to detailed explanations about the appropriate use of references and correct citing, the topic of plagiarism and intellectual property rights is addressed in detail including concrete examples. Furthermore, software applications such as Endnote, Mendeley or Citavi are introduced. Students practice the use of references and citing during different practical assignments; the first about creating text chapters including citations from various different sources manually, the second by using software applications. 3) Data: An introduction is given on structuring and preparation of primary and secondary data sets using corresponding statistics software like SPSS and R as well as the structuring of methods and results chapters. Formal requirements and good practice for the illustration of results in written text, tables and figures are presented. Students practice data preparation and results illustration during different practical assignments like structuring and preparing a primary and secondary datasets, creating a methods & data chapter, preparing tables and figures and embed them into a self-written results chapter. 4) Presentation: An introduction is given on the design and structure of scientific presentations. In detail, common practices for presenting scientific contents are	4 WLH

<p>explained and the typical corporate design of the Georg-August-University is introduced. As an assignment students prepare a presentation about scientific contents to practice.</p> <p>Literatur: Theisen, M.R. (2011): Wissenschaftliches Arbeiten (15.A), München, Vahlen</p>	
<p>Examination: Written assignments (9 each max. 3 pages), 2 data sheets and 1 presentation-file (max. 15 slides)</p> <p>Examination requirements: Students have to prepare weekly assignments and have to upload the particular documents on a weekly basis.</p> <p>Required contents:</p> <ul style="list-style-type: none"> • Annotated outline • Reference list • Introduction • Literature review • Methods chapter • Primary data sheet • Secondary data sheet • Results presented in tables and figures • Results chapter • Conclusion • Presentation 	6 C
<p>Admission requirements: Enrolled in SIA study-program with focus on International Agribusiness and Rural Development Economics</p>	<p>Recommended previous knowledge: none</p>
<p>Language: English</p>	<p>Person responsible for module: Dr. agr. sc. Verena Otter Dr. Sebastian Lakner</p>
<p>Course frequency: each winter semester; Göttingen</p>	<p>Duration: 1 semester[s]</p>
<p>Number of repeat examinations permitted: twice</p>	<p>Recommended semester:</p>
<p>Maximum number of students: 30</p>	

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.		Workload: Attendance time: 28 h Self-study time: 152 h
Course: Management of (sub-)tropical landuse systems (Block course, Lecture) <i>Contents:</i> Witzenhausen: Plant-animal interactions, diet selection and nutritional wisdom, impact of grazing on pastures; statistical approaches to measure and cope with short-distance variability in crop growth; measurement techniques for nutrient fluxes in different 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. 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.		
Examination: Written examination (90 minutes) Examination requirements: Knowledge about: the ability of animals to select feed; animal-plant interactions; effects of grazing on grasslands and pastures; statistical methods and measurements material flows in various agroecosystems; landuse management; incomes in different operating systems; soil conservation measures for smallholders and soil conservation systems; potential use of waste products to increase productivity and the significance of agrobiodiversity.		6 C
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	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Food quality and organic food processing (Lecture) <i>Contents:</i> 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 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	4 WLH
Examination: Presentation (ca. 20 minutes, 50%) and project work (max. 20 pages, 50%) Examination requirements: Knowledge about the quality of food in terms of concepts and criteria with focus on organic production. Insides in processing and management of organic food according the guidelines, standards and practices. Basic knowledge in the concepts of HACCP and QACCP.	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowlegde in chemistry

Language: English	Person responsible for module: Dr. Nicolaas Busscher
Course frequency: each summer semester; Witzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 40	
Additional notes and regulations:	
Literature:	
<p>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</p>	

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.	Workload: Attendance time: 40 h Self-study time: 140 h
Course: Exercise on the quality of tropical and subtropical products (Exercise) <i>Contents:</i> 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. Belitz, Grosch, Schieberle 2004: Food Chemistry, 3rd rev. ed., Springer Berlin.	4 WLH
Examination: Project work (max. 40 pages) Examination prerequisites: Participation in all introductory meetings and at all experimental laboratory work Examination requirements: Knowledge about quality parameter of wheat, rice and starch containing products, potatoes, fruits and vegetables. Knowledge about starch and protein quality of baking wheat, sensoric properties of bread and bakery products, rheological properties of rice flour and other starch containing products, consumer acceptance of potatoes, marketing of fruits and vegetables, texture analysis, intrinsic quality parameter of fruits and vegetables and sensoric properties of fruits and vegetables.	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge on agriculture production and chemistry
Language: English	Person responsible for module: Dr. Inga Smit
Course frequency: each winter semester; 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 insights 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 contexts	Workload: Attendance time: 119 h Self-study time: 61 h
Course: International land use systems research - an interdisciplinary study tour (Lecture, Excursion, Seminar) <i>Contents:</i> 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 on 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: Oral exam (ca. 20 minutes, 50%) and oral seminar presentation (ca. 20 minutes) with written outline (max. 4 pages) (50%) Examination prerequisites: Day protocol of the excursion (max 2 pages) Examination requirements: The module and excursion contents are reviewed in an oral exam whereby two examiners are putting forward questions to the below topics (10 minutes each): A) Aspects of soil, plant, crop and forestry sciences pertaining to the regions and enterprises/farms visited during the excursion. B) Aspects of animal husbandry and socio-economic issues pertaining to the regions and enterprises/farms visited during the excursion.	6 C
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: Winter semester, every second year, alternating with Module I02; Witzzenhausen	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.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.	Workload: Attendance time: 60 h Self-study time: 120 h
Course: Sustainabe nutrition (Lecture, Excursion) <i>Contents:</i> <ul style="list-style-type: none"> • 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: Presentation (ca. 15 minutes, 50%) with written outline (max. 15 pages, 50%) Examination requirements: Kenntnis von Ernährungsstilen und Lebensmittelqualität (in ausgewählten Ländern) Kenntnis von Methoden zur Erfassung von umweltrelevanten Parametern entlang der Lebensmittelkette (von der Landwirtschaft bis zum Verbraucher) Kenntnis rechtlicher Vorgaben zur Kennzeichnung von Lebensmitteln sowie Vorgaben zur Verarbeitung von nachhaltig produzierten Lebensmitteln und Marketing	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge on biochemistry, statistics and environmental issues
Language: English	Person responsible for module: Prof. Dr. Angelika Ploeger
Course frequency: each winter semester; 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: Students have a detailed understanding of the concepts of statistical modelling, regression analyses and analyses of variance. They are familiar with the basic concepts of 'linear models', 'generalized linear models' and 'non-parametric estimation procedures', which now belong to the standard methods in applied statistics. Students are able to practically apply these methods and carry out statistical analyses in soil, plant and animal sciences using the statistical software R. They are able to apply the acquired skills in the analysis of their own MSc (and PhD) datasets.	Workload: Attendance time: 84 h Self-study time: 96 h
Course: Applied Statistical Modelling <i>Contents:</i> Course Part I: Statistical analyses in soil and plant sciences (Lecture, Internship) <ul style="list-style-type: none"> • Review of statistical concepts (boxplots, QQ plots, distributions, classical tests, correlations, analyses of count and proportion data) • Experimental design: populations and samples • Introduction to the software R • Regression (multiple linear, polynomic, non-linear) • Statistical modelling, model types and model simplifications • Transformations Course Part II: Statistical analyses in animal sciences (Lecture, computer practical) <ul style="list-style-type: none"> • General aspects of hypotheses formulation and testing • Data distribution (normal, categorical, Poisson) and model selection criteria • Analyses of variance, post-hoc tests • Non-parametric test procedures • Mixed model procedures (linear, non-linear) • Formulation of statistical models and basic programming in R 	4 WLH
Examination: Written examination (90 minutes) Examination requirements: One written exam with two parts. Knowledge of basic statistical terms and approaches, linear and generalized linear models and non-parametric estimation procedures. Ability to apply the methods and models to real data by using the software package R.	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge (B.Sc. level) of applied statistics
Language: English	Person responsible for module: Prof. Dr. Bernard Ludwig
Course frequency: each summer semester; Witzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted:	Recommended semester:

twice	
Maximum number of students: 25	

Additional notes and regulations:

Literature:

Lecture notes

Crawley, M.J. 2012. The R Book, Wiley

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

Field, A., Miles, J., Field, Z. 2012. Discovering Statistics using R, SAGE

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

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

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 acquired knowledge to problems in the field or in economic or social sciences. Students are also able to present results and discuss them on the basis of their knowledge.		Workload: Attendance time: 0 h Self-study time: 180 h
Course: Free project <i>Contents:</i> 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 stored result.		
Examination: Project work (roughly 15 pages or 4000 words) Examination requirements: In agreement with the instructor. Generally project work (roughly 15 pages or 4000 words).		6 C
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: each 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 <ul style="list-style-type: none"> • 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 	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Sustainable International Agriculture: basic principles and approaches (Lecture) <i>Contents:</i> 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 examination (90 minutes) Examination requirements: Barkmann (Soc-Econ): general definitions and indicators for sustainable development; strong and weak sustainability; the substitution-paradigm and its limits; carrying capacity and critical natural capital; economic growth models; economic approaches for the quantification of sustainable development; SNA / green accounting; cost-benefit analysis. Bürkert (Nat Sci): concepts of sustainability; agroforestry systems; shifting cultivation; effects on soil fertility and sustainability. NN (Soc-Econ): dimensions of social sustainability; utilization of communal resources; McDonaldisation of agriculture; agriculture and social justice. Ludwig (Nat Sci): soils: textures; minerals; types; organic matter; functions and forms; N-dynamics. Water erosion; wind erosion: processes and rates; counteracting measures. Emissions of greenhouse gases (GHG) and ammonia: sources and processes; options of minimizing emissions. Möller (Soc-Econ): multi-functionality and farm-management; realization of sustainability concepts in the farm enterprise; agro-ecological systems and sustainable	6 C

farm management; indicators for enterprise sustainability; controlling of sustainability; profitability of organic farming; collective forms of farming. Schlecht (Nat Sci): sustainability of livestock husbandry; environmental effects of animal keeping and their avoidance: a) GHG emissions and environmental pollution from animal holdings; b) overgrazing.	
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Admission requirements: none	Recommended previous knowledge: none
Language: English	Person responsible for module: Prof. Dr. Eva Schlecht
Course frequency: each winter semester; 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.I14M: GIS and remote sensing in agriculture	6 C 4 WLH
<p>Learning outcome, core skills: GIS:</p> <p>A broad overview of basic GIS functions and related background knowledge should enable students to explore GIS-Software for relevant commands and prepare functional strategies for spatial data management and analysis. Lecture and exercise examples have predominantly agricultural reference.</p> <p>Remote Sensing</p> <p>The lecture will introduce physical principles (reflectance, transmittance, and absorption), sensor techniques (passive and active sensors, satellites, field spectrometer) and methods of analysis (calibration, validation) in remote sensing applications. This technical framework is presented using agricultural examples, as e.g. the generation of maps for crop yield and protein, assessment of species composition in mixed vegetation (e.g. grassland), like legume content for a calculation of residual nitrogen and crop rotation effects.</p>	<p>Workload: Attendance time: 56 h Self-study time: 124 h</p>
<p>Courses:</p> <p>1. GIS (Lecture) <i>Contents:</i> The course gives an introduction to Geographical Information Systems (GIS). Starting from geodetical background information, a wide range of different GIS- methods and - functions are presented using agricultural examples (e.g. data import, georeferencing, aggregation, (re)classification, interpolation, overlays and image analysis). The students have the opportunity to carry out exercises on the computer themselves for some important GIS-procedures. A special focus is given on data capturing using maps and field data survey with GPS as well as the spatial analysis of site conditions. Finally a particular view on GIS in organic farm management and Precision Farming is given.</p> <p>2. Remote sensing in agriculture (Lecture) <i>Contents:</i> The lecture will introduce physical principles (reflectance, transmittance, and absorption), sensor techniques (passive and active sensors, satellites, field spectrometer) and methods of analysis (calibration, validation) in remote sensing applications. This technical framework is presented using agricultural examples, as e.g. the generation of maps for crop yield and protein, assessment of species composition in mixed vegetation (e.g. grassland), like legume content for a calculation of residual nitrogen and crop rotation effects.</p>	<p>2 WLH</p> <p>2 WLH</p>
<p>Examination: Oral examination (approx. 30 minutes) Examination requirements:</p>	6 C

Knowledge about basic GIS functions and the preparations of functional strategies for spatial data management. Knowledge of physical principles, methods of analysis and sensor techniques.	
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Admission requirements: none	Recommended previous knowledge: none
Language: English	Person responsible for module: Dr. Thomas Möckel
Course frequency: each winter semester; Witzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 20	

<p>Additional notes and regulations:</p> <p>Literature:</p> <p>Principles of Geographical Information Systems by Peter A. Burrough and Rachael A. McDonnell (2015)</p> <p>Introduction to Remote Sensing by James B. Campbell and Randolph H. Wynne (2011)</p>
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<p>Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.I15: Analysis and management of social-ecological systems in agricultural landscapes</p>	<p>6 C 4 WLH</p>
<p>Learning outcome, core skills: After successfully completing this module students should:</p> <ul style="list-style-type: none"> • understand the main principles of of landscape sustainability science • be able to systematically analyse landscape change processes from a social-ecological perspective • have developed a thorough understanding of the role of human perceptions and values as connected to landscape change • have gained a basic working knowledge on social-ecological approaches to investigating landscape change (particularly interviews) <p>This module contributes to the following skills:</p> <ul style="list-style-type: none"> • analytical thinking • sound reasoning • constructively dealing with scientific literature • group work techniques (organization of working schedule, team work) • data acquisition and analysis, selection and presentation of data • presentation skills and communication of main research results 	<p>Workload: Attendance time: 56 h Self-study time: 124 h</p>
<p>Course: Analysis and management of social-ecological systems in agricultural landscapes (Lecture, Seminar) <i>Contents:</i> This project module highlights the interdisciplinary field of „landscape sustainability science“ and demonstrates its applications for analysis and management of agricultural landscapes. It will discuss current drivers of agricultural landscape change, such as intensification, urbanization or land abandonment. The course will then discuss the multiple social values of these landscapes. Accompanied by comprehensive introduction and supervision, students will form small project groups to carry out an empirical assessment (through simple methods such as photo voice, freelisting, social media analysis, participatory GIS) to reveal values of and/or conflicts around agricultural landscapes in an area nearby Witzenhausen or Göttingen. Key concepts used are social-ecological production landscapes, social values and cultural ecosystem services.</p>	<p>4 WLH</p>
<p>Examination: Group reports (max. 20 pages; 70%) and group presentations (about 30 minutes; 30%) Examination requirements: Knowledge of the main principles of of landscape sustainability science and understanding of the role of human perceptions and values as connected to landscape change.</p>	<p>6 C</p>
<p>Admission requirements: none</p>	<p>Recommended previous knowledge: none</p>

Language: English	Person responsible for module: Prof. Dr. Tobias Plieninger
Course frequency: each winter semesterWitzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: not limited	
Additional notes and regulations: Literature: Course materials to be provided	

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	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Ecology and agroecosystems (Lecture, Seminar) <i>Contents:</i> 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: Oral exam (approx. 15 minutes, 60%) and presentation (approx. 20 minutes, 40%) Examination requirements: Students should be able to explain the function and biophysical limits of (sub)tropical agro-pastoral land use systems, to justify the need to establish interdisciplinary approaches and to describe current research methods in land use systems analysis.	6 C
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: each summer semester; 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.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.		Workload: Attendance time: 60 h Self-study time: 120 h
Course: Ecological soil microbiology (Lecture, Excursion, Seminar) <i>Contents:</i> 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: Project work (max. 12 pages) Examination prerequisites: 2 presentations (each ca. 20 minutes) Examination requirements: Kenntnisse der zeitgemäßen Methoden der Bodenmikrobiologie zur Bestimmung der Aktivität, der Gemeinschaftsstruktur von Bodenmikroorganismen und deren Biomasse, sowie Wissen über Bodenfruchtbarkeit und Bodenqualität und deren Bestimmung.		6 C
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: each winter semester; 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: Based on knowledge of principles of plant nutrition the students are able to find solutions for specific problems with regard to plant nutrition in the tropics.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Plant nutrition in the tropics and subtropics (Lecture, Practical course) <i>Contents:</i> Lecture: Dynamics and availability of nutrients in acid, highly weathered soils, alkaline soils, and paddy soils. Nutrient deficiency and toxicity in plants. Problems with Al-toxicity and salinity. N-fertilization, N ₂ -fixation. Nutrient cycling in special cropping systems like shifting cultivation, intercropping, agroforestry, paddy rice. Laboratory course: Investigations about P availability, P uptake, and P efficiency mechanisms. Performing a complete experiment including the necessary chemical analyses and data evaluations.	4 WLH
Examination: Oral examination (approx. 20 minutes) Examination prerequisites: Oral exam (20 minutes) Examination requirements: Knowledge of basic principles of plant nutrition and tropical plant nutrition in particular. Knowledge of cropping systems and their influence on soil fertility and nutrient cycles. Special aspects of plant nutrition in paddy rice.	6 C
Admission requirements: Prerequisite for admission to examination is the attendance at the laboratory course.	Recommended previous knowledge: Basic knowledge in soil and plant sciences
Language: English	Person responsible for module: Dr. Bernd Steingrobe
Course frequency: each winter semester; 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.	

Laboratory course: blocked in a week at the beginning of the semester break.

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.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Organic cropping systems under temperate and (sub)tropical conditions (Lecture, Excursion, Seminar) <i>Contents:</i> 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: Oral exam (ca. 15 minutes, 75%) and presentation (15 minutes, 25%) Examination requirements: Each individual test has to be passed. Kenntnisse von ökologischen Pflanzenanbausystemen, vom Management von Nährstoffkreisläufsystemen, von gezielter Nutzung von Leguminosen für die standortgerechte N-Versorgung sowie Kenntnisse über die Grundlagen der P-Verfügbarkeit, der P-Rückführung und der Nutzung von Rohphosphaten. Wissen über die Möglichkeiten der P-Versorgung in verschiedenen Anbausystemen, über die Unterschiede und Probleme bei den Ökostandards in EU, Japan, Australien und USA sowie Wissen über den Beitrag der Tierhaltung zur Nachhaltigkeit ökologischer Anbausysteme.	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge in plant, soil and animal sciences
Language: English	Person responsible for module: Prof. Dr. Andreas Bürkert
Course frequency: each winter semester; Witzenhausen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students:	

not limited	
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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 understand soil - water - plant relations and basic soil physical, soil hydrological and soil (micro)biological processes. They are able to critically evaluate soil and water problems and limits of soils as a natural resource and judge soil management options for sustainable land use.		Workload: Attendance time: 60 h Self-study time: 120 h
Course: Soil and water (Lecture, Exercise) <i>Contents:</i> Fundamental physical and hydrological processes; Soil water storage and transport; Physicochemical properties, Soil water in relation to mechanical processes (e.g. workability, deformation, soil strength); Soil – Water - Plant Relations (root water uptake, root growth, transpiration, soil-plant-atmosphere continuum); Field water cycle and management effects (e.g. mulching, tillage, irrigation); Irrigation principles and practices; Soil degradation and conservation (e.g. soil salinisation, compaction, acidification, contamination); Edaphon and its functions; Mycorrhiza; Rhizobia; Methods in soil biology; Indicators of soil fertility; Turnover of the soil microbial biomass; Habitat protection and ecotoxicology; Soil biology and fertility of tropical soils.		4 WLH
Examination: Oral examination (approx. 30 minutes) Examination requirements: Kenntnisse über die Bodendegradation und Bodenerhaltung, das Wassermanagement in nationalem und internationalem Kontext, die Bodenqualität, Prozesse und Funktionen sowie über die Wassergewinnung und –verteilung, Flächenbewässerung, Beregnung, Tropfbewässerung.		6 C
Admission requirements: none	Recommended previous knowledge: Fundamentals of soil science; Module Soil and Plant Science or equivalent.	
Language: English	Person responsible for module: Peth, Stephan, Prof. Dr.	
Course frequency: each summer semester; Witzenhausen	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: not limited		
Additional notes and regulations: Literature: N.C. Brady & R. R. Weil, 2008. The Nature and Properties of Soils. 14th ed., Pearson International Press; Hillel, D. (1998): Environmental Soil Physics. Academic Press; Jury, W. & Horton, R. (2004): Soil Physics.		

Wiley & Sons; Lal, R. & Shukla, M.K. (2004): Principles of Soil Physics, Marcel Dekker Inc.; Ehlers, W. & Goss, M. (2003): Water Dynamics in Plant Production, CABI Publishing; Kirkham, M. B. (2005): Principles of Soil and Plant Water Relations, Elsevier; Coyne, M. S. (1999). Soil microbiology: an exploratory approach, Thomson Press; Paul, E.A., Clark, F.E. (1996). Soil microbiology and biochemistry, 2nd ed., New York Academic Press.

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.	Workload: Attendance time: 60 h Self-study time: 120 h
Course: Soil and plant science (Lecture, Seminar) <i>Contents:</i> Influence of soil formation processes on physical properties (texture, soil water, pore space), chemical properties (buffering, exchange capacity, nutrients), and biological properties (organic matter, edaphon), soil formation and classification. Nutrient availability and and nutrient mobilization under conventional and organic agricultural conditions. Major and minor nutrients and food quality. Plant breeding goals for different agricultural systems. Plant morphology, genetics and breeding: principles of plant domestication and use, characterization and evaluation, use of genetic resources in plant breeding, genetic basis for plant breeding Genetics of host-parasite interactions, epidemiology and plant defence. Insect physiology and ecology. Spezifische allgemeine und wissenschaftliche Artikel, die sich mit dem Zielland der Exkursion befassen werden über eine E-Learning Plattform zur Verfügung gestellt	4 WLH
Examination: Written exam (120 minutes) or oral exam (ca. 20 minutes) Examination requirements: 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	6 C
Admission requirements: none	Recommended previous knowledge: none
Language: English	Person responsible for module: Dr. Helmut Saucke
Course frequency:	Duration:

each winter semester; Witzenhausen	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		Workload: Attendance time: 84 h Self-study time: 96 h
Course: Pests and diseases of tropical crops (Lecture, Seminar) <i>Contents:</i> 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. Vorlesungsbasierte Literatur		6 WLH
Examination: Written exam (60 minutes, 67%) and presentation (ca. 20 minutes, 33%) Examination prerequisites: Seminar speech Examination requirements: Knowledge on the most important pests and diseases of tropical and subtropical crops; chemical and biological control options, phytosanitary approaches, and sustainable cropping systems for tropical crops.		6 C
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:	Duration:	

each summer semester; Göttingen	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.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.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Tropical agro-ecosystem functions (Lecture, Seminar) <i>Contents:</i> 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: Presentation (ca. 30 minutes, 50%) and oral exam (ca. 30 minutes, 50%) Examination requirements: Knowledge about the processes of soil degradation and the measures taken to control or prevent in selected land use systems in the tropics and subtropics; knowledge of ecosystem functions and their synthesis in agronomic concepts to adapt to unfavorable climatic and pedological conditions in the tropics and subtropics.		6 C
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: each summer semester; 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.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.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Agrobiodiversity and plant genetic resources in the tropics (Lecture, Seminar) <i>Contents:</i> 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: Oral exam (about 15 minutes, 60%) and presentation (about 20 minutes, 40%) Examination requirements: Students should be able to understand the role of agrobiodiversity in tropical agroecosystems, to present basic approaches to functionally analyse biodiversity and to discuss the need of and strategies for <i>in</i> and <i>ex situ</i> conservation of genetic resources.	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge in plant and soil sciences
Language: English	Person responsible for module: Prof. Dr. Gunter Backes
Course frequency: each winter semester; 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. Smithsonian	

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.		Workload: Attendance time: 60 h Self-study time: 120 h
Course: Methods and advances in plant protection (Lecture, Excursion, Exercise) <i>Contents:</i> 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: Written exam (120 minutes) or oral exam (ca. 20 minutes) (70%) and work reports (max. 3 pages) or seminar speech (ca. 10 minutes) (30%) Examination requirements: Advanced knowledge in plant protection (Entomology and Pathology) Methodology and evaluation methods in plant protection based on case studies.		6 C
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: each winter semester; 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, Macmillan 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: <ul style="list-style-type: none"> • Gain knowledge of the features of different crop modelling concepts and model families and learn to use the Agricultural Production Systems Simulator (APSIM) • Understand the basic principles of production ecology and agro-ecosystems modelling • Apply crop modelling to typical agronomic questions related to risk management strategies 	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Crop modelling for risk management (Lecture, Seminar) <i>Contents:</i> Process-based modelling has evolved to a key methodology to investigate resource dynamics (water, nitrogen) and crop productivity in diverse agro-ecosystems. In the lecture one widely applied model – the agricultural production system simulator (APSIM) – will be used to introduce the students to the concepts (potential, water-limited, and nitrogen-limited production) and application options of agro-ecosystem modelling. In the first part of the lecture students will learn along guided exercises to set up different simulations (single season cropping, rotation, intercropping, climate change effects etc.). In the second part selected case studies are presented, which address typical agronomy questions (fertilizer management, closing yield gap, identifying suitable crop rotations). Students will use the model to explore the processes, which determine the observed results in the fields from the case studies. Finally, in the last part students select a topic of interest for an own simulation experiment. Results will be presented by each participant in the last meeting and handed in as a report.	4 WLH
Examination: Presentation (about 30 min, 30%) and Homework (max. 20 pages, 70%) Examination requirements: <ul style="list-style-type: none"> • Knowledge of the basic principles of agro-ecosystems modelling • Working knowledge of using APSIM to investigate typical agronomic questions • Knowledge of analyzing simulated data and present it 	6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge (B.Sc. level) of plant sciences
Language: English	Person responsible for module: Prof. Dr. Reimund P. Rötter
Course frequency: each summer semester; Göttingen	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 20	

Additional notes and regulations:

Literature:

Van Keulen & Wolf, eds. 1986. Modelling of agricultural production: weather, soils and crops. Simulation Monographs, Wageningen, The Netherlands

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 the statistical software R for a study and description of ecological processes in arable soils. Based on their understanding of soil nutrient dynamics they are able to evaluate and critically assess the significance of long-term and laboratory experiments for studying C, N and P dynamics and to consider all influencing variables.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Nutrient dynamics: long-term experiments and modelling (Lecture, Exercise) Contents: <ul style="list-style-type: none"> • Description of the dynamics of C, N and P (forms, transformations and availability) in arable soils • Presentation of the results of existing long-term experiments with emphasis on the variables and variants influencing these results • Introduction to modelling, including statistical modelling • Application of the statistical software R for a description of C dynamics (linear and non-linear regression) • Modelling of the turnover of soil organic matter and soil nitrogen using the models "Rothamsted Carbon Model" and "DNDC" 		4 WLH
Examination: Oral examination (approx. 30 minutes) Examination requirements: Knowledge of biological and chemical processes in soils and of the C and N dynamics. Basic knowledge of modelling, including statistical modelling, and the structure of the Rothamsted Carbon Model and the DNDC model. Verständnis bodenkundlicher Prozesse, insbesondere der C- und N-Formen und Kreisläufe, Grundverständnis der Modellierung (einschließlich statistischer Modellierung), Kenntnisse der Modelle Rothamsted Carbon Model und DNDC.		6 C
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: each summer semester; 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.		Workload: Attendance time: 60 h Self-study time: 120 h
Course: Experimental Techniques in Tropical Agronomy (Lecture, Exercise, Seminar) <i>Contents:</i> Principles and practice of vegetative and generative propagation techniques in the greenhouse of the division. Introduction to statistical experimental design and analysis of greenhouse experiments. Theory and practice of eco-physiological measurement methods for the water balance and status, as well as gas exchange / photosynthesis rates in tropical crop plants Literatur Kopien von Powerpoint-Präsentationen, ausgewählte Kapitel von Lehrbüchern.		4 WLH
Examination: Presentation (ca. 30 minutes, 50%) and protocol (max. 20 pages, 50%) Examination requirements: Knowledge of botanical, ecological and agronomic facts of the presented crop plants; scientifically correct planning, implementation, evaluation, description and discussion of the results of a greenhouse experiment; limits and possibilities of interpretation of measurement methods for describing the physiological state variables of tropical crop plants.		6 C
Admission requirements: M.SIA.P12	Recommended previous knowledge: Basic knowledge (B.Sc. level) of plant sciences	
Language: English	Person responsible for module: Dr. sc. agr. Ronald Franz Kühne	
Course frequency: each summer semester; 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

<p>Georg-August-Universität Göttingen Universität Kassel/Witzenhausen Module M.SIA.P20: Plant nematology</p>	<p>6 C 4 WLH</p>
<p>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</p> <p>Students having taken this module will be able to detect nematode damage and identify plant-parasitic nematodes to genus.</p>	<p>Workload: Attendance time: 60 h Self-study time: 120 h</p>
<p>Course: Plant Nematology (Lecture, Exercise, Seminar) <i>Contents:</i> 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)</p> <p>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)</p> <p>Nematode identification: fishing of nematodes, fixation, mounting, permanent slides, identification keys, preparation of vulval cones (cyst nematodes) and perineums (root-knot nematodes)</p> <p>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)</p>	<p>4 WLH</p>
<p>Examination: Oral exam (ca. 20 minutes) or written exam (120 minutes) (50%) and presentation (ca. 15 minutes, 50%) Examination requirements: General and special biology of nematodes, especially plant parasitic nematodes. Methodologies in nematology and identification, general management of nematodes.</p>	<p>6 C</p>
<p>Admission requirements: none</p>	<p>Recommended previous knowledge: Basic knowledge (B.Sc. level) of soil, plant and animal sciences</p>

Language: English	Person responsible for module: Prof. Dr. Maria Renate Finckh
Course frequency: each winter semester; Witzhausen	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 Nematodes: 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 Universität Kassel/Witzenhausen Module M.SIA.P21: Energetic use of agricultural crops and Field forage production		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. Furthermore students are able to classify and to assess the importance of field forage production for organic cropping systems.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Energetic use of agricultural crops and Field forage production (Lecture, Excursion) <i>Contents:</i> 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. Gasification, Fischer-Tropsch-Process. Benefits and restrictions by the replacement of fossil fuel-based materials through biomass-based products. The importance of field forage production (ffp) for organic cropping systems; basics of ffp – plant species; integration of ffp in crop rotation systems; environmental impact of ffp, quality aspects; nutrient-dynamics		4 WLH
Examination: Oral examination (approx. 30 minutes) Examination requirements: Basic and theme specific deepened knowledge on the energetic use of agricultural biomass and on the presented aspects of field forage production.		6 C
Admission requirements: none	Recommended previous knowledge: Basic knowledge in soil and plant sciences, physics and chemistry.	
Language: English	Person responsible for module: Prof. Dr. Michael Wachendorf	
Course frequency: every 4th semester; Start WiSe 2017/2018; Witzenhausen	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: Literature:		

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.P22: Management of tropical plant production systems	6 C 4 WLH
Learning outcome, core skills: Knowledge of botanical, ecological and agronomic facts of presented 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.	Workload: Attendance time: 60 h Self-study time: 120 h
Course: Management of tropical plant production systems (Lecture) <i>Contents:</i> Presentation of the most important crops with respect to: botany, morphology, origin, climatic and ecological requirements, crop production, harvest procedure, 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 and specific management systems for the sustainable improvement of productivity. Literatur Rehm, S., Espig, G. 1991: The Cultivated Plants of the Tropics and Subtropics. Verlag Josef Margraf. Weikersheim, Germany; lecture notes	4 WLH
Examination: Written exam (90 minutes) or oral exam (ca. 30 minutes) Examination prerequisites: Crops and production systems in the tropics Examination requirements: Knowledge of botanical, ecological and agronomic facts of the presented crops and cropping systems. Knowledge of the assignment of crops and cropping systems to different site conditions, as well as system-oriented evaluation of sustainable production at selected sites.	6 C
Admission requirements: Basic knowledge on plant production (BSc-level)	Recommended previous knowledge: none
Language: English	Person responsible for module: Prof. Dr. Reimund P. Rötter
Course frequency: each winter semester; 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		6 C 4 WLH
Module M.WIWI-QMW.0004: Econometrics I		
Learning outcome, core skills: This lecture provides a detailed introduction and discussion to the theory of several topics of econometrics. In a practical course the students will apply the methods discussed to real economic data and problems using the statistical software packages Eviews and R.		Workload: Attendance time: 56 h Self-study time: 124 h
Courses: 1. Econometrics I (Lecture) <i>Contents:</i> Multiple linear regression model: Estimation, Inference and Asymptotics. Maximum likelihood modeling. Generalized least squares. Stochastic regressors. Instrumental variable estimators. Generalized method of moments, likelihood based inference. Dynamic models, weak exogeneity, cointegration, stochastic integration.		2 WLH
2. Econometrics I (Tutorial)		2 WLH
Examination: Written examination (90 minutes) Examination requirements: Linear regression models, generalized linear regression models. OLS, GLS, EGLS estimation. Multiplikative heteroskedasticity, autocorrelation. LM specification testing, Durbin Watson test. Convergence in probability, convergence in distribution. Asymptotics (consistency, asymptotic normality) of OLS estimators. IV estimation, GMM estimation.		6 C
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Admission requirements: None	Recommended previous knowledge: Notwendige: Mathematik (lineare Algebra), Statistik. Erwünscht: Einführung in die Ökonometrie (oder vergleichbare Vorlesung)	
Language: English	Person responsible for module: Prof. Dr. Helmut Herwartz	
Course frequency: every semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 2 - 3	
Maximum number of students: not limited		

Georg-August-Universität Göttingen		6 C 4 WLH
Module M.WIWI-VWL.0008: Development Economics I: Macro Issues in Economic Development		
Learning outcome, core skills: Expose students to macroeconomic issues in economic development, including how economic growth, trade, inequality, aid, capital flows, and population issues affect economic development. They understand historical roots of underdevelopment and acquire knowledge of current economic models and empirical approaches in these topic areas.	Workload: Attendance time: 42 h Self-study time: 138 h	
Courses: 1. Development Economics I (Lecture) 2. Development Economics I (Tutorial)	2 WLH 2 WLH	
Examination: Written Exam	6 C	
Examination requirements: The students demonstrate a good understanding of key theories and models of economic development. They are able to critically present these theories and models, are able to interpret empirical results that relate to these models, and are able to crucially draw relevant policy conclusions coming out of these models and empirical assessments.		
Admission requirements: None	Recommended previous knowledge: Knowledge of macroeconomics and econometrics at BA level is highly desirable.	
Language: English	Person responsible for module: Prof. Stephan Klasen	
Course frequency: every winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 1 - 3	
Maximum number of students: not limited		