HOCHSCHULE
RHEIN-WAAL
Rhine-Waal University
of Applied Sciences

Handbook of modules for the study course Sustainable Agriculture, B.Sc.

April 2026

valid for all students enrolled
from WS 2019/20 onwards

The most important details

Duration:	7 semesters full-time, 9 semesters part-time
Location:	Kleve
Qualification:	Bachelor of Arts, B.A.
Course start:	Annually in the winter term
Language:	English
Preparatory internship:	Minimum of 8 weeks working full time before the beginning of the 4th semester, longer practical experience in an agribusiness company or an agricultural or horticultural enterprise is recommended
Internship/ study abroad:	in the 6th semester
Bachelor thesis:	in the second half of the 7th semester (full time) in the 9th semester (part time)
Calculation of workload:	1 CP equals 30 hours per semester
Examinations:	all examination types as detailed in §14, 17–20 General Examination Regulations for Bachelor Degree Programmes
Literature:	Literature mentioned in the module descriptions are first recommendations and do not replace the syllabus of the module. The module coordinators assume as a rule that the titles specified always refer to the most current version.
Attendance:	Attendance of all lab courses, seminars and exercises marked * is mandatory, attendance of all seminars and exercises is recommended.
This programme is accredited by	PROGRAMM AKKREDITIERT Akkreditierungsrat

Inhalt

Module Code/ Modulcode	Subjects / Module	Module Requirements Modulvoraus-setzungen	CH/ SWS	Type L/V	S	E/Ü	LC/Pr	Pro	Ex/Prü graded/ benotet	attestation/Testat	ECTS points	CH / SWS WT / WS 1	ST / SS 2	WT / WS 3	ST / SS 4	WT / WS 5	SS / ST 6	WS / WT 7	
SA 1 4807	Basics of Biology and Agroecology I Grundlagen der Biologie und Agroökologie I		4	3			1		P	T	5	4							*
SA 1 4802	Sustainable Learning - Learning Sustainability Nachhaltiges Lernen - Nachhaltigkeit lernen		4	1	2	1			P	T	5	4							*
SA 1 4808	Agricultural Engineering I and Energy Use in Agriculture Agrartechnik I und Energienutzung in der Landwirtschaft		4	2		2			P		5	4							
SA 1 4804	Principles of Economics Grundlagen der Ökonomie		4	1	1	2			P		5	4							
SA 1 4805	Analysis and Interpretation of Data I Analyse und Interpretation von Daten I		4	2		2			P		5	4							
SA 1 4809	Agricultural Chemistry Agrikulturchemie		4	2			2		P	T	5	4							*
SA 1 4810	Soil Science and Tillage Bodenkunde und Bodenbearbeitung		6	3		1	2		P	T	5	2	4						*
SA 2 4827	Organic and Biochemistry, Biotechnology Organische und Biochemie, Biotechnologie		4	2			2		P	T	5		4						*
SA 2 4811	Biology and Biodiversity Biologie und Biodiversität		4	2			2		P	T	5		4						*
SA 2 4828	Agricultural Engineering II and Agrotechnology Agrartechnik II und Agrartechnologie	SA 1 4808	4	2		2			P		5		4						
SA 2 4825	Agricultural Economics and Farm Management Agrarökonomie und Farmmanagement		4	1	1	2			P		5		4						
SA 2 4829	Basics of Animal Sciences Grundlagen der Nutztierwissenschaften		4	3			1		P	T	5		4						*
SA 3 4841	International Markets, Trade and Agricultural Policy Internationale Märkte, Handel und Agrarpolitik		4	1	3				P	T	5			4					*
SA 3 4847	Climate Change and Water Management Klimawandel und Wassermanagement		4	4					P		5			4					
SA 3 4848	Crop Physiology and Nutrition Pflanzenphysiologie und -ernährung	SA 1 4807 SA 1 4809	5	3			2		P	T	5			5					*
SA 3 4849	Crop Health I Pflanzengesundheit I		4	4					P		5			4					
SA 3 4845	Analysis and Interpretation of Data II Analyse und Interpretation von Daten II		4	2		2			P		5			4					
SA 3 4850	Animal Husbandry and Health Haltung, Zucht und Gesundheit von Tieren	SA 2 4829	4	2			2		P	T	5			4					*
SA 4 4875	Agroecology II and Agronomy Agrarökologie II und Agronomie	SA 2 4811 SA 3 4848	4	2	1	1			P		5				4				
SA 4 4824	Rural Development and Sustainable Behaviour Ländliche Entwicklung und nachhaltiges Verhalten		4	1	2	1			P	T	5				4				*
SA 4 4876	Horticulture and Agroforestry Gartenbau und Agroforst		5	3			2		P	T	5				5				*
SA 4 4874	Project Projekt		4					4		T	5				4				
	Elective modules 1 Wahlpflichtkatalog 1		8	4	4				P		10				8				
SA 5 4921	Ethics in Life Sciences Ethik in den Lebenswissenschaften		3	1	2				P		5					3			
SA 5 4922	Sustainability and Agri-food Chains Nachhaltigkeit und Agri-food Wertschöpfungsketten		4	1		1		2	P		5					4			
SA 5 4844	Natural Resources and Environmental Economics Ressourcen- und Umweltökonomie	SA 1 4804	4	1	1	2			P		5					4			
SA 5 4925	Animal Welfare Tiergerechtheit	SA 2 4829 SA 3 4850	4	2		2			P		5					4			
	Elective modules 2 Wahlpflichtkatalog 2		8	4	4				P		10					8			
SA 6 4991	Internship or Study Abroad Praxissemester oder Auslandsstudiensemester	min. 90 ECTS points **								T	30						X		
SA 7 4992	Academic Methods and Principles Wissenschaftliches Arbeiten		4		2	2				T	5							4	
	Elective Modules 3 Wahlpflichtkatalog 3		8		4			4		T	10							8	
SA 7 4993	Bachelor Thesis Bachelorarbeit	min. 180 ECTS points							P		12							X	
SA 7 4994	Colloquium Kolloquium	207 ECTS points							P		3							X	
	total credit hours // Semesterwochenstunden		**135**	**59**	**27**	**23**	**16**	**10**				**26**	**24**	**25**	**25**	**23**		**12**	
												30	**30**	**30**	**30**	**30**	**30**	**30**	
														150			**60**		
															210				

		total	1.Sem	2.Sem	3.Sem	4.Sem	5.Sem	6.Sem	7.Sem
CH		135	26	24	25	25	23	0	12
ECTS points		210	30	30	30	30	30	30	30

Abbreviations: // Abkürzungen
CH = credit hours per week // SWS = Semesterwochenstunden

WS = winter term // Wintersemester
SS = summer term // Sommersemester
Ex/Prü = type of examination // Prüfungsart
ECTS points = European Credit Transfer System credit points // Leistungspunkte nach dem Europäisches System zur Übertragung und Akkumulierung von Studienleistungen
L/V = Lecture // Vorlesung
S = seminar // Seminar
E/Ü = exercise // Übung
LC/Pr = lab course // Praktikum
Pro = project // Projekt
T = certificate // Testat (unbenotet)
P = examination (graded) // benotete Prüfung

** In addition to the General Examination Regulations for Bachelor 's Degree Programmes regarding the admission to the internship or study abroad the student has to show the successful completion of all modules/module examinations of the first study year of the study programme.
** Ergänzend zu den Voraussetzungen der Rahmenprüfungsordnung zur Zulassung zum Praxis- oder Auslandsstudiensemester hat der/die Studierende das erfolgreiche Ableisten sämtlicher Module/Modulprüfungen des 1. Studienjahres des Studiengangs nachzuweisen.

	Elective modules 1 Wahlpflichtkatalog 1		SWS	Ex	ETCS points	
SA 4 4898	Focus Field Animal Sciences and Aquaponics 1 Schwerpunkt Tierwissenschaften und Aquaponik 1		4	P	5	
SA 4 4899	Focus Field Plant and Soil Sciences 1 Schwerpunkt Pflanzen- und Bodenwissenschaften 1		4	P	5	
SA 4 4924	Focus Field Analysis of Sustainability and Food Sciences 1 Schwerpunkt Nachhaltigkeitsanalyse und		4	P	5	
SA 4 4900	Area of Specialization Economics and Social Sciences 1 Vertiefungsbereich Wirtschafts- und Sozialwissenschaften 1		4	P	5	
SA 4 WPF_1	Module from any Bachelor Study Course of the Faculty of Life Sciences at Rhine-Waal University of Applied Sciences Wahlmöglichkeit Angebot Fakultät Life Sciences Bachelorstudiengänge		4	P	5	***
	2 elective modules amount to		**8**		**10**	

In order to take this area of specialization a module from the following module catalog must be selected.
Für das Belegen des Vertiefungsbereichs muss ein Modul aus dem folgenden Modulkatalog gewählt werden.

AB 2 4021	Strategy and Management Strategie und Management
AB 2 4022	Agronomy II and Horticulture Agronomie II und Gartenbau
AB 2 4023	Financial Accounting Rechnungswesen
AB 2 4026	Supply Chain Management Versorgungskettenmanagement
AB 4 4071	Agricultural Extension Landwirtschaftliche Beratungslehre
AB 4 4072	Entrepreneurship and Innovation Management Existenzgründung und Innovationsmanagement
AB 4 4073	Market Research Marktforschung

	Elective modules 2 Wahlpflichtkatalog 2		SWS	Ex	ETCS points	
SA 5 4947	Focus Field Animal Sciences and Aquaponics 2 Schwerpunkt Tierwissenschaften und Aquaponik 2		4	P	5	
SA 5 4948	Focus Field Plant and Soil Sciences 2 Schwerpunkt Pflanzen- und Bodenwissenschaften 2		4	P	5	
SA 5 4949	Focus Field Analysis of Sustainability and Food Sciences 2 Schwerpunkt Nachhaltigkeitsanalyse und Lebensmittelwissenschaften 2		4	P	5	
SA 5 4950	Area of Specialization Economics and Social Sciences 2 Vertiefungsbereich Wirtschafts- und Sozialwissenschaften 2		4	P	5	
SA 5 WPF_2	Module from any Bachelor Study Course of the Faculty of Life Sciences at Rhine-Waal University of Applied Sciences Wahlmöglichkeit Angebot Fakultät Life Sciences Bachelorstudiengänge		4	P	5	***
	2 elective modules amount to		**8**		**10**	

In order to take this area of specialization a module from the following module catalog must be selected.
Für das Belegen des Vertiefungsbereichs muss ein Modul aus dem folgenden Modulkatalog gewählt werden.

AB 1 4001	Marketing Marketing
AB 1 4006	Communication Kommunikation
AB 3 4043	Environmental, Agricultural and Food Law Umwelt-, Agrar- und Lebensmittelrecht
AB 3 4046	Management Accounting Controlling
AB 5 4124	Integrated Management Systems Integrierte Managementsysteme

	Elective modules 3 Wahlpflichtkatalog 3		SWS	Ex	ETCS points	
SA 7 4971	Project reg. Academic Principles and Methods in preparation of Bachelor Thesis Projekt zum Wissenschaftlichen Arbeiten in der Vorbereitung der Bachelorarbeit		8	T	10	
550	Language Course Sprachkurs		4	T	5	***
SA 7 WPF_3	Module from catalogue 1 and 2 of study programme Wahlmöglichkeit aus Wahlpflichtkatalog 1 und 2 des Studiengangs		4	P	5	***
SA 7 WPF_4	Module from any Bachelor Study Course at Rhine-Waal University of Applied Sciences Wahlmöglichkeit Angebot HRW Bachelorstudiengänge		4	P	5	***
	1-2 elective modules amount to		8		10	

The faculty reserves the right to determine a minimum number of participants for offering an elective subject. Admission to mandatory modules is subject to available capacities. The possibility to obtain the required number of credit points remains unaffected. / Die Fakultät behält sich das Recht vor, eine Mindestteilnehmerzahl für das Zustandekommen eines Wahlpflichtkurses festzulegen. Die Zulassung zu Pflichtmodulen erfolgt vorbehaltlich freier Kapazitäten. Die Möglichkeit des Erreichens der vorgeschriebenen

In case of new developments in the different fields of Sustainable Agriculture the faculty reserves the right to expand the range of elective modules by further study courses over the time. / Die Fakultät behält sich vor, das Wahlpflichtangebot im Laufe der Zeit bei neuen Entwicklungen in verschiedenen Feldern der nachhaltigen Landwirtschaft durch weitere Fächer zu erweitern.

*** The actual selection from any study programme of the Rhine-Waal University has to be approved by the Examination Committee of the Faculty of Life Sciences. Module code and module description of the module chosen will be used. // Die konkrete Auswahl aus dem Studienangebot der Hochschule bedarf der Zustimmung des Prüfungsausschussvorsitzenden. Modulcode und Modulbezeichnung entsprechen dem gewählten Modul.

Module Code/ Modulcode	Subjects / Module	Module Requirements Modulvoraus-setzungen	CH/ SWS	Type					Ex/Prü		ECTS points	part time study / berufsbegleitendes Studium CH / SWS									
				L/V	S	E/Ü	LC/Pr	Pro	graded/ benotet	attestation/Testat		WT / WS 1	ST / SS 2	WT / WS 3	ST / SS 4	WT / WS 5	SS / ST 6	WS / WT 7	WS / WT 8	WS / WT 9	
SA 1 4807	Basics of Biology and Agroecology I Grundlagen der Biologie und Agroökologie I		4	3			1		P	T	5	4									*
SA 1 4802	Sustainable Learning - Learning Sustainability Nachhaltiges Lernen - Nachhaltigkeit lernen		4	1	2	1			P	T	5	4									*
SA 1 4808	Agricultural Engineering I and Energy Use in Agriculture Agrartechnik I und Energienutzung in der Landwirtschaft		4	2		2			P		5			4							
SA 1 4804	Principles of Economics Grundlagen der Ökonomie		4	1	1	2			P		5			4							
SA 1 4805	Analysis and Interpretation of Data I Analyse und Interpretation von Daten I		4	2		2			P		5	4									
SA 1 4809	Agricultural Chemistry Agrikulturchemie		4	2			2		P	T	5	4									*
SA 1 4810	Soil Science and Tillage Bodenkunde und Bodenbearbeitung		6	3		1	2		P	T	5	2	4								*
SA 2 4827	Organic and Biochemistry, Biotechnology Organische und Biochemie, Biotechnologie		4	2			2		P	T	5		4								*
SA 2 4811	Biology and Biodiversity Biologie und Biodiversität		4	2			2		P	T	5		4								*
SA 2 4828	Agricultural Engineering II and Agrotechnology Agrartechnik II und Agrartechnologie	SA 1 4808	4	2		2			P		5				4						
SA 2 4825	Agricultural Economics and Farm Management Agrarökonomie und Farmmanagement		4	1	1	2			P		5				4						
SA 2 4829	Basics of Animal Sciences Grundlagen der Nutztierwissenschaften		4	3			1		P	T	5		4								*
SA 3 4841	International Markets, Trade and Agricultural Policy Internationale Märkte, Handel und Agrarpolitik		4	1	3				P	T	5					4					*
SA 3 4847	Climate Change and Water Management Klimawandel und Wassermanagement		4	4					P		5					4					
SA 3 4848	Crop Physiology and Nutrition Pflanzenphysiologie und -ernährung	SA 1 4807 SA 1 4809	5	3			2		P	T	5			5							*
SA 3 4849	Crop Health I Pflanzengesundheit I		4	4					P		5					4					
SA 3 4845	Analysis and Interpretation of Data II Analyse und Interpretation von Daten II		4	2		2			P		5			4							
SA 3 4850	Animal Husbandry and Health Haltung, Zucht und Gesundheit von Tieren	SA 2 4829	4	2			2		P	T	5							4			*
SA 4 4875	Agroecology II and Agronomy Agrarökologie II und Agronomie	SA 2 4811 SA 3 4848	4	2	1	1			P		5						4				
SA 4 4824	Rural Development and Sustainable Behaviour Ländliche Entwicklung und nachhaltiges Verhalten		4	1	2	1			P	T	5				4						*
SA 4 4876	Horticulture and Agroforestry Gartenbau und Agroforst		5	3			2		P	T	5						5				*
SA 4 4874	Project Projekt		4					4		T	5				4						
	Elective modules 1 Wahlpflichtkatalog 1		8	4	4				P		10						8				
SA 5 4921	Ethics in Life Sciences Ethik in den Lebenswissenschaften		3	1	2				P		5							3			
SA 5 4922	Sustainability and Agri-food Chains Nachhaltigkeit und Agri-food Wertschöpfungsketten		4	1		1		2	P		5									4	
SA 5 4844	Natural Resources and Environmental Economics Ressourcen- und Umweltökonomie	SA 1 4804	4	1	1	2			P		5							4			
SA 5 4925	Animal Welfare Tiergerechtheit	SA 2 4829 SA 3 4850	4	2		2			P		5							4			
	Elective modules 2 Wahlpflichtkatalog 2		8	4	4				P		10						4		4		
SA 6 4991	Internship or Study Abroad Praxissemester oder Auslandsstudiensemester	min. 90 ECTS points **								T	30					X					
SA 7 4992	Academic Methods and Principles Wissenschaftliches Arbeiten		4		2	2				T	5										4
	Elective Modules 3 Wahlpflichtkatalog 3		8		4			4		T	10										8
SA 7 4993	Bachelor Thesis Bachelorarbeit	min. 180 ECTS points							P		12								X		
SA 7 4994	Colloquium Kolloquium	207 ECTS points							P		3										X
	total credit hours // Semesterwochenstunden		**135**	**59**	**27**	**23**	**16**	**10**			**210**	**18**	**16**	**17**	**16**	**16**	**17**	**19**	**0**	**16**	
												20	**20**	**20**	**20**	**20**	**20**	**25**	**42**	**23**	
															145				**65**		
																210					

Abbreviations: // Abkürzungen
CH = credit hours per week // SWS = Semesterwochenstunden

	total	1.Sem	2.Sem	3.Sem	4.Sem	5.Sem	6.Sem	7.Sem	8. Sem	9. Sem
CH	135	18	16	17	16	16	17	19	0	16
ECTS points	210	20	20	20	20	20	20	25	42	23

WS = winter term // Wintersemester
SS = summer term // Sommersemester
Ex/Prü = type of examination // Prüfungsart
ECTS points = European Credit Transfer System credit points // Leistungspunkte nach dem Europäisches System zur Übertragung und Akkumulierung von Studienleistungen
L/V = Lecture // Vorlesung
S = seminar // Seminar
E/Ü = exercise // Übung
LC/Pr = lab course // Praktikum
Pro = project // Projekt
T = certificate // Testat (unbenotet)
P = examination (graded) // benotete Prüfung

** In addition to the General Examination Regulations for Bachelor 's Degree Programmes regarding the admission to the internship or study abroad the student has to show the successful completion of all modules/module examinations of the first study year of the study programme.
** Ergänzend zu den Voraussetzungen der Rahmenprüfungsordnung zur Zulassung zum Praxis- oder Auslandsstudiensemester hat der/die Studierende das erfolgreiche Ableisten sämtlicher Module/Modulprüfungen des 1. Studienjahres des Studiengangs nachzuweisen.

The elective modules hold true as in the fulltime version.

SA 1 4807 Basics of Biology and Agroecology I

Study Semester:	**1** (full time) **1** (part time) **1** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lectures	45 h	Preparation for contact time	30 h
Lab course/exercise	15 h	Literature review	20 h
		Preparation for exams	40 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

Prof. Dr. Natalie Laibach; Prof. Dr. Kerstin Koch

Teaching contents

Basics, terms and concepts of cell biology (plant and animal cells and their components); fundamental genetics for breeding (molecular basis, inheritance, mutations, polyploidy); basics of zoology; terms, definitions, principles and concepts of ecology and agroecology; global cycles of matter; population and community ecology; foodwebs, habitat and niche; disturbance and succession; diversity and stability of agroecosystems; interactions in cropping systems; sustainable agroecosystems; basics of biological and agroecological experimentation and data documentation; introduction to scientific working

Learning objectives

On successful completion of this module, students should

- know the relevant definitions, principles and concepts of cell biology, genetics and zoology[1]
- know the relevant definitions, principles and concepts of ecology and their application in agriculture[1]
- know how populations and communities of organisms in agroecosystems react to their environment[1]
- be able to relate their knowledge in biology and ecology to its relevance in sustainable agriculture[2]
- be able to partly apply methods of biology and agroecology[3]
- be able to present and document results and findings in a scientifically appropriate format[4]
- be able to analyse how their findings are related to those of others[4]
- be able to evaluate the application of ecological principles and concepts in sustainable agricultural systems[5]
- be able to critically discuss possibilities and shortcomings of agroecology in the existing agricultural context[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; excursions; exercises

Entrance requirements

Mandatory: None

Recommended:

Reading list

McGraw Hill: Biology
Alberts: Essential Cell Biology
Campbell and Reece: Biology
Reece, Urry, Cain, Wasserman, Minorsky, Jackson and Campbell: Biology
Gliessman: Agroecology
Odum, Brewer and Barrett: Fundamentals of Ecology
Callenbach: Ecology: A Pocket Guide
Various case studies and scientific publications

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

written exam; presentation

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration materials

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence		X	

last amended: October 2024

SA 1 4802 Sustainable Learning – Learning Sustainability

Study Semester:	**1** (full time) **1** (part time) **1** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	15 h	Preparation for contact time	30 h
Seminar	30 h	Preparation for exams	60 h
Excursion/Exercise	15 h		
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

Prof. Dr. Florian Wichern; Dr. Conor Watson

Teaching contents

Self Management and Learning: people and team skills; time management; presentation skills; giving and receiving feedback; academic reading and academic writing

Sustainability: Definitions, concepts and dimensions of sustainability and sustainable development; stakeholders and driving forces; introduction to methods of sustainability assessment (e.g. footprints, LCA); introduction to sustainability management, auditing, labelling and control systems (e.g. EMAS, ISO, Codex Alimentarius); multi-, inter- and transdisciplinarity; basics of land use and supply chain systems; sustainable agroecosystems

Learning objectives

On successful completion of this module, students should

- know the relevant terms, definitions, concepts and dimensions of sustainability and sustainable development, with special emphasis on their relevance in agriculture[1]
- know how to succeed at university[1]
- be able to relate their knowledge about sustainability and sustainable development to agriculture and their own life[2]
- be able to apply methods of self, time and project management individually and in groups[3]
- be able to critically discuss the perspectives and shortcomings of sustainability approaches in agriculture[5]
- be able to evaluate their personal learning progress and identify their own learning needs[5] be able to consider the social impact of professional decisions[2,3] and thus deepen their capacity to engage in society[2,3]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgment

Teaching and learning methods

Seminar; self-study; group work; excursion; exercise; feedback

Entrance requirements

Mandatory: None

Recommended:

Reading list

Smale and Fowlie: How to Succeed at University
Pears and Shields: Cite them right
Gliessman: Agroecology
Morse: Sustainability: A Biological Perspective
McIntyre et al. (eds.): International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD): Global Report

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes: certificate for "Self Management and Learning"

for "Sustainability": written exam; assignments

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material; online tutorials; videos; video feedback

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence	X		

last amended: October 2025

SA 1 4808 Agricultural Engineering I and Energy Use in Agriculture

Study Semester:	**1** (full time) **3** (part time) **1** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	50 h
Exercise	30 h	Literature review	20 h
		Preparation for exams	20 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Matthias Kleinke

Lecturers

Prof. Dr. Matthias Kleinke

Teaching contents

Fundamentals of physics, fundamentals of agricultural machines and buildings; properties of machinery used in the production chain, e.g. engines, tractors, tillage equipment, plant protection and fertilization, cereals, sugarbeet, potato, cattle and pic breeding, fundamentals of energy conversion technologies; renewable energy in agriculture, thermal and electrical energy systems; the use and production of energy in agriculture;

Learning objectives

On successful completion of this module, students should

- know the fundamentals of physics[1]
- understand basic functioning and use of technology in agriculture and energy systems[2]
- understand the technology for crop production chains[2]
- be able to apply technological solutions to agricultural problems[3]
- be able to analyse pros and cons of agrotechnology[4]
- be able to critically discuss the benefits and negative effects of agrotechnology[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; excursion

Entrance requirements

Mandatory: None

Recommended: None

Reading list

Tipler and Mosca: Physics for Scientists and Engineers Extended Version
Field and Solie: Introduction to Agricultural Engineering Technology: A Problem Solving Approach
Kaltschmitt, Streicher and Wiese (eds.): Renewable Energy: Technology, Economics and Environment

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; lab equipment; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: November 2019

SA 1 4804 Principles of Economics

study semester:	**1** (full time) **1** (part time) **1** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	15 h	Preparation for contact time	30 h
Seminar	15 h	Literature review	30 h
Exercise	30 h	Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Tobias Wünscher

Lecturers

Dr. Jana Lohmann

Teaching contents

Principles of microeconomics and macroeconomics; markets; supply and demand; welfare; consumer behaviour; firm behaviour; competition; public sector; economic growth; economic fluctuations; public policy

Learning objectives

On successful completion of this module, students should

- know principles of micro- and macroeconomics[1]
- be able to relate their knowledge in economics to aspects in business management and public policy[2]
- be able to apply standard economic and analytical tools to micro- and macroeconomic questions[3,4]
- be able to document results and findings in a scientifically appropriate form[4,5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; exercises; group work and presentation

Entrance requirements

Mandatory: None

Recommended: None

Reading list

Mankiw, Taylor: Economics

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: May 2023

SA 1 4805 Analysis and Interpretation of Data I

Study Semester:	**1** (full time) **1** (part time) **1** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	40 h
Exercise	30 h	Literature review	10 h
		Preparation for exams	40 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. PD Dr.-Ing. Sylvia Moenickes

Lecturers

Prof. Dr. Henrik Rudolf

Teaching contents

Mathematics 1: Calculus 1: review of prominent functions, differentiation and integration and their application; introduction to differential equations

Statistics 1: descriptive statistics and data visualization; basics of probability theory; basic distributions (binomial, hypergeometric, Poisson, normal, exponential)

Learning objectives

On successful completion of this module, students should

- know basic mathematical concepts and procedures, and their application[1,2,3]
- be able to develop an exact way of thinking, working and wording as well as a feeling for numbers and the well-considered use of the calculator[2,3]
- be able to find and verify independent solutions[3,4,5]
- be able to interpret mathematical formulas[4,5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lectures; self-study; group work; exercise; feedback

Entrance requirements

Mandatory: None

Recommended:

Reading list

Milton: Head first data analysis
Ekstrom and Sorensen: Introduction to statistical data analysis for the life sciences
Soo Tang Tan: Applied mathematics for the managerial, life and social sciences
Bulmer: Principles of Statistics
Simon and Blume: Mathematics for Economists

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: October 2024

SA 1 4809 Agricultural Chemistry

Study Semester:	**1** (full time) **1** (part time) **1** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	45 h
Lab course	30 h	Lab journal writing	20 h
		Preparation for exams	25 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Peter Scholz

Lecturers

Dr. Conor Watson; Dr. Stefan Weber

Teaching contents

Lecture:
Terms, definitions, principles and concepts of general chemistry; models of the atom; chemical bonding; chemical equilibrium; acids and bases; oxidation / reduction; processes affecting soil nutrients, loss of nutrients from agricultural soils

Lab course:
Practical experiments illustrating theories taught in lectures; fundamental lab skills including measuring and transferring solutions, titration, report writing, constructing standard graphs and using them to calculate nutrient concentrations

Learning objectives

On successful completion of this module, students should

- know the relevant definitions, principles and concepts of general and agricultural chemistry[1]
- be able to apply chemical theories and terminology to scientific questions[1,2]
- be able to conduct a simple experiment and to document the result[1-3]
- be able to interpret experimental results within known chemical theories[4,5]
- know important elements in agricultural sciences and their influence on farming[1,2]
- know farming-relevant key processes in water and soil[1,2]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; lab work with lab journal

Entrance requirements

Mandatory: None

Recommended:

Reading list

Corwin: Introductory chemistry
Hill, McCreary and Kolb: Chemistry for changing times
Pulford and Flowers: Environmental chemistry at a glance

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for lab course

Teaching materials and media

Projector; white/black board; smart board; hand-outs; general lab equipment; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: November 2019

SA 1 4810 Soil Science and Tillage

Study Semester:	**1&2** (full time) **1&2** (part time) **1&2** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	45 h	Preparation for contact time	20 h
Exercise	15 h	Literature review	10 h
Lab course/Field course	30 h	Preparation for exams	30 h
Sum	90 h	Sum	60 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

Prof. Dr. Florian Wichern

Teaching contents

Physical, chemical and biological properties of soils; terms and definitions of soil science; soil formation, classification and use; threats to and conservation of soil resources; relevance of soils for agricultural production; methods of soil analysis; methods of soil health appraisal; basics of soil tillage and influence on soil properties

Learning objectives

On successful completion of this module, students should

- know the relevant concepts of soil physics, soil chemistry and soil biology[1]
- know how soils are formed, classified, function and can be protected[1]
- be able to relate their knowledge about soils to its relevance in sustainable agriculture[2]
- be able to apply standard analytical lab procedures of soil science in experiments[3]
- be able to apply methods to assess soil fertility and health[3]
- be able to analyse and document results and findings in a scientifically appropriate form[4]
- be able to analyse how their data fit to the data of others[4]
- be able to evaluate the influence of different tillage systems on soil properties and determine their sustainability[5]
- be able to critically discuss options of sustainable soil use and soil health in an agricultural context[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; lab course with lab journal; field trip; excursion; feedback

Entrance requirements

Mandatory: None

Recommended: Agricultural chemistry (SA 1 4809)

Reading list

Weil and Brady: The Nature and Properties of Soils
Brady and Weil: Elements of the Nature and Properties of Soils
Scheffer and Schachtschabel Soil Science
Grotzinger and Jordan: Understanding Earth
White: Principles and Practice of Soil Science

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for lab course

Teaching materials and media

Projector; white/black board; hand-outs; lab equipment; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence		X	

last amended: October 2021

SA 2 4827 Organic and Biochemistry, Biotechnology

Study Semester:	**2** (full time) **2** (part time) **2** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	45 h
Lab course	30 h	Lab journal writing	20 h
		Preparation for exams	25 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Peter Scholz

Lecturers

Dr. Stefan Weber; Dr. Nadine Merettig; Prof. Dr. Natalie Laibach

Teaching contents

Lecture:
Terms, definitions, principles and concepts of organic, bio and food chemistry; important functional groups; common reaction types; reaction mechanisms; important biomolecules: nucleotides, peptides and amino acids, carbohydrates, fatty acids; genetic code, transcription, regulation and translation; exemplary biochemical pathways; catalysis; bio- and genetic engineering; genetically modified food

Lab course:
Purification of products by distillation; basic synthesis procedures: nucleophilic substitution reactions; qualitative analysis of biomolecules: nucleic acids, protein and carbohydrates; chromatographic methods; isolation of plasmidic DNA and electrophoresis; basic biotechnological procedures and microbial methods: culture techniques

Learning objectives

On successful completion of this module, students should

- know the relevant definitions, principles and concepts of organic, bio and food chemistry[1]
- know the basic concepts and mechanisms of bio- and genetic engineering[1]
- understand the application of bio- and genetic engineering in agriculture and the food industry[2]
- be able to apply theories and terminology to scientific questions[1,2]
- be able to analyse pros and cons of the use of bio- and genetic engineering in agriculture[4]
- be able to conduct simple experiments and to document the result[1-3]
- be able to interpret experimental results within known biochemical concepts[4,5]
- know the chemical composition and main properties of lipids, protein and carbohydrates[1]
- know the importance of microorganisms in biotechnology[1]
- understand and apply basic biotechnological processes, with respect to the metabolism of the selected microorganism[2,3,4,5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; lab course with lab journal

Entrance requirements

Mandatory: None

Recommended: Agricultural chemistry (SA 1 4809)

Reading list

Bruice: Essential organic chemistry
Bailey and Bailey: Organic chemistry
Horton, Moran, Scrimgeour, Perry and Rawn: Principles of biochemistry
Belitz: Food Chemistry
Damodaran: Fennema's Food Chemistry
Benkeblia (ed.): Sustainable Agriculture and New Biotechnologies
Mascia, Scheffran and Widholm (eds.): Plant Biotechnology for Sustainable Production of Energy and Co-products

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for the lab course

Teaching materials and media

Projector; white/black board; smart board; hand-outs; general lab equipment; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence		X	

last amended: March 2024

SA 2 4811 Biology and Biodiversity

Study Semester:	**2** (full time) **2** (part time) **2** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	40 h
Lab course/Field course	30 h	Literature review	20 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Kerstin Koch

Lecturers

Prof. Dr. Kerstin Koch

Teaching contents

Biology: fundamentals of microbiology in relation to agriculture; human and animal parasites; plant tissues, basics in plant physiology (photosynthesis, plant hormones); functional plant anatomy; flow of water and nutrients; sensing and movement, fruit and seed dispersal strategies;

Biodiversity: fundamentals of plant identification; invasive species; indicator plants; biodiversity and the CBD; Hot Spots of biodiversity; strategy types in nature conservation; biodiversity indices; Vavilov centres of diversity

Lab course:
plant anatomy, microscopy and specimen preparation, practice of biological experimentation and scientific data documentation

Learning objectives

On successful completion of this module, students should

- know the basics of plant and animal biology[1]
- understand how plants and animals function and use resources and how this relates to strategies and diversity[2]
- understand how microorganisms differ from eukaryotes and influence important agricultural processes[2]
- be able to apply their knowledge in the conduction and documentation of simple biological lab experiments[3]
- be able to identify plant species and analyse agricultural systems with respect to their influence and use of diversity[4]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; lab course

Entrance requirements

Mandatory: *None*

Recommended: None

Reading list

Campbell and Reece: Biology
Reece, Urry, Cain, Wasserman, Minorsky, Jackson and Campbell: Biology
Stohlgren: Measuring Plant Diversity

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for lab course

Teaching materials and media

Beamer; white/black board; handout; lab equipment; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: November 2019

SA 2 4828 Agricultural Engineering II and Agrotechnology

Study Semester:	**2** (full time) **4** (part time) **2** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	50 h
Exercise	30 h	Literature review	20 h
		Preparation for exams	20 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Matthias Kleinke

Lecturers

Prof. Dr. Matthias Kleinke

Teaching contents

Fundamentals of and new developments in agrotechnology (e.g. concerning irrigation technology, technology in animal husbandry, energy use and production); fundamentals and methods of technology assessment (TA); urban and vertical farming; precision farming; graphical display of data; basic GIS and GIS software; agrotechnology in plant protection: good agricultural practice, pesticides: users protection, environmental protection, field sprayer: handling, drift, technique

Learning objectives

On successful completion of this module, students should

- know the basic functioning and use of agrotechnological equipment[1]
- know[1] and understand[2] basic concepts, apply[3] and analyse[4] exemplary case study, critically discuss necessity and limits of technology assessment [5]
- understand concepts of urban, vertical and precision farming[2]
- be able to apply agrotechnological solutions to agronomic problems[3]
- be able to analyse pros and cons of new developments in agriculture[4]
- be able to critically discuss the benefits and negative effects of agrotechnology[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; excursion

Entrance requirements

Mandatory: Agricultural Engineering I and Use of Energy in Agriculture (SAg_03)

Recommended: None

Reading list

Field and Solie: Introduction to Agricultural Engineering Technology: A Problem Solving Approach
Smit, Nasr and Ratta: Urban Agriculture – Food, Jobs and Sustainable Cities
Despommier: The Vertical Farm
Wütscher and Decker (eds.): Interdisciplinarity in Technology Assessment: Implementation and its Chances and Limits

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; lab equipment; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: November 2019

SA 2 4825 Agricultural Economics and Farm Management

Study Semester:	**2** (full time) **2** (part time) **2** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	15 h	Preparation for contact time	30 h
Seminar	15 h	Literature review	30 h
Exercise	30 h	Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Tobias Wünscher

Lecturers

Prof. Dr. Tobias Wünscher

Teaching contents

The farm, farming and food system; business economics with special reference to businesses in the agrifood sector; business objectives; the behaviour of firms; farm management; production economics; production factors, costs of production; budgeting; enterprise choice; linear programming; entrepreneurship

Learning objectives

On successful completion of this module, students should

- know the relevant concepts and principles of agricultural economics[1]
- be familiar with all functional areas of a agrifood and farm business[1]
- be able to relate their knowledge of general objectives to management decisions in agricultural production[2]
- be able to apply standard analytical tools to examine production economics decisions and enterprise choice[3]
- be able to document results and findings in a scientific appropriate form[4]
- be able to analyse the relevant processes in a business[4]
- be able to design concepts for various business areas[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; exercise; self-study; group work; business case studies

Entrance requirements

Mandatory: None

Recommended: None

Reading list

Cramer, Jensen, Southgate: Agricultural Economics and Agribusiness
Olson: Economics of Farm Management in a Global Setting
Norwood and Lusk: Agricultural Marketing and Price Analysis

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: May 2023

SA 2 4829 Basics of Animal Sciences

Study Semester:	**2** (full time) **2** (part time) **2** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	45 h	Preparation for contact time	40 h
Lab course	15 h	Literature review	20 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Steffi Wiedemann

Lecturers

Prof. Dr. Steffi Wiedemann

Teaching contents

Lecture:
introduction to animal husbandry and sciences; domestication; basic animal anatomy and applied physiology (skeletal system, working of nerves and muscles, digestive system, circulatory system, respiratory system, endocrine system, sensory systems, reproductive system, lactation); basics of animal growth and development, similarities and differences among groups of animals, introduction to the composition and quality assessment of feedstuff and animal-derived products; exercises during the lecture; field trip

Lab course:
enhancement of knowledge by demonstration of relevant organ systems, organs, milk and feed stuff; basic quality assessments of milk and feed stuff

Learning objectives

On successful completion of this module, students should

- know the basics of animal husbandry, anatomy and physiology[1]
- understand basic interactions among anatomy and physiology and animal husbandry[2]
- be able to apply the knowledge for basic feed ration balancing[3]
- be able to apply their knowledge in the appraisal of farm animals [3,4]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; e-learning units; lab course with lab journal; exercise; field trip

Entrance requirements

Mandatory: None

Recommended:

Reading list

Gillespie: Modern Livestock and Poultry Production
Reece: Functional Anatomy and Physiology of Domestic Animals
Moyes, Schulte: Principles of Animal Physiology
Frandson: Anatomy and Physiology of Farm Animals

Further literature will be named and given in the course.

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for lab course

Teaching materials and media

Beamer; white/black board; hand-outs; e-learning platform; lab equipment; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence		X	

last amended: November 2019

SA 3 4841 International Markets, Trade and Agricultural Policy

Study Semester:	**3** (full time) **3** (part time) **5** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	15 h	Preparation for contact time	40 h
Seminar	45 h	Literature review	20 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Tobias Wünscher

Lecturers

Prof. Dr. Tobias Wünscher

Teaching contents

Lecture:
Introduction to agricultural policy and trade; the functioning of agricultural markets; global agricultural markets and trade; agricultural trade and development; agricultural commodity trading; agricultural policy as public policy; EU Common Agricultural Policy; land policy; the role of agricultural cooperatives; agricultural policy in other global regions

Seminar:
For the seminars, students will complete weekly reading assignments. These reading materials consist of scientific articles and book chapters, which deepen and complement the topics covered during the lectures. Students will present their reading materials and discuss selected questions during the seminars.

Learning objectives

On successful completion of this module, students should

- know the relevant concepts of international agriculture commodity markets, trade and agricultural policy[1]
- understand the role of governments and other stakeholders in the agricultural policy arena[2]
- be able to apply basic concepts of political sciences to current developments in the agriculture sector[3]
- be able to analyse and critically discuss the impact of agricultural and trade policy in a global context[5]
- be able to consider the social impact of professional decisions[2,3] and thus deepen their capacity to engage in society[2,3]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; seminar, self-study; group work and presentation; poster walk; excursion

Entrance requirements

Mandatory: None

Recommended: Principles of Economics (SA 1 4804)

Reading list

Peterson: A Billion Dollars a Day: The Economics and Politics of Agricultural Subsidies
Cubbage: Natural Resource Policy
B. Hill: Understanding the Common Agricultural Policy
M. Hill: The Public Policy Process

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for seminar

Teaching materials and media

Projector; white/black board; hand-outs; flipchart/ pin-board

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence			X

last amended: October 2024

SA 3 4847 Climate Change and Water Management

Study Semester:	**3** (full time) **5** (part time) **5** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	60 h	Preparation for contact time	30 h
		Literature review	30 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Natalie Laibach

Lecturers

Prof. Dr. Natalie Laibach

Teaching contents

Climate change: past climate change and the response of and effect on past societies; contrast, definition of weather and climate; energy budget of earth; natural greenhouse gases and their control and effect on climate; present climate zones; past climates in the history of earth and suspected factors involved with natural climate change; the climate system as part of the system earth; causes (forces) for and short-term and long-term controls on climate; the effect of feedback mechanisms on climate; anthropogenic climate change from population growth coupled with agricultural and industrial expansion; outlook for the future climate and basic concepts on climate control including change of agricultural present-day to future sustainable practise; tools and methods for climate impact assessment (e.g. carbon footprint, carbon offset)

Water management: fundamental knowledge about the properties of water and hydrological concepts; key technologies for water production, purification and treatment; sustainable water use and irrigation systems; integrated river management; water quality and risks; tools and methods for water use assessment (e.g. water footprint)

Learning objectives

On successful completion of this module, students should

- know the relevant factors controlling climate and the interaction and interdependence of these factors[1]
- know the elements of the water cycle and water catchment management[1]
- be able to outline and compute the key elements of irrigation and drainage systems[1]
- know and understand natural and anthropogenic influences on our climate system[2]
- comprehend the concept of modelling regional climate trends for agricultural purposes[2]
- value water as a scarce resource and improve understanding of the importance of conserving water resources[2]
- be able to relate changing environmental conditions to the effects on climate[3,4]

- master fundamental laws and equations in hydrology and their application in typical water management situations[3]
- be able to identify the most important procedures of water treatment and purification and appreciate their importance with regard to possible toxicological impact on human population[4]
- be able to analyse conditions of agricultural practise in the context of climate change, limited conventional energy resources and growing world population[4]
- be able to develop sensitivity and need for climate control based on past societal experiences[5]
- be able to discuss options for sustainable agriculture in a world of limited natural resources[5]
- be able to consider the social and ecological impact of professional decisions[2,3] and thus deepen their capacity to engage in society[2,3]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; excursion; feedback

Entrance requirements

Mandatory: None

Recommended:

Reading list

Aguado and Burt: Understanding Weather and Climate
Ruddiman: Earth's Climate, Past and Future
Grotzinger and Jordan: Understanding Earth
Hornberger: Elements of Physical Hydrology
Brutsaert: Hydrology – an Introduction
Gray: Water Technology – an Introduction for Environmental Scientists and Engineers
Asano: Water Reuse: Issues, Technologies and Applications
Smith: Landscape Irrigation – Design and Management

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence			X

last amended: October 2024

SA 3 4848 Crop Physiology and Nutrition

Study Semester:	**3** (full time) **3** (part time) **5** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	45 h	Preparation for contact time	30 h
Lab course	30 h	Literature review	20 h
		Preparation for exams	25 h
Sum	75 h	Sum	75 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

Prof. Dr. Florian Wichern; Prof. Dr. habil Jens Gebauer

Teaching contents

Lecture:
Plant physiological responses to abiotic factors (light/radiation, temperature, water, salt); function of plant hormones; details of photosynthesis and water use in higher plants; competition and allelopathy; toxicity and plant physiological responses; functions of essential plant nutrients; uptake, transport and mobilisation of nutrients; practical nutrient management and fertilisation; methods of sustainability assessment (material flow analysis, nutrient flow analysis)

Lab course:
Plant physiological responses to abiotic factors (e.g. nutrients, salt); function of plant hormones; functions of essential plant nutrients; uptake, transport and mobilisation of nutrients; practical nutrient management and fertilisation; advanced methods of crop physiology and nutrition; applied statistics; scientific work

Learning objectives

On successful completion of this module, students should

- know the essential nutrients of plants and their basic functions[1]
- know the basic plant physiological mechanisms[1]
- understand effects of environmental stressors on plants[2]
- understand[2] the photosynthetic pathways and discuss[3] their impact on plant water use
- be able to apply methods of crop physiology and nutrition to agricultural questions[3]
- be able to analyse basic connections between state of nutrition and physiological consequences[4]
- be able to analyse ecophysiological and nutritional reasons for crop rotations

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; lab course with lab journal; field trip

Entrance requirements

Mandatory: Basics of Biology and Agroecology I (SA 1 4807); Agricultural Chemistry (SA 1 4809)

Recommended: Biology and Biodiversity (SA 2 4811), Soil Science and Tillage (SA 1 4810)

Reading list

Lambers, Stuart Chapin and Pons: Plant Ecophysiology
Larcher: Physiological Plant Ecology
Lincoln and Zeiger: Plant Physiology
Marschner: Mineral Nutrition of Higher Plants
Barker and Pilbeam: Handbook of Plant Nutrition.
Bilitewski, Härtle, Marek, Weissbach and Boeddicker: Waste Management
Fageria: The Use of Nutrients in Crop Plants
Scientific articles

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for lab course

Teaching materials and media

Projector; white/black board; hand-outs; lab equipment; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence		X	

last amended: October 2022

SA 3 4849 Crop Health I

Study Semester:	**3** (full time) **5** (part time) **5** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	60 h	Preparation for contact time	30 h
		Literature review	30 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. habil. Jens Gebauer

Lecturers

Prof. Dr. habil. Jens Gebauer

Teaching contents

History of plant pathology; losses caused by weeds, pests and plant diseases; development of pests and diseases and the effect of the environment; types of diseases incl. fungi, bacteria and viruses with examples; types of pests incl. nematodes, insects, mites, slugs/snails and wildlife with examples; problems caused by weeds and parasitic plants with examples; integrated pest management incl. physical, cultural, biotechnological and biological methods of plant protection; chemical plant protection methods and action principles; regulations and laws regarding sustainable use of pesticides; principles and concepts in plant breeding and its contribution to crop health; importance of agro-biodiversity and its conservation; plant diversity in cropping systems and its contribution to crop health

Learning objectives

On successful completion of this module, students should

- know important crop species[1]
- know important weed, plant pathogen and pest species[1]
- know[1] and understand[2] the relevant concepts of plant protection
- know[1] and understand[2] the relevant concepts in plant breeding
- know[1] and understand[2] the relevant concepts in the conservation of plant genetic resources
- understand the impact of biodiversity on ecosystem functioning[2]
- be able to relate their knowledge about plant protection and agrobiodiversity to its relevance in sustainable agriculture[2]
- be able to apply their knowledge to use pesticides in a sustainable and responsible manner[3]
- be able to analyse if application of pesticides is necessary[4]
- be able to critically discuss the benefits and negative effects of pesticide application[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work and presentations; field trip; exercises on species identification

Entrance requirements

Mandatory: None

Recommended:

Reading list

Schumann and D'Arcy: Essential Plant Pathology
Agrios: Plant Pathology
Pedigo and Rice: Entomology and Pest Management
Brown: An Introduction to Plant Breeding
Engels et al.: Managing Plant Genetic Diversity

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: November 2019

SA 3 4845 Analysis and Interpretation of Data II

Study Semester:	**3** (full time) **3** (part time) **5** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	40 h
Exercise	30 h	Literature review	10 h
		Preparation for exams	40 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

N.N.

Lecturers

Prof. Dr. Henrik Rudolf

Teaching contents

Mathematics 2: Linear algebra: vector spaces and matrix operations, eigenvalue analysis: Calculus introduction to multivariate functions

Statistics 2: Inferential statistics; correlation, regression analysis; hypothesis testing; analysis of variance, post hoc test; parameter estimation, time series

Learning objectives

On successful completion of this module, students should

- know basic mathematical concepts and procedures for multivariate problems, and their application[1,2,3]
- understand differences in methods of analysis and display of data[2]
- be able to apply methods of data analysis and display to agricultural data based on R[3, 4]
- be able to critically assess examples of data display[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lectures; self-study; group work; exercise; feedback

Entrance requirements

Mandatory: None

Recommended:

Reading list

Milton: Head first data analysis
Ekstrom and Sorensen: Introduction to statistical data analysis for the life sciences
Soo Tang Tan: Applied mathematics for the managerial, life and social sciences
Bulmer: Principles of Statistics
Simon and Blume: Mathematics for Economists
Stewart, Redlin und Watson: Algebra and Trigonometry
Stewart: Calculus. Metric International Version

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: October 2024

SA 3 4850 Animal Husbandry and Health

Study Semester:	**3** (full time) **7** (part time) **5** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	40 h
Lab course	30 h	Literature review	20 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Steffi Wiedemann

Lecturers

Prof. Dr. José Maria Chapa Gonzalez

Teaching contents

Lecture:
Basics of animal husbandry including management, housing and nutrition of different farm animal species and systems (organic, conventional, intermediate); introduction to animal health (individual and herd health; diagnosis, treatment, prevention of important diseases in farm animal production such as metabolic, infectious (e.g. zoonotic) or nutritional diseases; introduction to the immune system; introduction to animal hygiene; legal regulations; basics of animal breeding (quantitative genetics; pure and cross breeding; fundamentals of genomic breeding, importance of diversity, breeding strategies for sustainable agriculture)

Lab course:
Enhancement of knowledge by practical applications, exercises and excursions

Learning objectives

On successful completion of this module, students should

- know the basics of animal husbandry, health and breeding[1]
- know the important livestock diseases[1]
- understand the mechanisms and regulations of immune systems of different livestock species[2]
- understand the genetic basis of breeding programmes[2]
- be able to compare animal husbandry systems with respect to influences on animal health and wellbeing[3, 4]
- know and understand major livestock diseases and are able to apply their knowledge[3]
- be able to compare different breeding programmes[4] and evaluate their success[5]
- be able to assess animal health and disease prevention programs for a sustainable development of agriculture[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; lab course with lab journal; exercises; field trip

Entrance requirements

Mandatory: Basics of animal sciences (SA 2 4829)

Recommended:

Reading list

Gillespie: Modern Livestock and Poultry Production
Williams: The Complete Textbook of Animal Health & Welfare
Hafez and Hafez: Reproduction in Farm Animals
Bearden, Fuquay and Willard: Applied Animal Reproduction

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for lab course

Teaching materials and media

Beamer; white/black board; hand-outs; lab equipment; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence		X	

last amended: October 2024

SA 4 4875 Agroecology II and Agronomy

Study Semester:	**4** (full time) **6** (part time) **4** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	30 h
Seminar	15 h	Literature review	20 h
Exercise/Excursion	15 h	Preparation for exams	40 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

Prof. Dr. Natalie Laibach

Teaching contents

Classification systems of global land use; basics, principles and concepts of cropping systems; arable farming and fodder production; introduction to grassland systems; relevant annual and perennial crops of temperate, subtropical and tropical regions; crop rotations and interactions in crops; aspects of sustainability in cropping systems; agroecological practices and scientific evidence; sustainability management, auditing, labelling and control systems in plant production (organic food standards, HACCP, Global Gap); application of methods for sustainability assessment (e.g. carbon or water footprint, ecological rucksack, nutrient balances); application of agronomic methods in plant production

Learning objectives

On successful completion of this module, students should

- know the relevant principles and concepts of global land use and cropping systems[1]
- know how annual and perennial crops are cultivated in arable farming systems, fodder production and grassland systems[1]
- be able to relate their knowledge to its relevance in creating sustainable cropping systems[2]
- be able to apply methods of sustainability evaluation[3]
- be able to present and document results and findings in a scientifically appropriate format[4]
- be able to evaluate cropping sequences in agricultural systems regarding their sustainability[5]
- be able to critically discuss possibilities and shortcomings of more sustainable cropping systems in relation to the investigated sustainability parameters[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; seminar; self-study; group work; excursion; exercise; feedback; presentation

Entrance requirements

Mandatory: Biology and biodiversity (SA 2 4811); Crop physiology and nutrition (SA 3 4848)

Recommended: Soil science and tillage (SA 1 4810)

Reading list

Rehm and Espig: The Cultivated Plants of the Tropics and Subtropics
Gliessman: Agroecology
Odum: Fundamentals of Ecology
McMahon, Kofranek and Rubatzky: Plant Science
Martin, Waldren and Stamp: Principles of Field Crop Production
Livingston: Field Crop Production
Sheaffer and Moncada: Introduction to Agronomy

Various scientific articles

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: March 2024

SA 4 4824 Rural Development and Sustainable Behaviour

Study Semester:	**2** (full time) **4** (part time) **2** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	15 h	Preparation for contact time	40 h
Seminar	30 h	Literature review	20 h
Exercise	15 h	Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Tobias Wünscher

Lecturers

Prof. Dr. Tobias Wünscher

Teaching contents

Lecture:
Introduction to rural development; human-ecological systems; economic development theories; measures of development; strategies for rural development; financing of rural development; rural tourism; sustainable development goals; rural public policies

Seminar:
For the seminars, students will complete weekly reading assignments, group tasks or online tutorials. These materials deepen and complement the topics covered during the lectures. Students will present their materials and discuss selected questions during the seminars.

Exercise:
Students will practice selected concepts during the exercise.

Learning objectives

On successful completion of this module, students should

- understand major economic and sociological concepts relevant to rural development and natural resource management[1]
- be able to comprehend contemporary challenges of sustainable development in rural areas[2]
- be able to analyse public policies dilemmas in developed and developing countries[3,4]
- be able to critically discuss sustainable rural development issues in the context of agriculture and natural resource management[5]
- be able to consider the social impact of professional decisions[2,3] and thus deepen their capacity to engage in society[2,3]
-

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; seminar; self-study; group work and presentation; excursion; experiments

Entrance requirements

Mandatory: None

Recommended: None

Reading list

Singh: Rural development: principles, policies and management
Scholz: Environmental literacy in science and society: from knowledge to decisions
Norton, Alwang and Masters: Economics of agricultural development
Yunus: A world of three zeros

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for seminar

Teaching materials and media

Projector; white/black board; hand-outs; flipchart/ pin-board; visualisation aids for presentation; demonstration materials

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence			X

last amended: May 2023

SA 4 4876 Horticulture and Agroforestry

Study Semester:	**4** (full time) **4** (part time) **4** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lectures	45 h	Preparation for contact time	25 h
Lab course/Field course	30 h	Literature review	20 h
		Preparation for exams	30 h
Sum	75 h	Sum	75 h

Total workload: **150 h**

Module coordinator

Prof. Dr. habil. Jens Gebauer

Lecturers

Prof. Dr. habil. Jens Gebauer

Teaching contents

Lecture:
Nomenclature and systematics of horticultural plants; origin and domestication of horticultural plants; assessment of agro-biodiversity and its importance in sustainable production systems; diversity of important horticultural plant species (fruits, vegetables, herbs and spices, ornamentals, trees); horticultural production systems in temperate and tropical regions, their importance and aspects of their sustainability; harvest and post-harvest handling; seed production and storage of orthodox and recalcitrant seeds; sexual and vegetative propagation techniques; temperate and tropical agroforestry systems and their aspects of sustainability; tree-crop interactions; homegardens as small scale agroforestry systems; non-timber forest products including wild fruit trees

Lab course:
Training in identification of crops (hortiversity), sexual and vegetative propagation of annual and perennial crops, seeding, weeding, thinning, pruning, harvesting and post-harvest handling, farm visits

Learning objectives

On successful completion of this module, students should

- know the relevant horticultural products and their production systems[1]
- know basics in propagation of horticultural crops[1]
- know[1] and understand[2] the concepts of agro-biodiversity and centres of crop diversity
- know[1] and understand[2] the concepts of agroforestry production systems of different climatic zones
- be able to apply different aspects of sustainability in horticultural production[3]
- be able to evaluate the influence of environmental factors on horticultural cropping systems[4]
- be able to critically discuss the opportunities and challenges in horticulture[5]
- be able to critically discuss options of agroforestry systems[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work and presentation; demonstration materials; experiments in the greenhouse/gardens; field trip

Entrance requirements

Mandatory: None

Recommended: Crop Health I (SA 3 4849)

Reading list

Jackson, Looney, Morley-Bunker and Thiele: Temperate and Subtropical Fruit Production
Mason: Nursery Management
Davies: Organic Vegetable Production: A Complete Guide
Dole and Wilkins: Floriculture: Principles and Species
Hartmann et al.: Plant Propagation: Principles and Practices
Kellimore: Handbook of Agroforestry
Eyzaguirre and Linares: Home Gardens and Agrobiodiversity
Akinnifesi: Indigenous Fruit Trees in the Tropics

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for lab course

Teaching materials and media

Projector; white/black board; hand-outs; lab equipment; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence			X

last amended: November 2019

SA 4 4874 Project

Study Semester:	**4** (full time) **6** (part time) **6** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
project	10 h	Preparation for contact time	90 h
discussions	10 h	Literature review	10 h
group work	20 h	Preparation for exams	10 h
Sum	40 h	Sum	110 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Matthias Kleinke

Lecturers

Prof. Dr. Dirk Bockmühl (coordination); all lecturers of the faculty

Teaching contents

Organization of projects as part of a knowledge-based education; structuring of tasks; collection and analysis of relevant academic literature; acquisition of social competence and ability to work in a team; acquisition and deepening of subject-specific knowledge and methods; writing of academic texts; adequate presentation of results by way of posters, reports or presentation

Learning objectives

On successful completion of this module, students should

- know and apply methods of academic writing to a project relevant to the study course[3]
- have acquired and broadened their discipline-specific knowledge[1,3,4]
- be able to define the relevant project phases on the basis of the project's subject and to define an appropriate project organisation[1]
- be able to collect the relevant data and to discuss the information in their group[2]
- be able to detect multidisciplinary contexts and to apply if necessary knowledge and methods in an interdisciplinary, but always problem- and/or goal-oriented way
- be able to work independently as well as in a team and have experienced requirements and options of leadership without disciplinary authority[2]
- be able to analyze the scientific/academic and societal relevance of the results for the achievement of the project's goal[4]
- be able to summarize the results of the project in a written report and prepare the presentation to the study course group[4]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

group work; project; discussion; contact time; presentation

Entrance requirements

Mandatory: None

Recommended: basic subjects relevant for the chosen project

Reading list

Wilson: An introduction to Scientific Research
Carey: A Beginner's Guide to Scientific Method
Valiela: Doing Science: Design, Analysis, and Communication of Scientific Research
Kahn: The Student's Guide to Successful Project Teams
APittampalli: Read This before Our Next Meeting
Horine: Project Management Absolute Beginner's Guide
Portny: Project Management for Dummies
Alley: The Craft of Scientific Presentations: Critical Steps to Succeed and Critical Errors to Avoid
Hofmann: Scientific Writing and Communication: Papers, Proposals, and Presentations
Alley: The Craft of Scientific Writing

Depending on disciplinary orientation of the project the supervisor will provide relevant academic literature.

Examination

Certificate according to §§ 14 and 20 General Examination Regulations for Bachelor’s and Master’s Degree Programmes

Teaching materials and media

Projector; white/black board; flipchart; visualization tools (facilitator's toolcase); AV-media; overhead projector; demonstration material; library

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence		X	
Methodological competence	X		
Social competence	X		

last amended: March 2025

SA 4 4898 Focus Field Animal Sciences and Aquaponics I

Study Semester:	**4** (full time) **6** (part time) **4** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	40 h	Preparation for contact time	30 h
Exercise/Field course	20 h	Literature review	30 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Steffi Wiedemann

Lecturers

Prof. Dr. Steffi Wiedemann and other lecturers

Teaching contents

Lectures:
Animal husbandry systems for different species in different contexts and different countries (topics include advanced animal nutrition, animal breeding, animal health, animal housing and animal hygiene); health management of typical farm and aquatic animals; interactions between livestock farming systems and health of animals; environmental impacts of livestock farming systems; impact of environment on livestock farming

Exercise/Field course
Enhancement of knowledge by exercises and field trips

Learning objectives

On successful completion of this module, students should

- be able to describe different husbandry systems for the most relevant farm and aquatic animal species[1]
- understand interactions between livestock farming systems and the environment [2]
- be able to apply standard procedures to manage health in farm animals[3]
- be able to critically discuss advantages and disadvantages of different livestock husbandry systems[4]
- be able to develop management recommendations for livestock farms to improve their sustainability[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; exercise; self-study; e-learning units; literature review; group work and presentation; field course

Entrance requirements

Mandatory: None

Recommended: Basics of Animal Sciences (SA 2 4829) or Agronomy I and Animal Husbandry (AB 1 4003)

Reading list

Williams: The Complete Textbook of Animal Health & Welfare
Hafez and Hafez: Reproduction in Farm Animals
Bearden, Fuquay and Willard: Applied Animal Reproduction
Sejian et al.: Climate Change Impact on Livestock: Adaptation and Mitigation
FAO: Tackling climate change through livestock
Current journal articles provided in the course

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; e-learning platform; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence		X	

last amended: November 2019

SA 4 4899 Focus Field Plant and Soil Sciences I

Study Semester:	**4** (full time) **6** (part time) **4** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	20 h	Preparation for contact time	30 h
Lab course	20 h	Literature review	30 h
Exercise and excursion	20 h	Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

Prof. Dr. Jens Gebauer; Dipl.agr. Julia Gorris; Maren Weller, M.Sc.

Teaching contents

The elective modules in this focus field deal with subjects in plant and soil sciences and provide the students an opportunity to strengthen their knowledge base and to specialize in this domain. The core area of plant sciences deals mainly with cultivated plants, its botanical and cultivation details and their use by human beings. In soil sciences the focus is primarily on agricultural soils at different spatial scales, however, comparing it with soils of forests and natural habitats where applicable. The elective courses offered, will either broaden students' perspective of crops and cropping systems, or strengthen their knowledge in specific areas. In addition to lectures and seminars, students will elaborate on their practical, methodical and analytical skills in field trips/excursions, exercises and lab courses.

Learning objectives

On successful completion of this module, students should

- have broadened their knowledge base on plant species in particular crops and soils and their management[1,2]
- be able to apply the knowledge gained on plants and soils to other cropping systems and soils[3]
- be able to analyse crop production systems and soils as basis for sustainable agriculture[4]
- be able to disseminate their knowledge to both scientific and non-scientific audience[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lectures; seminar; self-study; literature review; group work and presentation; field trip/excursion; exercise; lab course

Entrance requirements

Mandatory: None

Recommended: Basics of Biology and Agroecology I (SA 1 4807); Soil Science and Tillage (SA 1 4810); Biology and Biodiversity (SA 2 4811); Crop Physiology and Nutrition (SA 3 4848); Crop Health I (SA 3 4849)

Reading list

Will be announced in the individual elective courses

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; greenhouse/garden equipment; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence		X	

last amended: April 2026

SA 4 4924 Focus Field Analysis of Sustainability and Food Sciences

Study Semester:	**4** (full time) **6** (part time) **4** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	60 h	Preparation for contact time	35 h
		Literature review	35 h
		Preparation for exams	20 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

N.N.

Lecturers

Prof. Dr. Matthias Kleinke; Dr. Wael Sabra; Prof. Dr. Florian Wichern

Teaching contents

The elective modules in this focus field deal with subjects in the way of analysing sustainability in agricultural systems and in the field of food sciences and provide the students an opportunity to strengthen their knowledge base and to specialize in this domain. In addition to lectures and seminars, students will elaborate on their practical, methodical and analytical skills in field trips/excursions, exercises and lab courses.

The core area of the analysis of sustainability deals mainly with the investigation of various practical examples e.g. of urban farming and sustainable agricultural technologies; factors influencing urban farming and sustainable agriculture; aspects of non-sustainable development in agriculture; challenges of sustainable urban farming, land use and agriculture. In nature conservation as part of an sustainable land use the focus is primarily on important animal and plant species for nature conservation; endangered species and biodiversity; classification of relevant natural habitats and their position in landscapes; nature conservation approaches; investigation of interactions between agriculture and natural ecosystems; conflicts, regulations and laws; drivers of and stakeholders in nature conservation; examples of nature conservation. To the area of modelling ecological systems one focus is developing models for growth, harvesting, population interaction, environmental effects; computer based modelling, sustainability as steadiness and stability of critical points. In food sciences the following topics are relevant: nature of food, basics of human nutrition, technological influences on food availability; processing of selected products, nutrition value as influences by technology, eating habits, nutritional advices, food policy, influences on food choices.

Learning objectives

On successful completion of the different modules in this focus field, students should e.g.

- know the determining factors for agricultural systems and in particular urban farming systems and factors influencing their sustainability[1]
- be able to recognize challenges of urban farming and sustainable development in agriculture[2]

- be able to compare conventional, traditional and urban agricultural systems with respect to their sustainability using a sustainability assessment[3,4]
- be able to analyse pros and cons of new developments in agriculture[4]
- be able to develop recommendations for sustainable urban farming systems and concepts[5]
- know the major habitats, landscapes and conservation approaches[1]
- be able to describe the major regulatory approaches to nature conservation in Europe[1]
- recognize conflicts, limitations and challenges for nature conservation in agricultural landscapes[2]
- be able to recommend means to improve sustainability in agricultural systems in relation to nature conservation[5]
- know the relevant properties of ecological systems defining their long-term behaviour[1]
- understand the balance equation describing ecological systems[1,2,3]
- be able to set up balance equations for ecological processes and solve them with computer algebra systems[1,2,3]
- know and understand the nature of food and human nutrition[1,2]
- be able to evaluate the importance of food to human health[1,2]
- know the basics of different processing methods[1,2]
- be able to analyse effects of selected processed foods on human nutrition[4]
- be able to critically discuss possibilities and shortcomings of a sustainable development in human nutrition under different economic and cultural conditions[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; excursion; case studies; lab course; field trip

Entrance requirements

Mandatory: None

Recommended: Basics of Biology and Agroecology I (SA 1 4807); Soil Science and Tillage (SA 1 4810); Biology and Biodiversity (SA 2 4811)

Reading list

Various case studies and scientific publications; soil classification manuals; agroecology manuals; manuals for vegetation appraisal

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes; certificate for lab course

Teaching materials and media

Projector; white/black board; hand-outs; lab equipment; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: March 2024

SA 4900 Area of Specialization Economics and Social Sciences I

Study Semester:	**4** (full time) **6** (part time) **4** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	60 h	Preparation for contact time	35 h
		Literature review	35 h
		Preparation for exams	20 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Matthias Kleinke

Lecturers

See respective module

Teaching contents

The choices in this focus field offers the students an opportunity to strengthen their knowledge base and to specialize in the domain of economics and social sciences. They can choose from the following modules of the study program Agribusiness:

- AB 2 4021 Strategy and Management
- AB 2 4023 Financial Accounting
- AB 2 4026 Supply Chain Management
- AB 4 4071 Agricultural Extension (Module Requirement AB 1 4006 Communication)
- AB 4 4072 Entrepreneurship and Innovation Management
- AB 4 4073 Market Research (Module Requirements SA 1 4805 Analysis and Interpretation of Data I, SA 3 4845 Analysis and Interpretation of Data II)

For further information on these modules please check the Handbook of Modules of the study program Agribusiness.

Learning objectives

On successful completion of the different modules in this focus field the students have acquired the learning objectives of the respective module.

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

See respective module

Entrance requirements

See respective module

Reading list

See respective module

Examination

See respective module

Teaching materials and media

See respective module

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	See respective module		
Methodological competence			
Social competence			

last amended: October 2022

SA 4 WPF_1 Module from any Bachelor Study Course at the Faculty of Life Sciences at Rhine-Waal University of Applied Sciences

Study Semester:	**4** (full time) **6** (part time) **4** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	60 h	Preparation for contact time	30 h
		Literature review	30 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Peter F. W. Simon

Lecturers

All lecturers of the faculty

Teaching contents

Depending on the chosen module to be elected from any bachelor study course of the faculty of Life Sciences

Learning objectives

On successful completion of this module, students should

- have acquired knowledge from other areas of the faculty and deepen or enlarged their horizon[1]
- understand the importance of getting information beyond their specialisation[2]
- be able to implement alternative ways and approaches to problem solving[3]
- be able to compare contents and learning outcomes of other study courses with their own achievements[4]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Depending on chosen module

Entrance requirements

Depending on chosen module

Reading list

Depending on chosen module

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Depending on chosen module

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence			X

last amended: November 2019

SA 5 4921 Ethics in Life Sciences

Study Semester:	**5** (full time) **9** (part time) **7** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	15 h	Preparation for contact time	30 h
Seminar	30 h	Literature review	30 h
		Preparation for exams	45 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Tobias Wünscher

Lecturers

Prof. Dr. Natalie Laibach

Teaching contents

Logic, argumentation and science; the nature of reality; knowledge and truth; religion and political philosophy; theories of ethics and morality; ethical and moral reasoning; technology assessment; ethics in food security, food safety and biomass production; ethics in life sciences

Learning objectives

On successful completion of this module, students should

- know the basic concepts and theories of philosophy and ethics[1]
- know how to plan and conduct a seminar on a relevant topic of life sciences ethics[1]
- know the principles and range of technology assessment methods[1]
- comprehend the necessity of systematic and fact-based approaches to assess technologies[2]
- be able to identify moral reasoning[2]
- be able to apply ethical concepts as an instrument for moral reasoning[3]
- be able to analyse texts and presentations for moral reasoning of topics relevant in life sciences[4]
- be able to critically discuss relevant topics of life sciences ethics in the context of a sustainable development of agriculture[5]
- be able to consider the social an ethical impact of professional decisions[2,3] and thus deepen their capacity to engage in society[2,3]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Seminar; self-study; group work; feedback; presentation

Entrance requirements

Mandatory: None

Recommended: None

Reading list

Comstock: Life Science Ethics
Solomon: The Big Questions: A Short Introduction to Philosophy
Rachels: The Elements of Moral Philosophy
VDI 3780: Technology Assessment

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence		X	
Methodological competence	X		
Social competence	X		

last amended: October 2024

SA 5 4922 Sustainability and Agri-food Chains

Study Semester:	**5** (full time) **7** (part time) **7** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	15 h	Preparation for contact time	45 h
Exercise	15 h	Literature review	20 h
Project	30 h	Preparation for exams	25 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Tobias Wünscher

Lecturers

Prof. Dr. Tobias Wünscher

Teaching contents

Sustainability assessment in the agrifood-sector; advanced aspects of sustainable agriculture and sustainable agrifood chains; current issues in international agrifood chains; instruments of sustainability assessment; instruments of sustainable agrifood chain management

Learning objectives

On successful completion of this module, students should

- know the relevant fields of action of sustainability in the investigated agri-food chain[1]
- be able to organise and manage a project and a team[2]
- be able to apply the relevant methods of sustainability assessment[3]
- be able to present and document results and findings in a scientific report/article[4]
- be able to evaluate methods of farming and agri-food chain sustainability assessment[5]
- be able to critically discuss their findings[5]
- be able to develop management recommendations[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Self-study; group work, excursion; case studies; seminar presentation

Entrance requirements

Mandatory: None

Recommended: None

Reading list

Various case studies and scientific publications will be provided by lecturer.

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence	X		

last amended: May 2023

SA 5 4844 Natural Resource and Environmental Economics

Study Semester:	**3** (full time) **3** (part time) **5** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	15 h	Preparation for contact time	45 h
Seminar	15 h	Literature review	20 h
Exercise	30 h	Preparation for exams	25 h
Sum	60 h	Sum	90 h

Total workload: **150**

Module coordinator

Prof. Dr. Tobias Wünscher

Lecturers

Prof. Dr. Tobias Wünscher

Teaching contents

Environment and economics; markets and welfare; market failure; property rights; externalities; pollution; natural resource use; dynamic efficiency; economics of renewable resources; economics of non-renewable resources; environmental valuation; cost benefit analysis; sustainable development; policy instruments; public choice; decisions under risk; risk measures; concepts in environmental risk assessment and risk management

Learning objectives

On successful completion of this module, students should

- know the relevant concepts and principles of natural resource and environmental economics[1]
- be familiar with the concept of risk[1]
- be able to relate their knowledge of risk to management decisions in the agri-food sector and natural resource use[2]
- be able to apply cost benefit analysis to projects in the agribusiness and environmental sector[3]
- be able to document results and findings in an appropriate form[4]
- be able to analyse the relevant processes in a business[4]
- be able to design recommendations for private and public decision makers[5]
- be able to consider the social impact of professional decisions[2,3] and thus deepen their capacity to engage in society[2,3]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work and presentation; exercises, case studies

Entrance requirements

Mandatory: Principles of Economics (SA 1 4804)

Recommended: None

Reading list

Tietenberg and Lewis: Environmental & Natural Resources Economics
Perman, Ma, Common, Maddison and McGilvray: Natural Resource and Environmental Economics
Pearce, Atkinson and Mourato: Cost Benefit Analysis and the Environment: Recent Developments
Hardaker, Huirne and Anderson: Coping with Risk in Agriculture

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: May 2023

SA 5 4925 Animal Welfare

Study Semester:	**5** (full time) **7** (part time) **7** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	25 h
Exercise	30 h	Literature review	30 h
		Preparation for exams	35 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Steffi Wiedemann

Lecturers

Prof. Dr. José Maria Chapa Gonzalez

Teaching contents

Lecture:
Definition of animal welfare; overview of legal regulations concerning animal welfare and animal rights; criteria for evaluating livestock-friendliness; stress and pain; animal welfare in housing, handling, transport and slaughtering; zootechnical procedures; animal welfare in laboratory animals; welfare labels; basics and methods of animal ethology; observation and evaluation of animal behaviour

Exercise:
Enhancement of knowledge by application of methods to assess animal welfare, excursions and case studies

Learning objectives

On successful completion of this module, students should

- know the covered legal regulations[1]
- know the main behavioural traits of the important farm animals[1]
- understand[2] and apply[3] methods of animal ethology and behaviour observation
- be able to analyse the livestock-friendliness of livestock systems[4]
- be able to critically discuss the possibilities and shortcomings of animal welfare in sustainable agriculture[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; exercise; field trip; case study

Entrance requirements

Mandatory: Basics of Animal Sciences (SA 2 4829); Animal Husbandry and Health (SA 3 4850)

Recommended:

Reading list

Webster: Management and Animal Welfare
Jensen: The ethology of domestic animals: An introductory text
Grandin and Johnson: Animals in translation
Williams: The complete textbook of animal health and animal welfare
Vaarst, Roderick and Lund: Animal health and welfare in organic agriculture
Recent journal articles and publications distributed in the course

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; computers, flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence	X		

last amended: October 2024

SA 5 4947 Focus Field Animal Sciences and Aquaponics II

Study Semester:	**5** (full time) **5** or **7** (part time) **7** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	40 h	Preparation for contact time	30 h
Exercise/Field course	20 h	Literature review	30 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Steffi Wiedemann

Lecturers

Prof. Dr. José Maria Chapa Gonzalez; Eyitope Oluwatobi Ogundolap

Teaching contents

Lectures:
Animal husbandry systems for different species in different contexts and different countries (topics include advanced animal nutrition, animal breeding, animal health, animal housing and animal hygiene); health management of typical farm and aquatic animals; interactions between livestock farming systems and health of animals; environmental impacts of livestock farming systems; impact of environment on livestock farming

Exercise/Field course
Enhancement of knowledge by exercises and field trips

Learning objectives

On successful completion of this module, students should

- be able to describe different husbandry systems for the most relevant farm and aquatic animal species[1]
- understand interactions between livestock farming systems and the environment [2]
- be able to apply standard procedures to manage health in farm animals[3]
- be able to critically discuss advantages and disadvantages of different livestock husbandry systems[4]
- be able to develop management recommendations for livestock farms to improve their sustainability[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; exercise; self-study; e-learning units; literature review; group work and presentation; field course

Entrance requirements

Mandatory: None

Recommended: Basics of Animal Sciences (SA 2 4829) or Agronomy I and Animal Husbandry (AB 1 4003)

Reading list

Williams: The Complete Textbook of Animal Health & Welfare
Hafez and Hafez: Reproduction in Farm Animals
Bearden, Fuquay and Willard: Applied Animal Reproduction
Sejian et al.: Climate Change Impact on Livestock: Adaptation and Mitigation
FAO: Tackling climate change through livestock
Current journal articles provided in the course

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; e-learning platform; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence		X	

last amended: October 2024

SA 5 4948 Focus Field Plant and Soil Sciences II

Study Semester:	**5** (full time) **7** or **9** (part time) **7** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	20 h	Preparation for contact time	30 h
Lab course	20 h	Literature review	30 h
Exercise and excursion	20 h	Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

Prof. Dr. Florian Wichern; Dr. Conor Watson

Teaching contents

The elective modules in this focus field deal with subjects in plant and soil sciences and provide the students an opportunity to strengthen their knowledge base and to specialize in this domain. The core area of plant sciences deals mainly with cultivated plants, its botanical and cultivation details and their use by human beings. In soil sciences the focus is primarily on agricultural soils at different spatial scales, however, comparing it with soils of forests and natural habitats where applicable. The elective courses offered, will either broaden students' perspective of crops and cropping systems, or strengthen their knowledge in specific areas. In addition to lectures and seminars, students will elaborate on their practical, methodical and analytical skills in field trips/excursions, exercises and lab courses.

Learning objectives

On successful completion of this module, students should

- have broadened their knowledge base on plant species in particular crops and soils and their management[1,2]
- be able to apply the knowledge gained on plants and soils to other cropping systems and soils[3]
- be able to analyse crop production systems and soils as basis for sustainable agriculture[4]
- be able to disseminate their knowledge to both scientific and non-scientific audience[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lectures; seminar; self-study; literature review; group work and presentation; field trip/excursion; exercise; lab course

Entrance requirements

Mandatory: None

Recommended: Basics of Biology and Agroecology I (SA 1 4807); Soil Science and Tillage (SA 1 4810); Biology and Biodiversity (SA 2 4811); Crop Physiology and Nutrition (SA 3 4848); Crop Health I (SA 3 4849)

Reading list

Will be announced in the individual elective courses

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; greenhouse/garden equipment; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence		X	

last amended: October 2021

SA 5 4949 Focus Field Analysis of Sustainability and Food Sciences II

Study Semester:	**5** (full time) **5 or 7** (part time) **7** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	35 h
Seminar	30 h	Literature review	35 h
		Preparation for exams	20 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Matthias Kleinke

Lecturers

Prof. Dr. Florian Kugler

Teaching contents

Food Processing and Human Nutrition: For further information on this module please check the Handbook of Modules of the study program Agribusiness, module AB_26 Food Processing and Human Nutrition

Ecological Modelling: Models for growth, harvesting, population interaction, environmental effects; computer based modelling; sustainability as steadiness and stability of critical points (attractor, repellor)

Organic Farming: History, principles and concepts of organic farming in various countries; statistics and development of organic farming; sustainability of organic farming systems

Learning objectives

On successful completion of this module, students should

- know and understand the nature of food and human nutrition[1,2]
- be able to evaluate the importance of food to human health[1,2]
- know the basics of different processing methods and their weak and strong points concerning food quality and human nutrition[1,2]
- be able to apply the knowledge in developing solutions for case studies and questions in food technology[3]
- be able to analyse effects of selected processed foods on human nutrition[4]
- be able to critically discuss possibilities and shortcomings of a sustainable development in human nutrition under different economic and cultural conditions[5]
- know relevant properties of ecological systems defining their long-term behaviour[1]
- understand balance equations describing ecological systems[1,2,3]
- be able to set up balance equations for ecological processes[3]
- be able to solve these equations with the help of computer algebra systems[3]

- be able to support decisions in ecological management[4,5]
- know the principles of organic farming in Europe, the United States and other relevant countries[1]
- understand the conceptual and practical differences between conventional and organic farming[2]
- be able to critically discuss publications comparing conventional and organic farming[4]
- be able to evaluate the sustainability of organic farming systems[5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Lecture; self-study; group work; excursion; case studies; lab course; field trip

Entrance requirements

Mandatory: None

Recommended: **Food Processing**: Agricultural Chemistry (SA 1 4809); Organic and Biochemistry, Biotechnology (SA 2 4827); Rural Development and Sustainable Behaviour (SA 4 4824); **Ecological Modelling**: Analysis and Interpretation of Data I (SA 1 4805) and II (SA 3 4845); **Organic Farming**: Basics of Biology and Agroecology I (SA 1 4807); Soil Science and Tillage (SA 1 4810); Crop Physiology and Nutrition (SA 3 4848); Horticulture and Agroforestry (SA 4 4876)

Reading list

Moffat and Prowse: Human Diet and Nutrition in a Biocultural Perspective: Past meets Present
Campbell-Platt: Food Science and Technology
Schmidt and Kloeble: Reference figures for organic farming inspections
Lampkin: Organic farming
Lampkin, Measures and Padel: Organic farm management handbook

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

projector; white/black board; hand-outs; lab equipment; flipchart; visualisation aids for presentation; demonstration material; A/V media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: October 2024

SA 5 4950 Area of Specialization Economics and Social Sciences II

Study Semester:	**5** (full time) **5 or 7** (part time) **7** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	60 h	Preparation for contact time	30 h
		Literature review	30 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Matthias Kleinke

Lecturers

See respective module

Teaching contents

The choices in this focus field offer the students an opportunity to strengthen their knowledge base and to specialize in the domain of economics and social sciences. They can choose from the following modules of the study program Agribusiness:

- AB 1 4001 Marketing
- AB 1 4006 Communication
- AB 3 4043 Environmental, Agricultural and Food Law
- AB 3 4046 Management Accounting
- AB 5 4124 Integrated Management Systems

For further information on these modules please check the Handbook of Modules of the study program Agribusiness.

Learning objectives

On successful completion of the different modules in this focus field the students have acquired the learning objectives of the respective module.

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

See respective module

Entrance requirements

See respective module

Reading list

See respective module

Examination

See respective module

Teaching materials and media

See respective module

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	See respective module		
Methodological competence			
Social competence			

last amended: October 2022

SA 5 WPF_2 Module from any Bachelor Study Course at the Faculty of Life Sciences at Rhine-Waal University of Applied Sciences

Study Semester:	**5** (full time) **7** (part time) **7** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	60 h	Preparation for contact time	30 h
		Literature review	30 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Peter F. W. Simon

Lecturers

All lecturers of the faculty

Teaching contents

Depending on the chosen module to be elected from any bachelor study course of faculty of Life Sciences

Learning objectives

On successful completion of this module, students should

- have acquired knowledge from other areas of the faculty and deepened or enlarged their horizon[1]
- understand the importance of getting information beyond their specialisation[2]
- be able to implement alternative ways and approaches to problem solving[3]
- be able to compare contents and learning outcomes of other study courses with their own achievements[4]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Depending on chosen module

Entrance requirements

Depending on chosen module

Reading list

Depending on chosen module

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Depending on chosen module

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence			

last amended: November 2019

SA 6 4991 Internship or Study Abroad

Study Semester:	**56** (full time) **1–7** (part time) **6** (cooperative)	**Credit Points (ECTS):**	**30**

Workload

Contact time	Self-study
Sum	Sum 900 h

Total workload: **900 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

Depends on selected activity

Teaching contents

Internship: Intention of the work placement is for the students to work in one or more functional divisions/branches of a company in order to implement knowledge and methods from their studies. The students are requested to consider the coherencies of economic, social and environmental aspects. After finishing the internship, the experience gained during the practical semester must be summarized in a written report according to criteria defined beforehand by the student and the supervising professor. The work placement can also be pursued abroad.

Study abroad: Instead of the work placement the students have the option to study a semester at a university abroad in order to deepen their theoretical and practical knowledge. The students attend selected classes and pass the relevant exams. On completion of their study abroad, students should be able to discuss relevant issues in a cross cultural and academic surrounding. Upon agreement of study abroad student and supervisor fix the intended outcomes. Upon return from study abroad the supervisor will check the written report based on the following criteria: expectations vs. the achievements actually made, validity of experiences for the studies, active learning, structuring of experiences achieved, effective competence to solve problems in an unfamiliar surrounding

Learning objectives

Internship: The learning outcomes result from the selected activity and the business environment of companies, organisations and institutions. It is necessary that these partners and the university agree on contents and outcomes in order to allow for an appropriate coordination of the study.

Study abroad: The learning outcomes depend on where and how the study abroad is pursued. The students will improve their language skills in an authentic surrounding. The student has to coordinate the selection of classes with the supervisor of this module for recognition of assembled ECTS.

- The students learn to consider the social impact of professional decisions[2,3] and thus deepen their capacity to engage in society[2,3]
- [1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Depends on selected activity

Entrance requirements

Mandatory: Minimum of 90 ECTS and all modules of the first 2 semesters

Recommended:

Reading list

Depends on selected activity

Examination

Internship: written report

Study abroad: successful completion of 15 ECTS, written report, presentation to supervisor of study abroad

Teaching materials and media

Depends on selected activity

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence		X	
Methodological competence		X	
Social competence		X	

last amended: November 2019

SA 7 4992 Academic Principles and Methods

Study Semester:	**7** (full time) **9** (part time) **8** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	20 h	Preparation for contact time	40 h
Exercise	30 h	Literature review	60 h
Sum	50 h	Sum	100 h

Total workload: **150 h**

Module coordinator

N.N.

Lecturers

N.N.

Teaching contents

Techniques of academic work; basics of academic work; structure of an academic paper; use of a library and scientific literature; literature research: presentation of results and topics; handling specialist literature: excerption; handling and proving arguments; presentation of results; presentation techniques; academic writing

Learning objectives

On successful completion of this module, students should

- know the principles of academic work and are able to apply and document these in practice[1,3]
- know the general structure of academic work and are able to arrange and format it[1,3]
- be able to document scientific issues[3]
- be acquainted with methodical aspects; internalize science-ethical issues like copyright, correct citation, plagiarism, etc.[1,2]
- be able to judge references and sources with respect to their relevance and significance[4,5]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and Judgement

Teaching and learning methods

Lecture; self-study; group work; exercises

Entrance requirements

Mandatory: None

Recommended: None

Reading list

Literature will be provided by the lecturer

Examination

Certificate according to §§ 14 and 20 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; AV-Media

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence		X	
Methodological competence	X		
Social competence			X

last amended: November 2019

SA 7 4971 Project reg. Academic Principles and Methods in Preparation of Bachelor Thesis

Study Semester:	**7** (full time) **9** (part time) **9** (cooperative)	**Credit Points (ECTS):**	**10**

Workload

Contact time		Self-study	
Project practice-oriented	30 h	Preparation for contact time	20 h
		Literature review	50 h
		practical, scientific work	180 h
		writing project report	20 h
Sum	30 h	Sum	270 h

Total workload: **300 h**

Module coordinator

Prof. Dr. Matthias Kleinke

Lecturers

all lecturers of the faculty

Teaching contents

The student should be prepared for his or her bachelor thesis through applied research. As a rule, the intended supervisor of the thesis will enable the student to gain theoretical and practical experience in his/her own research environment by working independently on a scientific topic that is preferably close to the planned thesis. All aspects of scientific work are taken up here, i.e. in addition to practical work (e.g. in the laboratory), in particular literature studies on the content and methodological preparation of the topic, experiment planning, scientifically appropriate documentation and writing of a final report, as well as presentation of the (interim) results in status seminars and oral final presentation if necessary.

The planned workload of 300 hours is to be completed as a rule during a continuous period of 6 weeks after completion of the internship, whereby the contact time and self-study portions can vary depending on the type of research activity. The figures given in the above table are therefore to be understood as a guideline.

The project for the preparation of the Bachelor's thesis can also be carried out in the company of the internship.

Learning objectives

On successful completion of this module, students should

- be able to work independently with scientific literature[3]
- be able to apply methods of theoretical and scientific work[1,3]
- be able to correctly document scientific work[3]
- have deepened their specialist knowledge on specific topics[1,3,4]
- have expanded their ability to work in a team[3]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

practical scientific work

Entrance requirements

Mandatory: None

Recommended: Internship or study abroad (SA 6 4991); Academic Methods and Principles (SA 7 4992); relevant basic courses of the semesters 1–5 according to the choice of topic

Reading list

Depending on the chosen subject area, scientific literature is made available by the supervisor or procured by the student.

Examination

Certificate according to §§ 14 and 20 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Relevant subject-related literature; if applicable, relevant laboratory equipment

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence		X	

last amended: November 2019

550 Language Course for Students (Without Previous Knowledge)

Study Semester:	**1–7** (winter term/summer term)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Language course	52 h	Preparation for contact time	28 h
		Self study	50 h
		Preparation for exams	20 h
Sum	52 h	Sum	98 h

Total workload: **150 h**

Module coordinator

International Center: Office of Languages and Intercultural Communication

Lecturers

Ratka Sosovska; Frau Elfriede van Dijk (LfbA DaF)

Teaching contents

Module contents are based on the “can-do statements” of the Common European Framework of Reference for Languages (CEFR) for the levels A1–B2. All four skills areas – Listening, Speaking, Reading, Writing – are practiced.

Learning objectives

The main objective of this module is to develop students’ verbal communication skills as well as to impart to them effective general learning and communication strategies. Upon successful completion of this module, students should be able to navigate common everyday situations using simple linguistic means of communication.

On successful completion of this module, students should

- Xxx[hochgestellte Zahl]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

classroom instruction; language practice in Language Lab; self-study

Entrance requirements

Level A1.1: The main objective of this module is to develop students’ verbal communication skills in German as well as to impart to them effective general learning and communication strategies. Upon successful completion of this module, students should be able to navigate common everyday situations using simple linguistic means of communication.

Level A1.2: The main objective of this module is the continued development of students' verbal communication skills by expanding their passive and active vocabularies and solidifying their grasp on underlying grammatical structures. Upon successful completion of this module, students should be able to navigate common everyday situations using simple linguistic means of communication.

Level A2.1: The main objective of this module is the continued development of students' communicative skills by expanding and solidifying their passive and active vocabularies, as well as their understanding and use of more advanced grammatical structures. Upon successful completion of this module, students should be able to navigate many everyday situations using limited means of communication, as well as produce and understand commonly used terms and phrases in German. Continued practice of learning strategies is also a central component of this module.

Level A2.2: The main objective of this module is the continued development of students' communicative skills by expanding and solidifying their passive and active vocabularies, as well as their understanding and use of advanced grammatical structures. Upon successful completion of this module, students should be able to navigate many everyday situations using limited means of communication, as well as produce and understand commonly used terms and phrases in German. Continued practice of learning strategies is also a central component of this module.

Level B1.1: The main objective of this module is the development of applied language skills so that students can communicate effectively in German both on and off campus. Developing effective writing skills receives more focus at the B1 level as well. Upon successful completion of this module, students should be able to give short presentations on specific (intercultural) topics and answer related questions from the audience.

Reading list

Studio [21] Das Deutschbuch A1-B1/+Medienpaket
Studio d Die Mittelstufe (B2/1 oder B2/2)

Examination

Certificate according to §§ 14 and 20 General Examination Regulations for Bachelor's and Master's Degree Programmes

A recognised certificate obtained elsewhere, confirming level B1.2 or higher, may be recognised.

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration material

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence		X	
Methodological competence			X
Social competence	X		

last amended: November 2019

SA 7 WPF_3 Module from Catalogue Elective Modules 1 and 2 of Study Course Sustainable Agriculture

Study Semester:	**7** (full time) **9** (part time) **8** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	60 h	Preparation for contact time	30 h
		Literature review	30 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Peter F. W. Simon

Lecturers

All lecturers of the study course

Teaching contents

Depending on the chosen module to be elected from catalogues Elective Modules 1 and 2 of Sustainable Agriculture

Learning objectives

On successful completion of this module, students should

- have broadened their knowledge of the chosen focus fields[1]
- understand the importance of broadening their knowledge beyond their specialisation[2]
- be able to implement alternative ways and approaches to problem solving[3]
- be able to compare contents and learning outcomes with their own achievements[4]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Depending on chosen module

Entrance requirements

Depending on chosen module

Reading list

Depending on chosen module

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Depending on chosen module

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence			X

last amended: November 2019

SA 7 WPF_4 Module from any Bachelor Study Course at Rhine-Waal University of Applied Sciences

Study Semester:	**7** (full time) **9** (part time) **8** (cooperative)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	60 h	Preparation for contact time	30 h
		Literature review	30 h
		Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Module coordinator

Prof. Dr. Peter F. W. Simon

Lecturers

All lecturers of the university

Teaching contents

Depending on the chosen module to be elected from any bachelor study course of Rhine-Waal University

Learning objectives

On successful completion of this module, students should

- have acquired knowledge from other areas of the university and deepened or enlarged their horizon[1]
- understand the importance of getting information beyond their specialisation[2]
- be able to implement alternative ways and approaches to problem solving[3]
- be able to compare contents and learning outcomes of other study courses with their own achievements[4]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Depending on chosen module

Entrance requirements

Depending on chosen module

Reading list

Depending on chosen module

Examination

Graded exam according to §§ 14, 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Depending on chosen module

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence		X	
Social competence			X

last amended: November 2019

SA 7 4993 Bachelor Thesis

Study Semester:	**7** (full time) **8** (part time) **8** (cooperative)	**Credit Points (ECTS):**	**12**

Workload

Contact time	Self-study
Sum	Sum 360 h

Total workload: **360 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

All lecturers of the faculty

Teaching contents

The contents of the bachelor thesis are specific and have to be coordinated with the chosen/elected instructor/lecturer. The assigned task will be adequately described and documented as well as the chosen approach, methodology and results.

Learning objectives

On successful completion of this module, students should

- demonstrate that they are able to complete a praxis-oriented task from their field of study without help and within an allotted period of time[3]
- be able to implement technical knowledge in a scientifically appropriate way[3, 4]
- be able to structure the necessary processes and tasks necessary for solving the conceptual formulation, control their progress and adjust if necessary[3]
- be able to document their starting point, the chosen approach and their findings in such a way that they fulfill the requirements of a scientific publication[3]

[1]Knowledge; [2]Comprehension; [3]Application; [4]Analysis; [5]Synthesis and judgement

Teaching and learning methods

Entrance requirements

Mandatory: Minimum of 180 ECTS

Recommended:

Reading list

Depending on chosen subject/task

Examination

Graded exam according to § 23 General Examination Regulations for Bachelor's and Master's Degree Programmes and § 7 Examination Regulations for study programme: written thesis of approx. 40–100 pages

Teaching materials and media

specific

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: November 2019

SA 7 4994 Colloquium

Study Semester:	**7** (full time) **9** (part time) **8** (cooperative)	**Credit Points (ECTS):**	**3**

Workload

Contact time	Self-study
Sum	Sum 90 h

Total workload: **90 h**

Module coordinator

Prof. Dr. Florian Wichern

Lecturers

All lecturers of the faculty

Teaching contents

The content of the colloquium is based on the bachelor thesis.

Learning objectives

The students present the results of their bachelor thesis during the colloquium. They put their research and findings in a context with the practical approach and present their findings in a scientific and structured way. The students justify their chosen approach autonomously by taking into consideration how far their results were influenced by assumptions/presuppositions and simplifications. They are able to analyze questions regarding their thesis and their findings and to answer these within the frame of the technical and non-technical context.

Teaching and learning methods

Entrance requirements

Mandatory: Minimum of 207 ECTS

Recommended:

Reading list

Examination

graded oral exam acc. to § 27 General Examination Regulations for Bachelor's Degree and Master's Programmes

Teaching materials and media

specific

Areas of competence

Area of competence	Core area	Partly relevant	Of minor relevance
Professional competence	X		
Methodological competence	X		
Social competence			X

last amended: November 2019