HOCHSCHULE
RHEIN-WAAL
Rhine-Waal University
of Applied Sciences

Handbook of modules for the study course Biological Resources, M.Sc.

draft for reaccreditation 2019

Biological Resources, M. Sc.

The most important details

Duration:	3 semesters (full time study) 6 semesters (part time study)
Location:	Kleve
Qualification:	Master of Science, M.Sc.
Course Start:	summer term und winter term
Language:	English
Master Thesis:	during 3rd semester (full time study) during 5th and 6th semester (part time study)
Calculation of Workload:	1 CP equals 30 hours per semester
Exams:	all examination types as detailed in §14, 17–20 General Examination Regulations for Master's Degree Programmes
Literature:	Literature mentioned in the module descriptions are first recommendations and do not replace the syllabus of the module.
Attendance:	Attendance of all seminars, exercises and lab courses is mandatory.

This study programme is a

Curriculum Biological Resources, M.Sc. (full time study)

Curriculum Biological Resources, M.Sc. // Biologische Ressourcen, M.Sc.

Module-Nr.	Subjects/Module	CH	Type					Examination		CP	ST	WT	Sem 3	
			L	S	E	Pra	Pro	graded	attestation					
BR_01	Simulation of biological systems Simulation biologischer Systeme	4	2		2			P		5	4			
BR_02	Animal ecology and ecosystem services Tierökologie und Ökosystemdienstleistungen	4	2			2		P	T	5	4			*
BR_03	Soil biological resources Bodenbiologische Ressourcen	4	1	1		2		P	T	5	4			*
BR_04	Closing cycles: Use and reduction of by-products Schließen von Kreisläufen: Verwendung und Reduzierung von Abfallprodukten	4	2			2		P	T	5	4			*
BR_05	Elective module 1 Wahlpflichtkatalog 1	3	3					P		5	3			
BR_06	Research project Angewandtes Forschungsprojekt	4					4		T	5	4			
BR_07	Environmental valuation and economic impact assessment Umweltbewertung und ökonomische Folgenabschätzung	4	1	1	2			P		5		4		
BR_08	Forest management and governance Bewirtschaftung und Management forstlicher Ressourcen	4	2	2				P		5		4		
BR_09	Underutilized plant resources Unternutzte Pflanzenressourcen	4	2			2		P	T	5		4		*
BR_10	Processing biological resources Verarbeitung biologischer Ressourcen	4	2			2		P	T	5		4		*
BR_11	Elective module 2 Wahlpflichtkatalog 2	3	3					P		5		3		
BR_12	Lecture Series Biological Resources Ringvorlesung Biologische Ressourcen	4	2	2					T	5		4		
BR_13	Master Thesis Masterarbeit							P		25			X	
BR_14	Colloquium Kolloquium							P		5			X	
	Semesterwochenstunden / hours per week	**46**	**22**	**6**	**4**	**10**	**4**		**SWS**		**23**	**23**		
									CP	**90**	**30**	**25**	**30**	

Abkürzungen // Abbreviations

SWS = Semesterwochenstunden // CH = credit hours per week
Prü = Prüfungsart // type of examination
CP = credit points (= ECTS-points)
V = Vorlesung // Lecture
S = Seminar
Ü = Übung // Exercise
Pra = Praktikum // lab course
Pro = Projekt // project
T = Testat (unbenotet) // certificate
P = benotete Prüfung // examination (marked)

gesamt		1.Sem	2.Sem	3.Sem
SWS	**46**	23	23	
CP	**85**	30	25	30

* ECTS will only be credited after completing all parts of the module.
* ECTS werden erst nach vollständigem Ableisten aller Modulteile gutgeschrieben.

Curriculum Biological Resources, M.Sc. (part time study)

Curriculum Master Study Course Biological Resources
Curriculum Masterstudiengang Biologische Ressourcen

											part time study					
Module-Nr.	**Module/Subjects**	**CH**	**Type**					**Examination**		**CP**	**ST 1**	**ST 2**	**WT 1**	**WT 2**	**Sem 5**	**Sem 6**
			L	**S**	**E**	**Pra**	**Pro**	**graded**	**attestation**							
BR_01	Simulation of biological systems Simulation biologischer Systeme	4	2		2			P		5	4					
BR_02	Animal ecology and ecosystem services Tierökologie und Ökosystemdienstleistungen	4	2			2		P	T	5	4					*
BR_03	Soil biological resources Bodenbiologische Ressourcen	4	1	1		2		P	T	5	4					*
BR_04	Closing cycles: Use and reduction of by-products Schließen von Kreisläufen: Verwendung und Reduzierung von Abfallprodukten	4	2			2		P	T	5			4			*
BR_05	Elective module 1 Wahlpflichtkatalog 1	3	3					P		5			3			
BR_06	Research project Angewandtes Forschungsprojekt	4					4		T	5			4			
BR_07	Environmental valuation and economic impact assessment Umweltbewertung und ökonomische Folgenabschätzung	4	1	1	2			P		5		4				
BR_08	Forest management and governance Bewirtschaftung und Management forstlicher Ressourcen	4	2	2				P		5		4				
BR_09	Underutilized plant resources Unternutzte Pflanzenressourcen	4	2			2		P	T	5		4				*
BR_10	Processing biological resources Verarbeitung biologischer Ressourcen	4	2			2		P	T	5				4		*
BR_11	Elective module 2 Wahlpflichtkatalog 2	3	3					P		5				3		
BR_12	Lecture Series Biological Resources Ringvorlesung Biologische Ressourcen	4	2	2					T	5				4		
BR_13	Master Thesis Masterarbeit							P		25					X	
BR_14	Colloquium Kolloquium							P		5						X
	Semesterwochenstunden	**46**	**22**	**6**	**4**	**10**	**4**				**12**	**12**	**11**	**11**		
											15	**15**	**15**	**10**	**30**	

Abkürzungen // Abbreviations

SWS = Semesterwochenstunden // CH = credit hours per week
Prü = Prüfungsart // type of examination
CP = credit points (= ECTS-points)
V = Vorlesung // Lecture
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Ü = Übung // Exercise
Pra = Praktikum // lab course
Pro = Projekt // project
T = Testat (unbenotet) // certificate
P = benotete Prüfung // examination (marked)

gesamt			**1.Sem**	**2.Sem**	**3.Sem**	**4. Sem**	**5. Sem**	**6. Sem**
SWS		**46**	12	12	11	11		
CP		**85**	15	15	15	10	30	

* ECTS will only be credited after completing all parts of the module.
* ECTS werden erst nach vollständigem Ableisten aller Modulteile gutgeschrieben.

	Elective modules 1 Wahlpflichtkatalog 1	SWS	Type L	S	E	Pra	Pro	Ex	CP	
BR_05.1	Biological resource value chains and sustainability management Wertschöpfungsketten und Nachhaltigkeitsmanagement biologischer Ressourcen	3	1	1	1			P	5	
BR_05.2	Marine bioresources Biologische Ressourcen der Meere	3		3				P	5	
BR_05.3	Use of diversity in a changing world Nutzung von Diversität in einer sich ändernden Welt	3		2		1		P	5	
BR_05.4	Entrepreneurship and business management Existenzgründung und Unternehmensführung	3		3				P	5	
BR_05.5	Innovation management Innovationsmanagement	3	2		1			P	5	
BR_05.6	Module from any master study course at Rhine-Waal University of Applied Sciences Wahlmöglichkeit aus dem gesamten Masterangebot HRW	3	3					P	5	**
	1 elective module amounts to								5	

	Elective modules 1 Wahlpflichtkatalog 1	SWS	L	S	E	Pra	Pro	Ex	CP	
BR_11.1	Animals in bioeconomy Nutztiere in der Bioökonomie	3	2		1			P	5	
BR_11.2	Environmental Systems Analysis Umweltsystemanalyse	3		3				P	5	
BR_11.3	Rhizosphere biology Rhizosphärenbiologie	3				3		P	5	
BR_11.4	Business planning Business planning	3	2	1				P	5	
BR_11.5	Module from any master study course at Rhine-Waal University of Applied Sciences Wahlmöglichkeit aus dem gesamten Masterangebot HRW	3	3					P	5	**
	1 elective module amounts to								5	

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 Zulasung zu Pflichtmodulen erfolgt vorbehaltlich freier Kapazitäten. Die Möglichkeit des Erreichens der vorgeschriebenen Kreditpunktzahl bleibt unberührt.

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

** The actual selection from any master study course at Rhine-Waal University has to be approved by the head of the examination committee. / Die konkrete Auswahl aus dem gesamten Studienangebot der Masterstudiengänge der Hochschule Rhein-Waal bedarf der Zustimmung des Prüfungsausschussvorsitzenden.

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BR_01 Simulation of Biological Systems

Study semester:	**Summer term** (full time) **Summer term 1** (part time)	**Credit Points (ECTS):**	**5**

Workload

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

Total workload: **150 h**

Coordinator

Prof. PD Dr.-Ing. Sylvia Moenickes

Instructors

Prof. PD Dr.-Ing. Sylvia Moenickes

Contents

Models: Cellular automata, individual based models, agent-based models; Monte Carlo methods; emergence, collective intelligence, robustness; statistics based interpretation

Programming: basic elements of Matlab code such as loops, conditions, arrays, plotting

Intended learning outcomes

On successful completion of this module, students should

- know properties of different models, systems, and statistical tools for interpretation[1]
- understand basic Matlab code[2]
- be able to describe and implement models[3]
- be able to read implemented models, run these models in a meaningful way for different scenarios and interpret[4]
- be able to make clear statements on model-based projections.[5]

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

Teaching and learning methods

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

Entrance requirements

None

Reading list

Examination

Graded exam acc. §§ 14 and 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; handouts; 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: November 2018

BR_02 Animal Ecology and Ecosystem Services

Study semester:	**Summer term** (full time) **Summer term 1** (part time)	**Credit Points (ECTS):**	**5**

Workload

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

Total workload: **150 h**

Coordinator

Prof. Dr. William Megill

Instructors

Margarete Dytkowicz

Contents

Animal species and the niche concept, evolution, succession and natural selection; resources; intraspecific competition; dispersal, dormancy and metapopulations; interspecific competition; predation and population dynamics; community ecology; fluxes of energy and matter through ecosystems; the ecosystem as a resource for human economy: ecosystems services; mapping and quantifying ecological resources in economic terms; conservation science; ecosystems engineering

Intended learning outcomes

On successful completion of this module, students should

- safely conduct ecological fieldwork[1,3]
- explain the role of animals in maintaining structure and process in ecosystem[1]
- evaluate the changes in habitat structure in an ecosystem due to natural succession and understand the extent to which conservation management is the management of successional processes[4]
- assess the relative importance of abiotic factors influencing animal ecosystems in contrast to biotic factors from within the systems[1]
- master the concept of ecosystem services and be able to describe and quantify them in a variety of ecosystems across a wide range of scales[2,3]
- make a balanced assessment of the conflicts between conservation and other competing land uses[4,5]
- appreciate the nature of landscape ecology and the importance of spatial relationships of such features as corridors and mosaics[1,2]
- adopt a global attitude towards natural ecosystems in biomes and the large-scale processes which govern their diversity[5]

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

Teaching and learning methods

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

Entrance requirements

None

Reading list

Begon, Townsend and Harper: Ecology: From individuals to ecosystems
Sodhi and Ehrlich: Conservation biology for all. Society for Conservation Biology

Examination

Graded exam acc. §§ 14 and 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; handouts; 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: November 2018

BR_03 Soil Biological Resources

Study semester:	**Summer term** (full time) **Summer term 1** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lectures	15 h	Preparation for contact time	30 h
Seminar	15 h	Literature review	30 h
Lab course	30 h	Preparation for exams	30 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Coordinator

Prof. Dr. Florian Wichern

Instructors

Dr. Conor Watson; Michael Hemkemeyer, M.Sc.

Contents

Soil microbial and macrobial resources and their potential use in biotechnology and agriculture (e.g. aromatics, antibiotics, remediation); influence of environmental and human factors (e.g. stressors) on soil biological resources; qualitative and quantitative determination of soil biota by classical techniques and modern molecular biological methods; detection of microbial functions, such as enzyme activity; use and development of cultivation and propagation techniques; application of soil biotechnology; experimental design and statistical analysis

Intended learning outcomes

On successful completion of this module, students should

- be familiar with soil microbial and macrobial resources and their possible uses[1]
- know how soil biota is influenced by environmental and human abiotic and biotic factors[1]
- be able to relate their knowledge about soil resources to its relevance in the bioeconomy and land use[2]
- apply special analytical lab procedures of soil ecology and microbiology in lab experiments[3]
- analyse and document results and findings in a scientifically appropriate form[4]
- analyse how their data compare with the data of others[4]
- be able to evaluate the potential of soil biological resources in biotechnology and land use[5]
- be able to critically discuss options of a sustainable use of soil biological resources *ex situ* and *in situ*[5]

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

Teaching and learning methods

Lab course; field trip; lecture; self-study

Entrance requirements

None

Reading list

Killham: Soil Ecology
Prescott, Harley, Klein: Microbiology
Glazer: Microbial Biotechnology: Fundamentals of Applied Microbiology
Brock: Biology of Microorganisms
Various scientific publications for methods and comparison of results

Examination

Graded exam acc. §§ 14 and 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 materials; 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 2018

BR_04 Closing Cycles: Use and Reduction of By-products

Study semester:	**Summer term** (full time) **Summer term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lectures	30 h	Preparation for contact time	50 h
Lab course/Field course	30 h	Literature review	20 h
		Preparation for exams	20 h
Sum	60 h	Sum	90 h

Total workload: **150 h**

Coordinator

Prof. Dr. Matthias Kleinke

Instructors

Prof. Dr. Matthias Kleinke; Prof. Dr.-Ing. Frank Platte

Contents

Biological resources and their cycles; anthropogenic impacts on natural materials cycles; environmental impact; fundamentals in waste and water management; use and reduction of biological by-products; energy production from biological resources, utilization of biofuels and biomaterials

Intended learning outcomes

On successful completion of this module, students should

- explain the elements of the fundamental biological resources and understand their cycles[1,2]
- know and understand basic concepts of environmental health and risk management[1,2]
- describe and assess anthropogenic impacts on natural cycles and resources as well as environmental status[1,2,3]
- value scarce resources and improve community understanding of the importance of closing circles and conserving those resources[1,2,4]
- compare, understand, apply, and analyse fundamental laws and equations in circular economy[1,2,3,4]
- outline and analyse the key elements of waste and water management[1,2,3,4]
- identify the most important procedures of use and reduction of organic by-products and appreciate their importance with regard to possible economic effects[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; excursion

Entrance requirements

None

Reading list

Bilitewski: Waste Management
Davis and Cornwell: Introduction to Environmental Engineering
Dahlquist: Biomass as Energy Source
Schaub and Turek: Energy Flows, Material Cycles and Global Development
Tomes, Prakshmanan and Songstad: Biofuels

Examination

Graded exam acc. §§ 14 and 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 materials; 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 2018

BR_05.1 Biological Resource Value Chains and Sustainability Management

Study semester:	**Summer term** (full time) **Summer term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	15 h	Preparation for contact time	35 h
Seminar	15 h	Literature review	35 h
Exercise/ project	15 h	Preparation for exams	35 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. Dr. Dagmar Mithöfer

Instructors

Prof. Dr. Dagmar Mithöfer

Contents

Value chains link producers and consumers; along the chains firms create value for competitive advantage. Students will learn how biological resource sector(s) work, get an overview of the actors, organization and governance of biological resource value chains. Students will learn approaches of value chain analysis. Based on selected models from institutional economics and industrial organization students will study public and private governance of (sustainable) agrifood and biological resource value chains. Students will learn alternative approaches to environmental and sustainability accounting, reporting and management of sustainable agrifood and biological resource value chains.

Intended learning outcomes

On successful completion of this module, students should

- know selected models of institutional economics and industrial organization[1]
- know principles of value chain analysis[1]
- know principles of environmental and sustainability accounting and reporting[1]
- know quality and sustainability management systems[1]
- be able to relate their knowledge to agrifood and biological resource value chains[2]
- apply value chain analysis and environmental and sustainability accounting and reporting methods to the study of agrifood and biological resource value chains [3&4]
- document results and findings in a scientifically appropriate form[4&5]
- design sustainability management systems of agrifood and biological resource value chains[5]

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

Teaching and learning methods

Lecture; self-study; case study; group work and presentation; field trip

Entrance requirements

None

Reading list

Reading material will be distributed during the course

Examination

Graded exam acc. §§ 14 and 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 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: November 2018

BR_05.2 Marine Bioresources

Study semester:	**Summer term** (full time) **Summer term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	45 h	Preparation for contact time	35 h
		Literature review	35 h
		Preparation for exams	35 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. Dr. William Megill

Instructors

Prof. Dr. William Megill

Contents

This course focuses on marine organism groups and environments, with a particular focus on coastal ecosystems and marine mammals. The course has the following parts: Introduction to marine biodiversity; basic taxonomy, identification techniques, identification literature and reference collections; Marine inventory methodology; specific techniques for the study of community ecology in the marine environment, quantification of biological diversity, potential for sustainable use of marine bioresources; Marine environments; marine biotopes (e.g. shallow/deep hard/soft bottoms, coral reefs, pelagial, interstitial environments, hydrothermal vents) and their characteristic ecological communities; Marine organism groups; systematics and morphology of mainly animals, but also marine plants, macro algae, eukaryotic microbes, archaea, bacteria, different adaptations to marine environments and potential as possible bioresources; Role of marine mammals in the coastal and offshore ecosystem. Marine mammals as beaters and/or indicators of localized bioresource stress. Marine mammals as a bioresource themselves: whaling vs marine ecotourism.

Intended learning outcomes

On successful completion of this module, students should

- identify and name common macroscopic species from the North Atlantic, with special focus on the North Sea
- recognise the larger organism groups and classify marine organisms to group
- identify marine organisms using appropriate literature
- identify and differentiate the characteristics of marine biotopes
- discuss taxonomic bases and apply these within the framework of marine inventories
- understand the special role played by the marine mammals in the marine ecosystem
- discuss the underlying factors (physical, biological, geographic and historical) that influence the biological diversity in marine environments

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

Teaching and learning methods

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

Entrance requirements

None

Reading list

Lecture notes, Moodle, online resources

Examination

Graded exam acc. §§ 14 and 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; handouts; 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: November 2018

BR_05.3 Use of Diversity in a Changing World

Study semester:	**Summer term** (full time) **Summer term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	30 h	Preparation for contact time	35 h
Lab course/Field course	15 h	Literature review	35 h
		Preparation for exams	35 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. Dr. Steffi Wiedemann

Instructors

N.N.

Contents

Acquisition of skills that are crucial to extent, distribute and stabilize the biodiversity in different parts of the world; change and turnover of biological diversity through time over large and small temporal scales (ecological and evolutionary processes); influences of human-related activities on transformation in ecosystems; tools and policies towards sustainable ecosystems; visits of sites which are related to biodiversity or are impacted by urban development; obtaining of environmental samples to assess the conservation values of that site; group projects

Intended learning outcomes

On successful completion of this module, students should

- have detailed knowledge on skills for the assessment of conservation values[1,2]
- be able to critically review literature on the topic of biodiversity in a changing world[2, 3]
- be able to apply the knowledge and analyse the conservation value of different environmental sites within a group[3,4]
- be able to critically discuss findings and define solutions or recommendations based on the acquired knowledge[4,5]

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

Teaching and learning methods

Lab course; self-study; group work; field trip

Entrance requirements

None

Reading list

Recommended reading material will be presented during the course.

Examination

Graded exam acc. §§ 14 and 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 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: November 2018

BR_05.4 Entrepreneurship and Business Management

Study semester:	**Summer term** (full time) **Summer term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

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

Total workload: **150 h**

Coordinator

Prof. Dr. Dietrich Darr

Instructors

Prof. Dr. Dietrich Darr, Prof. Dr. Marcel Friedrich

Contents

Participants will take over the leadership of a simulated company and face the challenge of making important business decisions in the area of all key functions of a business corporation, including procurement and production, human resource management, research and product development, and marketing and sales. The simulation also addresses the topics of product life cycle, personnel competence, productivity, reengineering, environmental aspects, corporate identity and shareholder value-oriented management.

Intended learning outcomes

On successful completion of this module, students should

- understand the fundamentals and concepts of core business functions[1,2]
- define economic goals and strategies and implement them in a dynamic environment[2,3]
- learn to use business tools like cost accounting and income analysis to make operational business decisions for a simulated company[3]
- analyse financial figures and operational results of previous business periods and adjust the overall business strategy to changing economic conditions[4,5]
- define and solve problems in teams with the aid of data-processed planning models[5]

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

Teaching and learning methods

Computer-based management simulation; self-study; group work and presentation

Entrance requirements

None

Reading list

TOPSIM – Participants manual “General Management”

Examination

Graded exam acc. §§ 14 and 17–19 General Examination Regulations for Bachelor’s and Master’s Degree Programmes

Teaching materials and media

Business simulation game; projector; white/black board; hand-outs; flipchart

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 2018

BR_05.5 Innovation Management

Study semester:	**Summer term** (full time) **Summer term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
lecture	30 h	Preparation for contact time	40 h
exercise	15 h	Literature review	25 h
		Preparation for exams	40 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. Dr. Marcel Friedrich

Instructors

Prof. Dr. Marcel Friedrich

Contents

Innovation management as an integral part of corporate management; description of innovation strategies in a corporate context; presentation of internal innovation process as well as the possibilities of external partnerships; the connection to the operational management of technology; organizational embedding of innovation management; discussion of specific case studies and application of modern methods of innovation management to practical examples

Intended learning outcomes

On successful completion of this module, students should

- be able to apply relevant concepts and methods of innovation management[1]
- understand the need for and nature of innovation[2]
- be able to classify the innovation management in the corporate governance[3,4]
- know concepts and strategies of innovation management[1,4]
- can describe and apply the innovation process in a realistic context[1,3,4,5]
- know the organizational forms of innovation management[1,4]
- be able to apply creative techniques to the development of innovative ideas[1,3]
- be able identify innovation opportunities[1,3]

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

Teaching and learning methods

Lecture; self-study; group work; projects and / or case studies

Entrance requirements

None

Reading list

Tidd and Bessant: Managing Innovations
Ahmed and Shephard: Innovation Management
Trott: Innovation Management and New Product Development

Examination

Graded exam acc. §§ 14 and 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; moderation 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: November 2018

BR_05.6 Module from any Master Study Course at Rhine-Waal University of Applied Sciences

Study semester:	**Summer term** (full time) **Summer term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lectures	45 h	Preparation for contact time	35 h
		Literature review	35 h
		Preparation for exams	35 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. Dr. Peter F. W. Simon

Instructors

All lecturers of the university

Contents

Depending on the chosen module to be elected from all study courses of Rhine-Waal University

Intended learning outcomes

On successful completion of this module, students should

- acquire knowledge from other areas of the university and deepen or enlarge 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]
- 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 acc. §§ 14 and 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 2018

BR_06 Research Project

Study semester:	**Summer term** (full time) **Summer term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	10 h	Preparation for contact time	40 h
Project	20 h	Literature review	40 h
		Preparation for exams	40 h
Sum	30 h	Sum	120 h

Total workload: **150 h**

Coordinator

Prof. Dr. Marcel Friedrich

Instructors

Various lecturers

Contents

The project is an individual or a group work on a specific scientific topic chosen from a variety of options offered by the professors. It includes extensive literature research, field or lab work and data analysis. Additionally, seminars are offered on scientific working and writing, on basics, regulations and relevant topics of biological resources, as well as including a section on research ethics.

Intended learning outcomes

On successful completion of this module, students should

- know the relevant aspects in the field of research chosen[1]
- further advance their ability to search and summarize scientific literature in the relevant field of research independently[2]
- further advance their ability to organise and manage a project[2]
- apply relevant scientificmethods[3]
- present and document results and findings in a scientific report/article[4]
- analyse in depth how their findings are related to those of others[4]
- be able to critically evaluate the scientific methods used[5]
- be able to critically discuss their findings in the context of biological resource use and management[5]

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

Teaching and learning methods

Group work; self-study; excursion; seminar; feedback

Entrance requirements

None

Reading list

Various case studies and scientific publications

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; demonstration materials; 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 2018

BR_07 Environmental Valuation and Economic Impact Assessment

Study semester:	**Winter term** (full time) **Winter term 1** (part time)	**Credit Points (ECTS):**	**5**

Workload

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

Total workload: **150 h**

Coordinator

Prof. Dr. Dagmar Mithöfer

Instructors

Prof. Dr. Dagmar Mithöfer

Contents

Natural and environmental resources often constitute public goods for which market prices are lacking. Methods for valuation on non-market goods will be introduced to assess internal and external costs and benefits of natural resource use. Students will learn methods of private and social cost benefit analysis. Public programs and policies are interventions that target specific goals such as governance of natural resource use and beneficiaries. Impact assessments are done to understand whether these interventions work, how well they work and what does not work. Building on environmental valuation tools the course introduces ex post and ex ante evaluation as well as qualitative and quantitative methods of impact assessment.

Students will work with case studies and data for valuation of non-market goods; students will work with case studies and data to assess impact of public programs and policies.

Intended learning outcomes

On successful completion of this module, students should

- know the relevant concepts of valuation of non-market goods and cost benefit analysis[1]
- know the relevant concepts and principles of impact evaluation[1]
- be able to relate their knowledge in natural & environmental resource valuation cost benefit analysis and impact assessment to aspects of public program and policy design[2]
- be able to apply their knowledge by designing impact evaluation as well as valuation studies
- apply valuation methods of non-market goods, cost benefit analysis and impact assessment methods[3&4]
- 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; case studies, exercises

Entrance requirements

None

Reading list

Kolstad: Environmental Economics
Garrod and Willis: Economic Valuation of the Environment: Methods and Case Studies
Khandker, Koolwal and Samad: Handbook on Impact Evaluation: Quantitative Methods and Practices.
Selected material from 3IE – International Initiative for Impact Evaluation, http://www.3ieimpact.org/

Further reading material will be distributed during the course.

Examination

Graded exam acc. §§ 14 and 17–19 General Examination Regulations for Bachelor and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; visualisation aids for presentation; demonstration materials; 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 2018

BR_08 Forest Management and Governance

Study semester:	**Winter term** (full time) **Winter term 1** (part time)	**Credit Points (ECTS):**	**5**

Workload

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

Total workload: **150 h**

Coordinator

Prof. Dr. Dietrich Darr

Instructors

Prof. Dr. Dietrich Darr

Contents

Global scale and importance of forests; forest types, functions and services; introduction to forest growth, forest inventory and management planning; management of natural forests; plantation forestry; agroforestry; timber use, forest certification and timber trade; non-timber forest products; forests and nutrition; interests and conflicts in the forest sector; instruments of forest policy; global forest governance; forests and climate change; forests in the bioeconomy

Intended learning outcomes

On successful completion of this module, students should

- know the relevant concepts and principles of forest management, forest economics and forest policy[1]
- understand socio-economic theories and conceptual frameworks of forestry science and the current state of pertinent research[2]
- apply methods and analytical tools of forest economics and policy to contemporary problems of global forest management[3,4]
- 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; group work; excursions; exercises

Entrance requirements

None

Reading list

Innes and Tikina: Sustainable forest management – from concept to practice
Kant and Alavalapati: Handbook of forest resource economics
Krott: Forest policy analysis

Examination

Graded exam acc. §§ 14 and 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 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: November 2018

BR_09 Underutilized Plant Resources

Study semester:	**Winter term** (full time) **Winter term 1** (part time)	**Credit Points (ECTS):**	**5**

Workload

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

Total workload: **150 h**

Coordinator

Prof. Dr. habil. Jens Gebauer

Instructors

Dr. Katja Kehlenbeck

Contents

This module covers different aspects of underutilized plant genetic resources such as taxonomy, morphology, physiology, biochemistry, genetics, cytology and ethnobotany. It includes examples from gene bank management: collecting, maintenance, evaluation, storage and documentation. Areas of interest include crop evolution, domestication, crop-weed relationships, agrobiodiversity related wild species and the history of cultivated plants including palaeoethnobotany. Wild fruit tree species will play a key role to understand utilisation, promotion and conservation strategies of underutilized plant resources.

Intended learning outcomes

On successful completion of this module, students should

- know the different aspects and their underlying methods of plant genetic resources[1]
- have extensive botanical knowledge on plant genetic resources[1]
- be able to identify, characterise and maintain plant genetic resources[3,4]
- be able to set up research strategies to utilise, promote and conserve plant genetic resources[5]

[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

Basic knowledge in botany

Reading list

Akinnifesi et al.: The fruits of success: A programme to domesticate West and Central Africa's wild fruit trees is raising incomes, improving health and stimulating the rural economy
Chittaranjan: Wild Crop Relatives: Genomic and Breeding Resources
Collins and Qualset: Biodiversity in Agroecosystems
Hancock: Plant evolution and the origin of crops species
Kumar and Nair: Tropical homegardens a time-tested example of sustainable agroforestry
Leakey: Living with the trees of life towards the transformation of tropical agriculture
Journal of Genetic Resources and Crop Evolution
Journal of Plant Genetic Resources: Characterization and Utilisation
Wickens and Lowe: The Baobabs: Pachycauls of Africa, Madagascar and Australia

Examination

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

Teaching materials and media

Tropical greenhouse; botanical garden; gene bank; projector; white/black board; scientific papers; flipchart

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 2018

BR_10 Processing Biological Resources

Study semester:	**Winter term** (full time) **Winter term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

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

Total workload: **150 h**

Coordinator

Prof. Dr. Florian Kugler

Instructors

Prof. Dr. Florian Kugler; Prof. Dr.-Ing. Frank Platte

Contents

Lecture:
Basic procedural, chemical, and microbiological operations and techniques; nature of essential raw materials of plant/animal and microbiological origin; secondary (plant) metabolites; processing of selected raw materials; recovery of valuable components from by-products and waste resulting from food industry; fermentation processes

Practical part:
Production of sugar from sugar beet; extraction of betalains from red beetroot; production of plant oil from plant seeds; purification of plant oil; fermentation of sugar and alcohol distillation; hydrolysis of sucrose into invert sugar; extraction of chitin from tiger prawns; conversion of chitin to chitosan films

Intended learning outcomes

On successful completion of this module, students should

- know and understand the nature of important biological raw materials[1]
- know the basics about main processing methods applied in food industry and biotechnology[1]
- know relevant examples for utilization of by-products and waste resulting from food industry[2]
- apply the knowledge in developing solutions for case studies with regard to food processing and biotechnology[3]
- be able to critically discuss possibilities, challenges and shortcomings of processing biological resources under particular socio-economic and cultural circumstances[4,5]

[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

Entrance requirements

Basic knowledge in chemistry, biology, and physics

Reading list

Reading list will be provided by lecturers.

Examination

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

Teaching materials and media

Projector, white/black board, hand-outs, lab/pilot plant equipment, flipchart, visualisation aids for presentation, demonstration materials, 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: December 2018

BR_11.1 Animals in Bioeconomy

Study semester:	**Winter term** (full time) **Winter term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lecture	30 h	Preparation for contact time	35 h
Exercise	15 h	Literature review	25 h
		Preparation for exams	45 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. Dr. Steffi Wiedemann

Instructors

Prof. Dr. Steffi Wiedemann

Contents

Relevance of animals for bioeconomics (wildlife, farm animals, aquaculture, others); influence of biotic and abiotic factors on animal health, production and bioeconomics; management of biodegradable feedstocks such as manure, animal waste and associated matter fluxes from a bioeconomic perspective; effects of wildlife and of farm animals on the environment (e.g. production of greenhouse gases, sequestration of greenhouse gases in grassland, nutrient imbalances, landscape aspects); use of alternatives for food and feed production; determination of resource use efficiency and potential nutrient release using different techniques

Intended learning outcomes

On successful completion of this module, students should

- understand the relevance of animals for bioeconomics[1]
- have a profound knowledge on the management of biological resources derived from animals[2]
- be able to apply methods to compare the resource use efficiency of different agricultural systems[3]
- be able to critically compare publications about animals in bioeconomics[4]
- be able to evaluate interactions of animal and bioeconomics based on acquired knowledge[5]

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

Teaching and learning methods

Lecture; self-study; group work; literature review

Entrance requirements

None

Reading list

Literature will be distributed in the course

Examination

Graded exam acc. §§ 14 and 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 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: November 2018

BR_11.2 Environmental Systems Analysis

Study semester:	**Winter term** (full time) **Winter term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Seminar	45 h	Preparation for contact time	50 h
		Literature review	25 h
		Preparation for exams	30 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. PD Dr.-Ing. Sylvia Moenickes

Instructors

Prof. PD Dr.-Ing. Sylvia Moenickes

Contents

Global cycles of C, N, P, Water and their couplings. Constitutive equations. System behaviour: steady state, stability of steady states, attractants, repellors, point of no return, chaotic behaviour; Matlab-based simulation

Intended learning outcomes

On successful completion of this module, students should

- know fluxes and states of carbon, nitrogen, phosphor and water and their mathematical representation[1]
- understand the effect of natural and anthropogen couplings[2]
- make use of Matlab for steady state simulations and projections of anthropogene effects[3]
- be able to design and implement mathematical representations of countermeasures[4]
- be able to evaluate simulated effects of land use[5]

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

Teaching and learning methods

Lecture; seminar; self-study; group work; case studies

Entrance requirements

none

Reading list

Literature will be distributed in the course

Examination

Graded exam acc. §§ 14 and 17–19 General Examination Regulations for Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; lab equipment; flipchart; visualisation aids for presentation; demonstration materials; 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: January 2019

BR_11.3 Rhizosphere Biology

Study semester:	**Winter term** (full time) **Winter term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lab course/Field course	45 h	Preparation for contact time	30 h
		Literature review	45 h
		Preparation for exams	30 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. Dr. Florian Wichern

Instructors

Prof. Dr. Florian Wichern; Dr. Conor Watson

Contents

Rhizosphere as an environment of autotrophic and heterotrophic interactions; monitoring root development, morphology and physiology in space and time; factors influencing root development; visualising and quantifying plant-microbe interactions; making use of rhizosphere processes in biotechnology and land use (e.g. phytoremediation, bioelectricity); using classical and modern visualisation techniques for qualitative and quantitative root assessment (e.g. root scanning, microscopy, molecular markers); collecting and analysing organic and inorganic components of root exudates and rhizosphere solution; experimental design and statistical analysis

Intended learning outcomes

On successful completion of this module, students should

- know how roots develop in space and time and which factors influence their development[1]
- know how rhizosphere processes can be used in biotechnology and land use management[1]
- be able to relate their knowledge of rhizosphere processes to their relevance in the bioeconomy and land use[2]
- apply special analytical lab procedures of root ecology in lab experiments[3]
- analyse and document results and findings in a scientifically appropriate form[4]
- analyse how their data compare with the data of others[4]
- be able to evaluate and critically discuss the potential use of rhizosphere processes in biotechnology and land use[5]

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

Teaching and learning methods

Lab course; self-study; group work; field trip

Entrance requirements

None

Reading list

Luster and Finley (ed.) Handbook of methods used in rhizosphere research
Gregory: Plant roots
Various scientific publications for methods and comparison of results

Examination

Graded exam acc. §§ 14 and 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 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: November 2018

BR_11.4 Business Planning

Study semester:	**Winter term** (full time) **Winter term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
lecture	30 h	Preparation for contact time	40 h
exercise	15 h	Literature review	25 h
		Preparation for exams	40 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. Dr. Marcel Friedrich

Instructors

Prof. Dr. Marcel Friedrich

Contents

From the idea to the concept and business plan: Development of business ideas, business analysis and description of requirements (personal conditions, market assessment, competitive environment). Planning within the phase of starting a new venture (finance, cost, revenue, profitability, liquidity), forms of financing as well as the choice of legal form or company structure

Intended learning outcomes

On successful completion of this module, students should

- have a perception of entrepreneurship as career perspectives[1,2]
- know the necessities, prerequisites and measures to start a business[1,2,4]
- have achieved a basic knowledge about how to construct a business plan and have gained experiences toward starting a business in the future[1,2,3,4,5]
- know prospects and entrepreneurial responsibilities in the context of starting a new venture[1,2,4,5]

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

Teaching and learning methods

Lecture; self-study; group work; projects and / or case studies

Entrance requirements

None

Literature

Mariotti and Glacking: Entrepreneurship and Small Business Management
Bygrave and Zacharakius: Entrepreneurship
Osterwalder and Pigneur: Business Model Generation

Examination

Graded exam acc. §§ 14 and 17–19 General Examination Regulations for Bachelor's and Master's Degree Programmes

Teaching materials and media

Projector; white/black board; hand-outs; flipchart; moderation 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: November 2018

BR_11.5 Module from any Master Study Course at Rhine-Waal University of Applied Sciences

Study semester:	**Winter term** (full time) **Winter term 2** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time		Self-study	
Lectures	45 h	Preparation for contact time	35 h
		Literature review	35 h
		Preparation for exams	35 h
Sum	45 h	Sum	105 h

Total workload: **150 h**

Coordinator

Prof. Dr. Peter F. W. Simon

Instructors

All lecturers of the university

Contents

Depending on the chosen module to be elected from all study courses of Rhine-Waal University

Intended learning outcomes

On successful completion of this module, students should

- acquire knowledge from other areas of the university and deepen or enlarge 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]
- 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 acc. §§ 14 and 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 2018

BR_12 Lecture Series Biological Resources

Study semester:	**Winter & Summer Term** (full time) **Winter & Summer Term** (part time)	**Credit Points (ECTS):**	**5**

Workload

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

Total workload: **150 h**

Coordinator

Prof. Dr. Dietrich Darr

Instructors

Various lecturers

Contents

In this lecture series students will be exposed to interdisciplinary perspectives on biological resources and their management. Invited lecturers will present results and methodological approaches of their recent research and professional work in the field of biological resources and related disciplines. The lectures will provide participants with the opportunity to experience and engage in academic debate thereby obtaining further stimuli to define the topic of their own research project.

Intended learning outcomes

On successful completion of this module, students should

- understand core concepts of global biological resources and their sustainable management[1,2]
- know the predominant discourses and theories in managing and governing these resources[2]
- know methods and analytical tools used in contemporary research on biological resources[2]
- identify the key factors that determine the state and resilience of global biological resources[3,4]
- 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; group work; excursions; exercises

Entrance requirements

None

Reading list

Publications by the lecturers on the pertinent topic

Examination

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

The ECTS will be credited during semester 3.

Teaching materials and media

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

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 2018

BR_13 Master Thesis

Study semester:	**Semester 3** (full time) **Semester 5 and 6** (part time)	**Credit Points (ECTS):**	**25**

Workload

Contact time	Self-study
Sum	Sum 750 h

Total workload: **750 h**

Coordinator

Prof. Dr. Marcel Friedrich

Instructors

All lecturers of the faculty

Contents

The contents of the master 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.

Intended learning outcomes

On successful completion of this module, students should

- demonstrate that they are able to complete a scientific task from their field of study without help and within an allotted period of time
- apply/implement technical knowledge in a scientifically appropriate way
- structure the necessary processes and tasks necessary for solving the conceptual formulation, control their progress and adjust if necessary
- 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

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

Teaching and learning methods

Entrance requirements

Minimum of 50 ECTS

Reading list

Depending on chosen subject/task

Examination

Graded exam acc. § 26 General Examination Regulations for Bachelor's and Master's Degree Programmes and § 6 Examination Regulations for study programme: written thesis of approx. 50–120 pages

Teaching materials and media

Thesis-specific

Areas of competence

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

last amended: November 2018

BR_14 Colloquium

Study semester:	**Semester 3** (full time) **Semester 6** (part time)	**Credit Points (ECTS):**	**5**

Workload

Contact time	Self-study
Sum	Sum 150 h

Total workload: **150 h**

Coordinator

Prof. Dr. Marcel Friedrich

Instructors

All lecturers of the faculty

Contents

The content of the colloquiums is based on the master thesis.

Intended learning outcomes

The students present the results of their master 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

Minimum of 85 ECTS

Reading list

Examination

Graded exam acc. § 27 General Examination Regulations for Bachelor's and Master's Degree 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			

last amended: November 2018