Universität für Bodenkultur Wien

University of Natural Resources and Life Sciences, Vienna

Curriculum

for the Master's Programme in

Natural Resources Management and Ecological Engineering (NARMEE)

Programme classification no. 066 416

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CONTENTS

The *International Master in Natural Resources Management and Ecological Engineering* (NARMEE)[1] is a master's programme jointly offered by the University of Natural Resources and Life Sciences, Vienna (BOKU), the Lincoln University, Canterbury, New Zealand (LU) and the Czech University of Life Sciences Prague, Czech Republic (CULS).

§ 1 QUALIFICATION PROFILE

The master's programme in *Natural Resources Management and Ecological Engineering (*NARMEE*)* is a joint degree programme which serves to deepen and extend students' pre-vocational academic education, building on the basis provided by a bachelor degree programme (§ 51 [2] item 5 of the Universities Act UG 2002, Federal Law Gazette BGBl I no. 81/2009). The programme fulfils the requirements of Directive 2005/36/EC on the recognition of professional qualifications, article 11, letter e.

NARMEE is a two year master's programme in the areas of sustainable management, planning and design of natural resources, related biogeochemical cycles, landscapes and environments, ecological engineering, and business for sustainability. Building on a sound understanding of fundamental natural and socioeconomic processes and properties of natural resources, NARMEE provides manifold opportunities to specialise in thematic fields such as agro-municipal resource management, ecological engineering and risk management, nature conservation and biodiversity management, global resources and sustainability management, or human dimension and socio-economic aspects of sustainable development. NARMEE is jointly offered in English language by the Lincoln University in Canterbury, New Zealand (LU), the Czech University of Life Sciences Prague (CULS), and the University of Natural Resources and Life Sciences, Vienna (BOKU). The programme intends to qualify the graduates for an international career in the fields of resource management and ecological engineering through studies at two universities with similar profile but different focus on teaching and research. This setting intends to add a global dimension to the learning outcomes of this curriculum.

1a) Knowledge and personal and professional skills

After completing the programme, NARMEE graduates will qualify for the sustainable management of natural resources and environmental risks in relation to their specialisation areas by integrating technical, economic, ecological, social and cultural skills.

<u>Fundamental scientific competences and methodological skills:</u>
Graduates of the programme are qualified to

- comprehend and analyze important processes and features of natural resources (soils, water, bio-resources), biodiversity, biogeochemical cycles, and socio-economic principles of their sustainable management;
- conduct an informed selection and use of general skills and research methods such as spatial data analysis and integration, statistical analysis, mathematical modelling of natural and socio-economic processes, and methods in economics, social and cultural management;
- execute data collection, analysis and interpretation at high scientific and technical level, and communicate the results clear and concisely both in written and oral form in English language (technical reporting, scientific publication and presentation);
- develop technical and scientific projects to address relevant technical or scientific questions including hypothesis building and selection of appropriate methodologies for project execution.

[1] Referred to as "NARMEE" in the following

Managerial, planning and engineering competences:

Graduates of the programme are qualified to

- identify, define and develop solutions towards a more sustainable management of natural resources (including supply, processing, use and protection) and biodiversity in the elected thematic fields by integrating and applying natural science, technical and socio-economic knowledge, and methodological skills;
- develop concepts and planning tools for natural resource management at various spatial and temporal scales (from individual business, agro-municipal to global scale);
- apply concepts, methods, techniques and tools for assessment and management of environmental risks and protection from natural hazards with emphasis on ecological engineering approaches;
- apply concepts, methods and tools for assessing and managing the human dimension of sustainable use and management of natural resources at local, regional and global scale, by integrating legal, political, social, economic, cultural and ethical aspects;
- develop sustainability business ideas and strategies for their implementation.

Ethical and intercultural competences:

Graduates of the programme are qualified to

- comprehend and take into account different attitudes and approaches to natural resource management in the context of cultural and ethical diversity, and different stages of economic and societal development;
- linking natural resource management and ecological engineering to global development;
- use professional English in all oral and written communication.

1b) Professional qualifications

Within the thematic field covered by NARMEE and the elected specialisations, the graduates of this master curriculum will qualify for employments and entrepreneurship related to the management of natural resources and ecological engineering of environmental risks. Professional fields and types of employment may include:

- Consultancy in environmental resource management and ecological engineering at national, EU and international level;
- Business for sustainability and development;
- Employment in international organisations dealing with resource management, environmental and sustainability issues (e.g. FAO, WHO);
- Employment in European agencies dealing with resource management, environmental and sustainability issues (e.g. EU Commission and associated agencies);
- Employment in and consultancy for non-governmental organizations and development agencies;
- Employment in national governmental organisations (e.g. environmental departments);
- Employment in communities and community-owned associations and enterprises related to resource and environmental risk management;
- Employment in public and private education systems / organizations (may require additional didactic qualifications);
- Employment in public and private research organisations and the higher education sector (e.g. universities, colleges, research units of national states and EU).

§ 2 ADMISSION REQUIREMENTS

Students can start the master's programme at all three partner universities (acting as home university) and have to spend 1-2 semesters at one of the partner universities (acting as host university). Admission and application within the master's programme NARMEE are processed by the home university.

Admission at BOKU:

For graduates of bachelor´s programmes, mastery of the following learning outcomes with a minimum amount of ECTS as indicated below is required for admission:

LEARNING OUTCOME	ECTS
Comprehend and apply fundamentals of mathematics and statistics	6
Know and comprehend fundamentals of physics	3
Know and comprehend fundamentals of chemistry	3
Know and comprehend fundamentals of geology, geomorphology and soil science	6
Know and comprehend principles of hydraulics, water and waste management	6
Know and comprehend fundamentals of meteorology and climatology	2
Know and comprehend fundamentals of the biology of plants and animals	6
Know and comprehend fundamentals of microbiology	3
Know and comprehend general principles of ecology and biogeochemical cycles	3
Know and comprehend fundamentals of macro-economy and micro-economy	4
Know and comprehend the general principles of law and policy	4
Know the principles of GIS and remote sensing and apply GIS at least to simple problems	2

In addition, knowledge of English at level B2 (Common European Framework of Reference for Languages) is required and has to be verified.

§ 3 PROGRAMME STRUCTURE

3a) Duration, total ECTS credits, and structure

The programme consists of courses and other requirements worth a total of 120 ECTS credits, equivalent to four semesters (a total of 3,000 60-minute credit hours). The language of instruction is English.

NARMEE is addressing the following thematic fields:

- Agro-municipal resources management
- Ecological engineering and risk management
- Nature conservation and biodiversity management
- Global resources and sustainability management
- Human dimension and socio-economic aspects of sustainable development

Students can start the master's programme at any of the three partner universities (acting as home university) and have to spend 1-2 semesters at one of the other partner universities (acting as host university).

BOKU Home University

The NARMEE curriculum consists of the following main components:

General structure		
Semester	**International Master in Natural Resources Management and Ecological Engineering**	**ECTS credits**
1 and 2	Introduction (compulsory)	12
	General skills and research methods (compulsory elect)	12
	Fundamentals of natural resources (compulsory elect)	12
	Specialisations in thematic fields (elective)	12
	Thesis-related subjects and research skills (compulsory & free elective)	12
3 and 4	Master's thesis	30
	Courses related to fundamentals and /or the thematic fields of the specialisations at the partner university (compulsory & elective)	30

BOKU Host University

Students have to follow the respective curriculum at their home university.

They have to take 30 ECTS credits of courses at BOKU: 20 ECTS credits out of this curriculum, 10 ECTS credits free elective courses. Additionally the master's thesis is co-supervised (see § 8).

3b) Three-pillar principle

The three-pillar principle is the central identifying characteristics of both the bachelor's and master's programmes offered at the University of Natural Resources and Life Sciences, Vienna. In the master's programmes, the sum of the compulsory and elective courses must be made up of at least

15% technology and engineering
15% natural sciences
15% economic and social sciences, law

The master's thesis and free electives are excluded from the three-pillar rule.

§ 4 COMPULSORY COURSES AT BOKU

A total of 38 ECTS required to complete the master's programme (BOKU home university) is allocated to compulsory and compulsory elect teaching components:

- Introduction (12 ECTS, compulsory)
- General skills and research methods (12 ECTS, compulsory elect)
- Fundamentals of natural resources (12 ECTS, compulsory elect)
- Master´s thesis seminar (2 ECTS, compulsory elect)

The main component ***Introduction*** comprises two compulsory subjects (6 ECTS each):

Introduction			
Subject	**Course title**	**Course type**	**ECTS credits**
Introduction I	Introduction in Natural Resources Management and Ecological Engineering	VO	3
	Resource and Environmental Economics	VO	3
Introduction II	Biogeochemistry of Soils	VU	3
	Lecture Series in Soil, Water and Atmosphere	VO	3

In the main component ***General skills and research methods*** two out of four subjects need to be elected. Within both elected subjects, one modular unit (6 ECTS) has to be completed:

General skills & research methods			
Subject	**Course title**	**Course type**	**ECTS credits**
Spatial data analysis and integration	Remote Sensing and GIS in Natural Resource Management	VO	3
	Remote Sensing and GIS in Natural Resource Management	UE	3
	OR:		
	Remote sensing and image processing	VU	6
Statistical data analysis	Statistical analyses of ecological data	VU	3
	Statistics of extreme events and geostatistics	VS	3
	OR:		
	Multivariate analysis of ecological data sets	VO	3
	Environmental statistics	VU	3
	OR:		
	Multivariate analysis of ecological data sets	UE	1,5
	Multivariate Statistics	VU	4,5
Mathematical modelling of natural resources and their management	Hydrological Processes and modelling	VO	3
	Simulation in Vadose Zone Environment	VU	3
	OR:		
	Applied Mathematical Programming in Natural Resource Management	VS	3
	Computer Simulation in Energy and Resource Economics	VS	3

	OR:		
	Computer Based River Modelling	VU	3
	Introductory and Advanced SWAT modelling	VU	3
Methods in economics, social sciences and cross cultural management	Managerial Economics	VU	3
	Valuation Methods for Natural Resources	VO	3
	OR:		
	Intercultural Communication	VU	3
	Principles of Empirical Research in the Social Sciences	VS	3
	OR:		
	Technology assessment	VS	3
	Project management	VU	3

In the main component ***Fundamentals of Natural Resources*** two out of five subjects need to be elected. Within both elected subjects, one modular unit (6 ECTS) has to be completed:

Fundamentals of natural resources			
Subject	**Course title**	**Course type**	**ECTS credits**
Soil resources	Soil Physics and Chemistry	VO	3
	Soil Chemistry	UE	3
	OR:		
	Soil Ecology	VO	3
	Field course in soil ecology	UE	3
	OR:		
	Chemistry of Soil Water	VO	2
	Soils of the World: Genesis and Classification	VX	2
	Practical Course: Methods in Soil Ecology	SE	2
	OR:		
	Description, Functions of Soil Structure and its Changes in Agricultural Land Use	VX	3
	Soil Properties and Processes for Ecological Engineering	VU	3
Water resources and climate	Ecology of aquatic systems	VO	3
	Hydrogeology	VU	3
	OR:		
	Meteorological conditions and precipitation	VS	3
	Advanced Topics on Hydroclimatology	US	3
	OR:		
	Limnology	VU	3
	Limnochemistry and nutrient cycling	VU	3
	OR:		
	Physical environment of riverine landscape	VO	2
	River habitat and landscape assessment	VU	4
	OR:		

	Biology, Chemistry and Microbiology for Civil Engineering	VU	3
	Sediment regime and river morphology	VO	3
Bio-resources, biodiversity and ecology	Ecology and Population Biology of Plants in Agroecosystems	VX	5
	Farmland Ecology	VO	1
	OR:		
	Population genetics and evolutionary theory relevant for the management and protection of aquatic organisms	VO	3
	Conservation Biogeography and Genetics	VS	3
	OR:		
	Taxonomy and ecology of benthic invertebrates	VU	3
	Ecology of fishes	VO	3
	OR:		
	Fish sampling and monitoring	VÚ	3
	Fish ecological status assessment	VU	3
	OR:		
	Benthic invertebrate sampling and monitoring	VU	3
	Benthic invertebrate status assessment	VU	3
	OR:		
	Physiology of crop nutrition	VO	4
	Physiology of crop nutrition	UE	2
	OR:		
	Introduction to Tropical Ecology	VO	2
	Cropping systems in the tropics and subtropics	VO	4
	OR:		
	Plant and Environment	VO	3
	The Role of Soils in Nature Conservation and Wildlife Management	VU	1,5
	Fire ecology – vegetation and wildlife	VO	1,5
(Bio-)Chemistry of natural resources	Biophysical Chemistry	VU	3
	Bioorganic Chemistry	VO	3
	OR:		
	Kinetics of Biochemical Reactions	VU	3
	Proteomics	VU	3
	OR:		
	Biochemistry of Trace Elements	VO	3
	Advanced Analytical Techniques for Elemental Trace and Isotope Analysis	VO	2
	Isotopic tools for the investigation of the ecosystem	VU	1
Fundamentals of natural resource management	Decision Support Systems	SE	3
	Multiple Criteria Decision Making in Natural Resource Management	VS	3
	OR:		

	Game Theory in Environmental and Natural Resource Management	VO	3
	Principles of Commodity Markets and Trade Policy	VO	3

A compulsory master's thesis seminar (2 ECTS) related to the topic of the master thesis (***Thesis-related subjects and research skills***) must be completed:

Master's Thesis Seminar			
Subject	**Course title**	**Course type**	**ECTS credits**
Thesis-related subjects	Master's Thesis Seminar	SE	2

§ 5 ELECTIVE COURSES AT BOKU

In the main component ***Specialisations in thematic fields*** one of the following five thematic fields has to be elected. Within the elected thematic field two modular units (6 ECTS) from either one or two of the offered subjects need to be completed:

- Agro-municipal resource management
- Ecological engineering risk management
- Nature conservation and biodiversity management
- Global resources and sustainability management
- Human dimension and socio-economic aspects of sustainable development

Thematic field ***Agro-municipal resource management***:

Agro-municipal resource management			
Subject	**Course title**	**Course type**	**ECTS credits**
Soil management and protection	Soil Conservation and Soil Protection	VU	3
	Soil Water Management	VO	3
	OR:		
	Soil Fertility and Soil Ecology in Organic Agriculture	VU	3
	Soil Protection	VO	3
	OR:		
	Rhizosphere Processes and Application to Agriculture and Soil Protection	VO	3
	Ecology and Management of the Rhizosphere in Ecological Engineering	UE	3
Forest services and management	Effects of air pollutants and nutrient deficiencies on mountain forests	VS	3
	Forest and water	VS	3
	OR:		

	Agroforestry in Mountain Regions	VS	3
	Field Camp II - Concepts and methods of site ecology, forest growth and yield	PJ	3
	OR:		
	Field Camp I - Introduction to mountain forestry and forest sciences	VX	2
	Natural Resource Management in Mountain Forests	VS	4
	OR:		
	Field Camp III - Integrated forest management applications	PS	3
	Risk Management and Vulnerability Assessment	VS	3
Water resource planning and waste management	Water Resources Planning and Management	VO	3
	Irrigation Design	VU	3
	Process Simulation	VU	2
	Processes and Technologies for Waste Management	VO	1
	Planning and Assessment of Waste management Systems	VU	3

Thematic field ***Ecological engineering and risk management***:

Ecological engineering and risk management			
Subject	**Course title**	**Course type**	**ECTS credits**
Mitigation of natural hazards and erosion control	Mountain hazard processes	VS	4.5
	Mountain hazard processes - field trip	EX	1.5
	OR:		
	Geotechnics	VO	3
	Soil-bioengineering techniques (slopes and gullies)	VS	3
	OR:		
	Hydraulic Engineering and River Basin Management	VO	3
	Integrated Flood Risk Management	VO	3
	OR:		
	Ecologically Oriented Methods and Monitoring in River Engineering	VU	3
	Flood Forecasting and Flood Protection	SE	3
	OR:		
	Integral risk management	VS	3
	Protection and mitigation measures against natural hazards	VX	3
Management and remediation of polluted soils and environments	Soil Pollution and Remediation	VU	3
	In-Situ Treatment of Polluted Soils and Sediments: Phytoremediation, In-Situ Fixation and Attenuation Techniques	UE	3

River and river landscape management and engineering	Human impacts in riverine landscapes	VO	2
	Ecological river landscape management	VO	2
	Applications in river landscape management	VX	2
Sanitary engineering and water pollution control	Risk Assessment in the Aquatic Environment	VU	3
	Case Studies in Sanitary Engineering	SE	3
	On Site Solutions for Water Supply and Sanitation	VO	3
	Planning and Design in Water Supply and Wastewater Treatment	UE	3

Thematic field ***Nature conservation and biodiversity management***:

Nature conservation and biodiversity management			
Subject	**Course title**	**Course type**	**ECTS credits**
Biodiversity and conservation in aquatic, semiterrestrial and terrestrial environments	Environmental impacts on riverine ecosystems I	SE	4
	Environmental impacts on riverine ecosystems II	SE	2
	OR:		
	Fisheries management and conservation	VS	2
	Aquatic biomonitoring and -assessment	VO	2
	Ecohydromorphological mapping	VU	2
	OR:		
	Ecology, restoration and conservation of aquatic and riparian vegetation	VU	2
	Biodiversity and Conservation of Mountain Forests	VS	2
	Fire Management in Mountain Forest Ecosystems - Prophylaxis and Control	VS	2
	OR:		
	Management and Forest Protection in High Altitude Afforestations and Protective Forests	VX	3
	Mountain Forest Dynamics and Fire Ecology	VS	3
	OR:		
	Protection of Natural Resources by Organic Farming	VS	3
	Biocultural Diversity in Rural Landscapes	VS	3

Thematic field ***Global resources and sustainability management***:

Global resources and sustainability management			
Subject	**Course title**	**Course type**	**ECTS credits**
Global aspects of land and soil resource manage-	Soils and Food security	VO	2
	Soils and Global Change	SE	4
	OR:		

ment	Soil Problems in Aridic and Semiaridic Regions	VO	3
	Soil Management in Tropical and Subtropical Development Regions	VO	3
	OR:		
	International Land Management	VS	1,5
	Global Aspects in Landscape Planning	VX	4,5
	OR:		
	Dynamic Land Use Optimization under Global Change	SE	3
	Integrated land use modelling	VS	3
Global aspects of water and forest resource management and climate change mitigation	Possible Impacts of Climate Change on Water Resources	VO	3
	Environmental Risk Analysis and Management	VO	3
	OR:		
	Water Resources Management in Developing Co-operation	VU	3
	Appropriate Technologies for Water Supply & Sanitation in Developing Countries	VO	3
	OR:		
	Innovations for Sustainable Forest Management	VS	4
	Adapting Forest Management to Climate Change	VS	2
Global aspects of waste management	Radioactive Waste Management – Its Perception and Acceptance I	VO	2
	Radioactive Waste Management – Its Perception and Acceptance II	VO	2
	Life Cycle Management	VO	2
	OR:		
	Global Waste Management I	VO	3
	Global Waste Management II	VO	3

Thematic field ***Human dimension and socio-economic aspects of sustainable development***:

Human dimension and socio-economic aspects of sustainable development			
Subject	**Course title**	**Course type**	**ECTS credits**
Environmental policy, forecast and networking	Institutions and Policies of the EU (Introduction to the Law and Politics of the European Union)	VO	3
	International Law and Cooperation Development	VO	3
	OR:		
	Global Networking	SE	6
	OR:		
	Regional economics and regional governance	VO	3
	Forest policy analysis	VS	3
	OR:		

	Environmental history of aquatic systems	VS	2
	Foresights - what future to expect? (Late lessons from early warnings)	VO	2
	Environmental Policy and Social Impact Assessment	VO	2
Sustainable development, development research and innovation	Facilitating change for sustainable development	VS	3
	Participatory methods in development research and practice	SE	3
	OR:		
	Growth, Development, Trade and Environment	VO	3
	Science and technology studies: Understanding sustainable innovation	SE	3
	OR:		
	Applied development research I	VS	3
	Applied development research II	VS	3
	OR:		
	Negotiating change: simulating an international conference for sustainable development	VS	3
	Development Innovation	VS	3
	OR:		
	Mountain forest policy	VS	4,5
	Economics of multiple use forestry	VS	1,5

§ 6 FREE ELECTIVES AT BOKU

Free elective subjects amounting to 10 ECTS need to be chosen within the main component ***Thesis-related subjects and research skills*** according to the topic of the master's thesis.

The free electives may be selected from all courses offered by all recognized universities in Austria and abroad and need to be confirmed by the master's thesis supervisor and the NARMEE programme coordinator before including them into the individual course plan.

It is recommended to include one course (1-3 ECTS) related to the topic of the master thesis aimed at training the ***Research and scientific writing skills***. Examples of relevant courses offered at BOKU are listed in Annex B.

§ 7 COURSES AT THE PARTNER UNIVERSITIES

Students with BOKU as home university have to complete 30 ECTS of courses at one of the partner universities:

(1) Lincoln University, New Zealand (LU)

Students have to complete three modular units (all 600 Level, each 10 ECTS), including one compulsory unit related to the main component ***Fundamentals of natural resources***, and two elective units related to the main component ***Specialisations in thematic fields***. At

least one of the elective units should be related to the topic of the master thesis. The selection of the thematic fields and related individual courses requires consent of the programme coordinator at Lincoln University.

In the main component ***Fundamentals of Natural Resources*** the compulsory subject *Fundamentals of natural resource management* (10 ECTS) needs to be completed. The course offered depends on the term:

Fundamentals of natural resources			
Subject	**Semester**	**Course title**	**ECTS credits**
Fundamentals of natural resource management	Term 1	Environmental Sciences in Environmental Policy (ERST 631)	10
	OR:		
	Term 2	Aspects of Sustainability in an International Perspective (ERST 636)	10

In the main component ***Specialisations in thematic fields*** two modular units (courses, each 10 ECTS) from the following three thematic fields have to be elected:

- Ecological engineering risk management
- Nature conservation and biodiversity management
- Human dimension and socio-economic aspects of sustainable development

Thematic fields and courses currently offered at Lincoln University:

Specialisations		
Thematic field	**Course title**	**ECTS credits**
Ecological engineering and risk management	Courses which begin with the abbreviations ECOL, ENGN, ERST, MICR, PHSC, PLPT, SOCI, SOSC or TRAN	10
Nature conservation and biodiversity management	Courses which begin with the abbreviations ECOL, ERST or PLPT	10
Human dimension and socio-economic aspects of sustainable development	Courses which begin with the abbreviations ECON, ERST, BMGT or SOCI	10

Upon consent with the programme coordinators at Lincoln University and BOKU also courses related to the following two thematic fields may be taken (currently no explicit listing of courses available):

- Agro-municipal resources management (10 ECTS)
- Global resources and sustainability management (10 ECTS)

(2) Czech University of Life Sciences Prague (CULS)

In the three main components ***Fundamentals of natural resources***, ***Specialisations in thematic fields*** and ***Thesis-related subjects*** students have to complete modular units (courses) amounting to a total of 30 ECTS.

In the main component ***Fundamentals of natural resources*** students can elect courses amounting up to 24 ECTS from the following subjects:

Fundamentals of natural resources		
Subject	**Course title**	**ECTS credits**
Soil resources	Soil and water relationship	6
	Soil and plant relationship	6
Water resources and climate	Advanced meteorology	6
Bio-resources, biodiversity and ecology	Agricultural and environmental microbiology	6

In the main component ***Specialisations in thematic fields*** up to 30 ECTS can be elected from subjects of the following thematic fields:

- Agro-municipal resource management
- Nature conservation and biodiversity management
- Human dimension and socio-economic aspects of sustainable development

Thematic fields and subjects currently offered at Czech University of Life Sciences:

Specialisations		
Thematic Field	**ECTS credits**	**Subjects**
Agro-municipal resource management	0-12	Soil end environmental chemistry
		Soil conservation and protection
		Soil and Water
		Water resources management
Nature conservation and biodiversity management	0-12	Ecology and forest science
		Management of natural resources
Human dimension and socio-economic aspects of sustainable development	0-12	Policy and economics

Upon consent with the programme coordination at Czech University of Life Sciences and BOKU also courses listed in CULS´ NARMEE course list which are related to the following two thematic fields may be taken (currently no explicit listing of courses available):

- Ecological engineering and risk management (max. 12 ECTS)
- Global resources and sustainability management (max. 12 ECTS)

While no compulsory courses are required at CULS, in order to meet CULS' requirements for the joint degree, the **ELECTED** courses from CULS and BOKU together should cover the subjects of the following corridors[2]: *Soil Properties and Conservation*, *Water Resources and Management and Atmosphere*, *Biosphere and Environments* (to be specified in consent with the programme coordination at CULS)**.**

A maximum of 6 ECTS free elective subjects may be chosen within the main component *Thesis-related subjects and research skills* according to the topic of the master's thesis. The subjects may be selected from any course offered by CULS and needs to be confirmed by the master's thesis supervisor and the NARMEE programme coordination at CULS and BOKU before including them into the individual course plan.

Thesis-related subjects and research skills currently offered at Czech University of Life Sciences:

Thesis-related subjects and research skills	0-6	Any appropriate master courses offered by CULS

§ 8 MASTER'S THESIS

A master's thesis is a paper on a scientific topic, to be written as part of a master's degree programme (for exceptions please see the bylaws (Satzung) of the University of Natural Resources and Life Sciences, Vienna, part III- Teaching, § 30 [9]). The thesis is worth a total of 30 ECTS credits. With their master's theses, students demonstrate their ability to independently address a scientific topic, both thematically and methodologically (§ 51 [8] UG 2002 BGBl. I no. 81/2009).

The topic of a master's thesis shall be chosen in such a way that it is reasonable to expect a student to be able to complete it within six months. Multiple students may jointly address a topic, provided that the performance of individual students can be assessed (§ 81 [2] UG 2002 BGBl. I no. 81/2009).

The master's thesis has to be completed and defended at the home university, and must be co-supervised by the host university.
Each student has two thesis supervisors, the main supervisor from the home university and a co-supervisor from the host university. The expertise of the main supervisor needs to fall within the thesis theme.
The master's thesis shall be written in English. The thesis defensio must be held in English.

§ 9 COMPLETION OF THE MASTER'S PROGRAMME

The master's programme in Natural Resource Management and Ecological Engineering (NARMEE) has been completed when the student has passed all required courses and received a positive grade on the master's thesis and defensio.

[2] The corridors as defined in the study book of CULS each comprise between two and five individual courses.

§ 10 ACADEMIC DEGREE

The graduates of the master´s programme in *Natural Resources Management and Ecological Engineering* will receive a joint degree „Master of Science“, abbreviated „MSc“, from the University of Natural Resources and Life Sciences, Vienna, issued jointly with either the Czech University of Life Sciences Prague or Lincoln University, New Zealand. The Joint Degree will be issued by that university where the studies had been started („home university“).

The academic degree MSc, if used, shall follow the bearer's name (§ 88 [2] UG 2002 BGBl. I no. 81/2009).

§ 11 EXAMINATION REGULATIONS

(1) The master's programme in Natural Resources Management and Ecological Engineering is completed successfully upon completion of the following main components:

- Introduction (12 ECTS)
- General skills and research methods (12 ECTS)
- Fundamentals of natural resources (12 ECTS)
- Specialisations in thematic fields (12 ECTS)
- Thesis-related subjects and research skills (12 ECTS)
- Master thesis (30 ECTS)
- Courses related to fundamentals and /or the thematic fields of the specialisations at the partner university (30 ECTS)

(2) Student evaluation takes the form of course and module examinations. Course examinations can be either written or oral, as determined by the course instructor, taking the ECTS credit value of the course into account. Any prerequisites for admission to examinations shall be listed in § 4 under the respective course/module.

(3) Student evaluation in modules: Module evaluation is based on the grades given the students in the individual courses that make up the module. The total evaluation for the module is calculated as the average of the grades of all module courses, weighted by ECTS credits. Average values of .5 or lower are rounded to the better (numerically lower) grade; values of over .5 are rounded to the worse (numerically higher) grade. If deemed necessary, the Dean of Students may require a module examination at his/her discretion.

(4) The choice of examination method shall be based on the type of course: Lectures shall conclude with a written or oral examination, if continuous assessment of student performance is not applied. Seminars (SE) and project-based courses (PJ) can be evaluated based on independently written papers, length and contents of which are determined by the course instructor. For all other course types, the examination type is at the instructor's discretion.

(5) After the successful completion of all the courses and examinations required in the master's programme, the completed master's thesis, after it has been given a positive evaluation by the thesis supervisor and co-supervisor, shall be publically presented by the student and defended in the form of an academic discussion (defensio). The committee shall consist of a committee chair and two additional university teachers with a venia docendi or equivalent qualification. The student's total performance (thesis and defensio) will be assigned a comprehensive grade. Both thesis and defensio must receive a passing grade for the student to complete the programme. The written evaluations stating the rationale for the thesis grade and the defensio grade are included in calculating the comprehensive grade and are documented separately.

The comprehensive grade is calculated as follows:

- Master's thesis: 70%
- Defensio (incl. presentation): 30%

(6) A comprehensive evaluation of the student's performance on the entire programme shall be assigned. A comprehensive evaluation of "passed" means that each individual component of the programme was completed successfully. If individual components of the programme have not been successfully completed, the comprehensive evaluation is "failed". A comprehensive evaluation of "passed with honours" is granted if the student has received no grade worse than a 2 (good) on all individual components, and if at least 50% of the individual components were graded with 1 (excellent).

§ 12 TRANSITIONAL PROVISIONS

Students who are subject to the master curriculum Natural Resources Management and Ecological Engineering (NARMEE (H 066 416, version October 1, 2015) that was in action to date, are entitled to complete their study programme until November 30, 2019.

For students who are repositioned to this master's programme after the transitional period or who voluntarily switch to the new master's programme curriculum, examinations for courses taken under the provisions of the previously valid curriculum shall be recognized towards the new programme under the provisions of this curriculum based on the list of equivalent courses.

§ 13 EFFECTIVE DATE

This curriculum shall take effect on October 1, 2016.

ANNEX A TYPES OF COURSES

The following types of courses are available:
(Please only offer course types included in this list from now on.)

Lecture (VO)
Lectures are courses in which certain areas of a subject and the methods used in this area are imparted through didactic presentation.

Exercise course (UE)
Exercise courses are courses in which students are instructed in specific practical skills, based on theoretical knowledge.

Practical course (PR)
Practical courses are classes in which students deal with specific topics independently, based on previously acquired theoretical and practical knowledge.

Compulsory internship seminar (PP)
The compulsory internship seminar is a class in which students deal independently with topics related to their internship placements, based on previously acquired theoretical and practical knowledge.

Seminar (SE)
Seminars are courses in which students are required to work independently on the respective subject, deepen their knowledge of the topic and discuss relevant issues.

Field trips (EX)
Field trips are courses in which students have the opportunity to experience relevant fields of study in real-life practical application, to deepen their knowledge of the respective subject. Field trips can be taken to destinations both in Austria and abroad.

Master thesis seminar (MA)
Master thesis seminars are seminars intended to provide students with academic support during the thesis writing process.

Mixed-type courses:
Mixed-type courses combine the characteristics of the courses named above (with the exception of project-type courses). Integration of different course-type elements improved the didactic value of these courses.

Project course (PJ)
Project courses are characterized by problem-based learning. Under instruction, students work - preferably in small groups - on case studies, applying appropriate scientific methods.

Lecture and seminar (VS)
Lecture and exercise (VU)
Lecture and field trip (VX)
Seminar and field trip (SX)
Exercise and seminar (US)
Exercise and field trip (UX)

ANNEX B RECOMMENDED FREE ELECTIVES

Students are recommended to select a course related to ***Research and scientific writing skills***. Recommended courses are listed below:

Research and scientific writing skills				
Field	**Course number**	**Course title**	**Course type**	**ECTS credits**
Soil & Plant Sciences	911340	Soil - Plant Science Workshop: From the hypothesis to publication I	SE	3
	911011	Soil - Plant Science Workshop: From the hypothesis to publication II	SE	3
	911005	Writing Workshop	SE	1
Forest Sciences	912333	Scientific Methods and Writing Skills	VS	1
	912112	Scientific skills	SE	1
Biotechnology	791099	How to write and publish a scientific publication	VU	2
Aquatic ecology	812351	Scientific reading and presentation in aquatic ecology	SE	3