



Universität für Bodenkultur Wien

University of Natural Resources and Life Sciences, Vienna

Curriculum

for the Master Programme in

Environment and Bio Resources Management

Programme Classification No. 066 427

Effective Date: October 1st, 2018



For legal purposes, only the version of the curriculum that has been published in the official journal (Mitteilungsblatt) is binding and valid - this English translation is for information purposes only.

CONTENTS

§ 1	Qualification Profile	3
§ 2	Admission Requirements.....	5
§ 3	Programme Structure	6
§ 4	Compulsory Courses	8
§ 5	Elective Courses.....	9
§ 6	Free Electives	18
§ 7	Master's Thesis.....	18
§ 8	Completion of the Master Programme	19
§ 9	Academic Degree	19
§ 10	Examination Regulations	19
§ 11	Transitional Provisions	20
§ 12	Effective Date.....	21
Annex A	Types of Courses.....	22

Contact

Center for International Relations
University of Natural Resources and Life Sciences, Vienna
Peter Jordan Str. 82a, 1190 Vienna
Austria, Europe
Phone: (+43-1)-47654-2600
Fax: (+43-1)-47654-2606
e-mail: international@boku.ac.at
<http://www.boku.ac.at/international>

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**Curriculum of the Master Degree Programme
“Environment and Bio Resources Management”**

At the University of Natural Resources and Life Sciences, Vienna

As at October 1st, 2018

§ 1 QUALIFICATION PROFILE

The Master programme in Environment and Bio Resources Management is a 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.

1a) Knowledge and Personal and Professional Skills

Graduates of the Master study programme Environment and Bio Resources Management (UBRM) are equipped with empirical and analytical skills as well as multidisciplinary competences which are relevant in order to develop interdisciplinary solutions in an operational as well as social context. Graduates are enabled to understand, analyze and practically work with complex problems and interrelationships in the fields of environmental and bio resources management using disciplinary as well as interdisciplinary methods. Doing so, they can fall back on skills which were imparted in the context of business-management, economics, political sciences, jurisprudence as well as sociology.

The students acquire the following qualifications in three compulsory areas and advanced studies (learning results are shown in detail under §5a):

- *Environment-oriented business studies:* Graduates have the ability to better understand and to develop environmentally relevant decision-making processes on an operational level.
- *Environmental politics and legislation:* Graduates are enabled to understand and evaluate political decision-making processes and the role of political stakeholders. They can understand legal problems and can handle authorisation processes competently.
- *Environmental and resource economics:* Graduates have the ability to understand environmental and resource economic problems and interrelations. They can connect these with methodological skills and apply them with regards to an efficient and sustainable environment and resource management.

The proficiencies and skills of the graduates in the fields of economics, social sciences and jurisprudence mentioned above are connected with one or two of the following specialist divisions based on their focus. Each focus imparts in-depth knowledge and skills in the fields of natural sciences and engineering sciences. (The learning results of the following specialist divisions are shown in detail under § 5b):

- *Waste material:* Graduates have an understanding for the interrelations in complex waste management systems, especially in those areas where socially relevant aspects have to be considered.
- *Biodiversity / nature conservation / land use:* Graduates gained expertise of biological theories, concepts and tools in respect to the acquisition, assessment and monitoring of biodiversity and land use.
- *Soil:* Graduates are equipped with knowledge and skills of the ecosystem services of soil and for its optimization as well as of possibilities of soil rehabilitation and soil protection in the context of global change.
- *Energy:* Graduates know of and are able to apply their engineering knowledge in fields such as energy supply, energy use, energy transformation and energy management.
- *Climate:* Graduates have knowledge of problem areas of climate change in respect to the natural sciences, socio-economics and politics and are capable to develop strategies for solutions.
- *Mobility / transportation:* Graduates are equipped with socio-economic knowledge of mobility and transportation as well as traffic planning and management based on technical sciences and natural sciences. They have knowledge of the optimized handling of transportation using already existing infrastructures.
- *Regional development:* Graduates gained expertise in fundamental theories and models which help explain regional development and are able to apply comparative analyses of regions with respect to their regional economic, socio-cultural and landscape characteristics.
- *Environmental information management:* Graduates gained knowledge and skills in the fields of management, modeling and assessment of environmental data.
- *Water:* Graduates are equipped with socio-economic and ecologic-technical knowledge and skills when it comes to the development and application of sustainable water management concepts.

When a minimum of 31 ECTS credits in one of the above stated specialist divisions is completed successfully, this specialisation can be explicitly stated in the graduation papers upon request by the student.

The interdisciplinary and application-oriented positioning of this Master study programme establishes the understanding for the complex connections and interrelations of humans, environment and technics. These competences enable the graduates to work in various fields related to sustainable environment and bio resource management, both on an operational and social level.

1b) Professional Qualifications

Due to the interdisciplinary orientation of the Master study programme Environment and Bio Resources Management a wide range of activities and occupations open up for graduates depending on their chosen professional specification. Selected fields of activities include management and leading tasks in businesses and public institutions, such as the composition of reports on sustainability, organization and supervision of stake holder processes, development and realization of business plans, or the monitoring and realization of legal envi-

ronment and nature conservation sanctions. Graduates of the Master study programme Management of Environment and Bio Resources work in the following sectors:

Public Sector:

- public administration (county, province and federation)
- international organisations
- environment-, energy- and regional development agencies

Non-Profit Sector:

- lobbies, associations and co-operatives
- non-governmental organisations
- educational and research institutions

Private Sector:

- commerce, industry and trade
- utility and waste management companies
- consulting and civil engineering offices
- media and public relations
- insurance companies and financial service providers

§ 2 ADMISSION REQUIREMENTS

Graduates of the following Bachelor programmes offered by BOKU University of Natural Resources and Life Sciences are eligible for admission with no further requirements:

033 225 Forestry

033 227 Environment and Bio Resources

033 255 Agricultural Sciences

For graduates of Bachelor programmes completed at other universities, mastery of the following learning outcomes is required for admission:

Basic knowledge in

- economics and social sciences,
- natural sciences,
- engineering as well as
- methods of empirical research.

The basic knowledge required in the economic and social sciences comprises of environment and resource oriented business administration and economics as well as environment and resource oriented political sciences and jurisprudence.

The basic knowledge required in the natural sciences comprises of physics, chemistry, ecology as well as land use.

The basic knowledge required in the engineering sciences comprises of process, energy and environmental technology.

The required fundamental knowledge on empirical research comprises the quantitative and qualitative methods of data acquisition and evaluation.

Furthermore, competences in English at a level of B2 (according to the Common European Framework of Reference for Languages by the Council of Europe) are recommended.

§ 3 PROGRAMME STRUCTURE

3a) Duration of the Programme

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

3b) Overview of the Programme: Total ECTS Credits and Structure

The programme is divided into:

Compulsory courses:	26 ECTS credits, including
Master seminar:	2 ECTS credits
Advanced studies:	21 ECTS credits
Specialist divisions:	31 ECTS credits
Master's Thesis:	30 ECTS credits
Free electives:	12 ECTS credits

Compulsory Courses:

26 ECTS credits (see § 4)			
Methodological basis	Environment-oriented business studies	Environmental politics	Environmental and resource economics

Advanced Studies:

21 ECTS credits (see § 5)		
Environment-oriented business studies	Environmental politics and legislation	Environmental and resource economics

In advanced studies 21 ECTS credits have to be completed successfully. At least one course of each of the three advanced study divisions has to be completed successfully.

Specialist Divisions:

31 ECTS credits from one or two divisions (see § 5)		
Climate	Water	Waste management
Energy	Regional development	Biodiversity / land use
Mobility / transport	Environmental information management	Soil

In one or two specialist divisions courses to the extent of 31 ECTS credits have to be completed successfully. In the specialist division(s) chosen by the student, the successful completion of all identified courses (see § 5) and an expert seminar are compulsory. When a minimum of 31 ECTS credits in **one** of the specialist divisions is completed successfully, this specialisation can be explicitly stated in the graduation papers upon request by the student.

3c) Three-Pillar Principle

The three-pillar principle is one of the central identifying characteristics of both the Bachelor and Master programmes offered at the University of Natural Resources and Life Sciences, Vienna. In the Master 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, compulsory internship and free electives are excluded from the three-pillar rule.

3d) Limited Number of Participants in Courses

For courses with a limited number of participants the head of the Master course is authorised to first admit students enrolled in the Master programme (that means that students enrolled in a Bachelor study programme can only be admitted to the courses if further spaces are left on the course!) The admission of students enrolled in the Master study programme is conducted according to the following order of required courses by the students: compulsory course, elective course, free elective course.

§ 4 COMPULSORY COURSES

Used Abbreviations:

ECTS = European Credit Transfer System

WS = Winter Semester

SS = Summer Semester

Notes:

¹⁾ In English

²⁾ In English and German

³⁾ Courses not offered in the academic year 2018/19

⁴⁾ Courses only offered in even academic years

⁵⁾ Courses only offered in uneven academic years

26 ECTS credits taken from the compulsory courses have to be completed successfully, whereby 6 ECTS credits each have to be completed in the areas of methodological foundations, environmentally oriented business studies, environmental politics as well as environment and resource economics.

Methodological Basis		Semester	Course Type	ECTS Credits
Course Number	Course Title			
851307	Advanced statistical methods	WS	VU	3.0
732319	Qualitative research methods and designs in the social sciences	SS	VS	3.0
Environment-Oriented Business Studies		Semester	Course Type	ECTS Credits
Course Number	Course title			
733329	Environmental economics at company level	SS	VO	3.0
733312	Management accounting	WS	VU	3.0
Environmental Politics		Semester	Course Type	ECTS Credits
Course Number	Course Title			
732336	Science in politics and society	WS	VS	3.0
732339	Governance of sustainable development	WS or SS	SE	3.0
Environmental and Resource Economics		Semester	Course Type	ECTS Credits
Course Number	Course Title			
731319	Economics of externalities and social resources	SS	VO	3.0
731310	Economic of sustainable land use under global change	SS	VO	3.0

Learning outcomes: Graduates have acquired basic and special knowledge in the areas of environment-oriented business studies, environmental politics, environmental and resource economics as well as the computer-based application of statistical and qualitative methods.

Master Seminar		Semester	Course Type	ECTS Credits
Course Number	Course Title			
	Master's thesis seminar		SE	2.0

§ 5 ELECTIVE COURSES

5a)

Courses to the extent of 21 ECTS credits taken from the three advanced study areas (i) environment-oriented business studies, (ii) environmental politics and legislation and (iii) environmental and resource economics have to be completed successfully.

Students of the Master programme have to complete at least one course in each of the three advanced study areas.

(i) Advanced Studies: Environment-Oriented Business Studies				
Course Number	Course Title	Semester	Course Type	ECTS Credits
734329	Logistic systems	SS	VS	6.0
735305	Entrepreneurship and innovation (incl. patent licensing) ³	SS	VO	5.0
735327	Market research and market analysis	SS	VU	3.0
735332	Marketing strategies	WS	VO	2.0
734323	Business management I	WS	VU	3.0
733320	Environmental management and environmental information systems for businesses	WS	VO	3.0
731311	Project management - advanced	WS	VU	3.0

Learning outcomes: Graduates are familiar with environmentally relevant decision-making processes on an operational level. They know the essential possibilities of data acquisition, -structuring and -analysis and can apply their gained information in an innovative way for a sustainable corporate management. Furthermore, students know the complex environment requirements which businesses need to act in accordance with and are able to assess these economically. They are also familiar with the basics of developing marketing strategies and can also evaluate corporate aspects such as logistic questions in an appropriate way.

(ii) Advanced Studies: Environmental Politics and Legislation				
Course Number	Course Title	Semester	Course Type	ECTS Credits
732351	Policy of nature protection and environmental policy	WS	SE	3.0
732301	Analysis of politics	WS or SS	SE	3.0
732352	Governance and politics of climate change	WS	SE	4.0
732350	Conflicts in the environmental policy field	WS	SE	3.0
732307	Participation and conflict resolution	SS	SE	3.0
736310	Seminar environmental law	SS	SE	3.0
736311	Environmental law aspects of industrial installations ³	SS	VU	3.0
736312	Applied environmental impact assessment	WS	VO	2.0
731393	Institutional innovation and sustainability transformation	SS	VU	3.0

Learning outcomes: Graduates are familiar with political decision-making processes, the role of political stakeholders and the essential governmental and non-governmental mechanisms and instruments of social regulation in the field of environment. They also understand the complex interrelations of knowledge, evidence and politics respectively. Students can also comprehend legal problems and support authorisation procedures and legal compliance registers for businesses realized by lawyers.

(iii) Advanced Studies: Environmental and Resource Economics				
Course Number	Course Title	Semester	Course Type	ECTS Credits
731381	Advanced natural resource economics	WS	VO	3.0
731330	Growth, development, trade and environment ¹	SS	VO	3.0
731335	Game theory in environmental and natural resource management ¹	SS	VO	3.0
731338	Econometrics	SS	VO	3.0
731340	Advanced seminar in environmental and resource economics	WS	SE	3.0
731369	Computer simulation in energy and resource economics ¹	WS	VS	3.0
731348	Managerial economics ¹	WS	VU	3.0
731351	Applied mathematical programming in natural resource management ¹	WS	VS	3.0
731332	Econometrics - seminar	SS	SE	3.0
835305	Mathematical modelling in life sciences	SS	VU	3.0
731394	Alternative forms of economic organization in theory and practical experience	WS	SE	3.0

Learning outcomes: Graduates are familiar with the most important theories, concepts and methods of environment and resource economy. The knowledge of theoretical and concep-

tual foundations comprises of static and intergenerational efficiency of the allocation of resources, the optimal pollution and pollution regulation for point source pollution and non-point source pollution and the optimal offer of public goods. Students gain their methodical skills in respective courses in the fields of econometrics, theory of games, computer simulation and mathematical programming. With this knowledge of theory and their methodical skills students gain the competence to formulate recent environment and resource problems in an analytically precise way. Furthermore, they can establish relationships and solutions which account for a sustainable development.

5b)

Positive completion of courses to the extent of 31 ETCS credits from **one** or **two** specialist divisions. When one or two specialist divisions are chosen, the courses from one or two specialist divisions marked with **) must be completed successfully. The other courses can be freely chosen from the one or two chosen specialist divisions.

Furthermore, a course marked as specialist seminar to an extent of 3 and 5 ECTS credits must be chosen from the one or one of the two chosen specialist divisions.

When a minimum of 31 ECTS credits in one of the stated specialist divisions is completed successfully, this specialisation can be explicitly stated in the graduation papers upon request by the student.

Specialist Division: Climate				
Course Number	Course Title	Semester	Course Type	ECTS Credits
814305	**) Climate change scenarios and regional impact ¹	WS	VO	3.0
833318	**) Global change ecology	WS	VO	3.0
732352	**) Governance and politics of climate change	WS or SS	SE	4.0
833319	Seminar in global change and ecosystems ¹	WS	SE	2.0
911331	Ecosystem dynamics and their effect on greenhouse gases	SS	VO	3.0
814306	Characteristics of climate in Austria	WS	VO	2.0
816342	Possible impacts of climate change on water resources ¹	SS	VO	3.0
834304	Global change aspects in crop production	SS	VO	3.0
855309	Tourism and leisure planning	WS	VU	3.0
814325	Air pollution control and climate protection	SS	VU	3.0
732301	Analysis of politics	WS	SE	3.0
736313	Air pollution control	WS	VO	2.0
893360	Energy engineering ¹	SS	VO	3.0
	Specialist Seminars:			
991004	Global change and sustainability and their security relevance	SS	SE	3.0
814327	Sustainability challenge	WS & SS	PJ	4.0

Learning outcomes: The specialist division allows insights into the multifaceted aspects of climate change. There is an intensive investigation of the problems regarding natural sciences, socio-economics and politics. A special focus hereby lies on the regional impact but also on options of action of these global challenges as well as on the interaction with the protection of the environment. Graduates have a deep understanding of the relevant components of climate change and are enabled to work together with experts and pressure groups in order to develop, support and supervise strategies and measures required for the realization of such strategies.

Specialist Division: Water				
Course Number	Course Title	Semester	Course Type	ECTS Credits
732344	**) Water policy	SS	VS	3.0
816338	**) Water resources planning and management ¹	WS	VO	3.0
871360	**) Risk management and vulnerability assessment ¹	WS	VS	3.0
812348	Water legislation ¹	WS	VO	2.0
816307	Hydro-electric energy and electricity market	WS	VO	2.0
816308	Solution of conflicts between ecological integrity and engineering of rivers	WS	VO	3.0
812379	Data mining and data management in aquatic ecology ¹	SS	VU	2.0
816347	Application of GIS in hydrology and water management ¹	SS	VO	3.0
811302	Water hygiene ⁵	SS	VO	3.0
812349	Ecological river landscape management ¹	WS	VO	2.0
812347	Human impacts in riverine landscapes ¹	WS	VO	2.0
812329	Selected chapters in ecology of aquatic environments	WS	VO	3.0
816313	Environmental impact assessment for small hydropower plants ³	WS	VO	1.0
736319	Water law	SS	VO	3.0
816316	River maintenance and design ³	SS	VO	2.0
	<i>Specialist Seminar:</i>			
812382	Seminar - water (UBRM)	SS	SE	3.0

Learning outcomes: Graduates complement their socio-scientific and economic abilities with natural-scientific and engineering knowledge in the field of water management. This allows to also incorporate socio-economic and ecologic-technical aspects in the development and application of sustainable water management concepts. Graduates are enabled to work together with experts and pressure groups in order to develop, support and supervise strategies and measures required for the realization of such strategies.

Specialist Division: Waste Management				
Course Number	Course Title	Semester	Course Type	ECTS Credits
813337	**) Waste logistics	WS	VO	2.0
813339	**) Waste technology	SS	VO	3.0
813320	**) Waste management policy	WS	VS	4.5
813308	Research reports of waste management	WS or SS	VS	1.0
736314	Operational waste law	SS	VO	2.0
813301	Global waste management II ¹	SS	VO	3.0
813394	Chemistry and analysis of waste	WS	VO	2.0
813303	Planning and assessment of waste management systems ¹	SS	VU	3.0
791306	Environmental bioprocess engineering ¹	WS	VO	4.0
813304	Life cycle management ¹	SS	VO	2.0
813344	Monitoring of emissions from biological waste treatment processes	SS	VU	3.0
911339	Contaminated sites and soil protection	WS	VO	2.0
911305	Environmental toxicology	WS	VO	3.0
811334	Risk assessment in the aquatic environment ¹	WS	VU	3.0
814325	Air pollution control and climate protection	SS	VU	3.0
911301	Soil protection ¹	SS	VO	3.0
911300	Soil physics and chemistry ¹	WS	VO	3.0
911331	Ecosystem dynamics and their effect on greenhouse gases	SS	VO	3.0
811312	Water quality assessment	SS	VU	4.5
	Specialist Seminar:			
813353	Seminar waste management	WS	SE	4.5

Learning outcomes: Graduates have an understanding of the interrelations found in complex waste management systems, especially in those areas where socially relevant aspects have to be kept in mind (such as charge fee models, user-friendliness of collecting systems, consumer behavior). They can develop solution-based strategies and support the realization of these. Furthermore, they have a basic understanding for the technical and natural scientific components of waste management planning.

Specialist Division: Energy				
Course Number	Course Title	Semester	Course Type	ECTS Credits
892305	**) Electro-energy-technics	SS	VO	3.0
893360	**) Energy engineering ¹	SS	VO	3.0

893326	**) Energy economics	WS	VO	3.0
893324	Refrigeration engineering	WS	VO	2.0
893308	Applied measurement and control systems ¹	WS	VU	3.0
816307	Hydro-electric energy and electricity market	WS	VO	2.0
875310	Sustainable constructions	WS	VU	4.0
892312	Architects physics	WS	VO	2.0
892313	Practice completing the lecture - architects physics	WS	UE	3.0
893328	Environmental practical course	SS	PR	3.0
893306	Practical course in energy engineering ¹	WS	PR	3.0
731322	Energy economics and policy	SS	VS	3.0
818302	After Hiroshima and Fukushima: nuclear safety or present danger?	WS	VO	2.0
818303	Future energy supply in dependence of resource availability	WS	SE	3.0
818304	Technology assessment	SS	VS	3.0
818305	Computer-aided simulation of complex thermal hydraulic systems	WS or SS	VU	4.0
	Specialist Seminar:			
893323	Seminar on energy economics	WS or SS	SE	3.0

Learning outcomes: Graduates have knowledge in the engineering scientific areas of energy supply, energy use and energy management. Apart from that, they are well grounded when it comes to questions of recourse-oriented construction work and building physics as well as the long-term development and assessment of energy-technology. Technical unit operations are assessed energetically as well as exogetically and are subject to improvement by variation of the process parameters. Thereby, set targets are closed material cycles whenever possible and an improvement of the energy efficiency while at the same time minimizing the impact for the environment.

Specialist Division: Regional Development				
Course Number	Course Title	Semester	Course Type	ECTS Credits
855302	**) Spatial planning: legal and planning instruments	WS	VO	2.0
731347	**) Rural development ¹	SS	VO	3.0
731323	**) Socio-cultural aspects of the development of rural areas	SS	VO	3.0
731337	Methods and tools of rural development	WS	VO	3.0
855308	Politics of spatial and regional planning	WS	VO	3.0
731349	Agro-Food Studies	WS	VO	3.0
731371	Field trip regional development	SS	EX	3.0
855327	Sustainable spatial development ¹	WS	VS	5.0
855323	Spatial planning in alpine areas	SS	VO	2.0

855309	Tourism and leisure planning	WS	VU	3.0
853301	Strategies and instruments of recreational planning	WS	VO	3.0
855326	Spatial research in rural areas	SS	VO	2.0
731388	Management of rural development - seminar	WS	SE	3.0
169305	Facilitating change for sustainable development ¹	SS	VS	3.0
169317	Participatory methods in development research and practice ¹	SS	SE	3.0
	Specialist Seminar:			
731372	Seminar regional development	SS	SE	4.0

Learning outcomes: Graduates know the basic theories and models for the explanation of regional development. They can conduct comparative analyses of regions regarding characteristics of their regional-economics, socio-cultures and natural spaces. They know the fundamental developmental strategies, organizations, planning instruments and mechanisms for the regulation of regional development. By that, they are well grounded to supervise and evaluate development projects on their own.

Specialist Division: Biodiversity/ Land Use				
Course Number	Course Title	Semester	Course Type	ECTS Credits
913315	**) Integrated landscape management	WS	VS	6.0
834320	**) Biodiversity of ME Cultural Landscape	SS	SE	3.0
833300	Animal species of conservation concern and their habitat demands	SS	VO	2.0
912327	Forest ecosystem dynamics	WS	VS	4.0
834305	Conservation biogeography and genetics ¹	WS	VS	3.0
831329	Evaluation of ecosystem functions for nature conservancy in cultural landscapes ⁵	WS	VO	3.0
833325	Biological monitoring (theory and practice)	WS	VS	3.0
853310	Applied landscape management	WS	VS	4.5
853311	Programs and subsidies for landscape development	WS	VS	3.0
731350	Nature and landscape conservation economics	WS	VO	3.0
853318	Cultural landscape and ecotourism	WS	VO	2.0
	Specialist Seminar:			
834300	Nature conservation in practice	SS	SE	4.5

Learning outcomes: Graduates know about biological theories, concepts and tools in respect to the acquisition, assessment and monitoring of biodiversity; about relevant subjects of protection (on all levels of biodiversity, ranging from the genetic level to species, habitats and landscapes), whereby the understanding of functional interrelations, biological interactions and dynamic processes is in the foreground. Essential learning results are the ability to inte-

grate ecologic and social goals when it comes to the management of biological resources and to convincingly argue and transfer nature conservation as a social concern.

Specialist Division: Transport / Mobility				
Course Number	Course Title	Semester	Course Type	ECTS Credits
856321	**) Strategic planning in transport	WS	VO	2.0
734330	**) Green logistics ¹	SS	VU	3.0
856320	**) Road planning and environmental protection	WS	VU	4.0
856318	Transport planning and policy	WS	VO	1.0
856306	Traffic and transport planning ¹	WS	SE	3.0
856308	Public transport	SS	SE	2.0
856312	Road safety	SS	VO	2.0
856110	Pedestrian and bicycle traffic	SS	VO	2.0
856115	Traffic psychology	WS	VO	2.0
856316	Transport planning and highway engineering ⁴	WS	VU	3.0
856376	Transport telematics	WS	SE	2.0
856307	Traffic forecast and traffic models ⁴	SS	VU	3.0
856365	Road operation and maintenance	WS	VO	2.0
734332	Intermodal traffic	WS	VO	2.0
	Specialist Seminars:			
856304	Development of a transport master plan for a town	WS	SE	4.0

Learning outcomes: Graduates are equipped with knowledge in the field of socio-economics of mobility and transport as well as of technical and natural scientific transport planning in terms of optimized handling of traffic based on already existing infrastructure. Special attention is turned to the interaction of various traffic types (non-motorized, motorized, individual traffic, freight transportation and public transport) as well as on the consequences of traffic on other social areas of interest, such as environment or transport safety. An essential learning outcome is an all-embracing understanding for causes, development and effects of mobility and traffic. Thereby a smooth collaboration with specialists, for example from the technical / constructive segments of the specialist field can be ensured. Furthermore, a basis is created in order to get active in the field of traffic management in its broadest context.

Specialist Division: Environmental Information Management				
Course Number	Course Title	Semester	Course Type	ECTS Credits
857313	**) Selected topics of geo-data management	WS	VO	3.0
851311	**) Environmental statistics ¹	SS	VU	3.0

731328	**) Valuation methods for natural resources ¹	SS	VO	3.0
857325	Advanced level remote sensing and GIS	WS	VU	3.0
853309	GIS in landscape - planning	WS	VU	4.5
851309	Statistics with R ¹	WS	VU	2.0
851321	Programming with R	WS	VU	2.0
851304	Selected topics in statistics	WS	VU	3.0
851320	Statistics of extreme events and geostatistics ¹	WS	VS	3.0
871362	Vulnerability and risk management	WS	VS	2.5
731369	Computer simulation in energy and resource economics ¹	WS	VS	3.0
731351	Applied mathematical programming in natural resource management ¹	WS	VS	3.0
816355	Uncertainties in hydrological and ecosystem modelling ¹	WS	VU	3.0
	Specialist Seminar:			
851312	Interdisciplinary seminary environmental information management	SS	SE	4.0

Learning outcomes: Environment and bio resources are the result of spatiotemporal processes. For their assessment, information on their spatial condition and their chronological dynamics is necessary. Graduates are equipped with knowledge and skills of fundamental and deepening methods for management, modeling and assessment of environmental data that have a spatiotemporal reference. These include the keeping of data, data management, visualization and analysis with the help of geographical information systems (GIS), basics of modeling (environmental statistics) as well as the economic assessment of model data by means of multi-criteria planning and risk analysis. Students are enabled to interpret existing evaluations of environment and bio resources, to critically assess those and to conduct independent evaluations.

Specialist Division: Soil				
Course Number	Course Title	Semester	Course Type	ECTS Credits
911341	**) Biogeochemistry of soils ¹	SS	VU	3.0
911301	**) Soil protection ¹	SS	VO	3.0
911321	**) Field course soil ecology ¹	WS	UE	3.0
911342	Soils and food security ¹	WS	VU	2.0
911300	Soil physics and chemistry ¹	WS	VO	3.0
911329	Soil microbiology	WS	VO	3.0
911309	Soil chemistry laboratory ¹	WS	UE	3.0
911308	Soil physics - exercises in the laboratory	SS	UE	3.0
911333	Soil microbiology course ¹	SS	UE	4.0
911304	Soil indicators ¹	SS	VO	3.0
833301	Soil ecology ¹	WS	VO	3.0

833303	Soil zoology	WS	VO	3.0
911322	Role of soils in nature conservation and wildlife management ¹	WS	VU	1.5
911314	Molecular microbial ecology of soils ¹	SS	VU	3.0
911335	Soil legislation ³	SS	VO	3.0
911339	Contaminated sites and soil protection	WS	VO	1.5
815325	Soil - water - landscape ⁵	SS	VO	3.0
855328	Land policy and land rearrangement	SS	VO	2.0
912301	Biogeochemistry of forest ecosystems	WS	VS	3.0
912340	Ecology of roots and mycorrhizae I ²	WS	VU	3.0
912341	Ecology of roots and mycorrhizae II ²	WS	US	3.0
912302	Experimental methods in forest ecology ²	SS	VS	3.0
	Specialist Seminar:			
911327	Soils and global change ¹	WS	SE	4.0

The participation in the course 'Ecology of roots and mycorrhizae I' is required for the participation in the course 'Ecology of roots and mycorrhizae II'.

Learning outcomes: Graduates have a comprehensive understanding of the ecosystem services of soil and for its optimization, of conflicting use and possibilities of soil rehabilitation as well as soil protection in times of global change. The understanding of functional interrelations, interactions and dynamic processes is in the foreground. Learning results are the ability to accommodate the cultivation of land to the community, the synthesis of knowledge on soil fertility and optimization of the cultivation of land with regards to the appropriation of foods and animal feed, fibers and fuel. Graduates should be in the position to integrate ecological and social aims with respect to the management of the resource soil and they should be enabled to convincingly reason and realize soil protection as a social concern.

§ 6 FREE ELECTIVES

Free electives worth a total of 12 ECTS credits are required to complete the Master programme. Free electives may be selected from all courses offered by all recognized universities in Austria and abroad. Free electives are intended to impart knowledge and skills in the student's own academic subject as well as in fields of general interest. It is recommended that student focus on courses taught in a foreign language.

§ 7 MASTER'S THESIS

A Master's Thesis is a paper on a scientific topic, to be written as part of a master degree programme (*for exceptions please see the By Laws 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 Thesis, 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 shall be written in German or English. Languages other than German or English are permissible only if approved and confirmed by the thesis supervisor. The thesis defence must be held in German or English regardless of the language of the thesis.

§ 8 COMPLETION OF THE MASTER PROGRAMME

The Master programme in Environment and Bio Resources Management has been completed when the student has passed all required courses and received a positive grade on the Master's Thesis and defence examination.

§ 9 ACADEMIC DEGREE

Graduates of the Master programme in Environment and Bio Resources Management are awarded the academic title Diplom-Ingenieur (m) or Diplom-Ingenieurin (f), abbreviated as Dipl.-Ing./ Dipl.-Ing.ⁱⁿ or DI/DIⁱⁿ. The academic title Dipl.-Ing./Dipl.-Ing.ⁱⁿ or DI/DIⁱⁿ, if used, shall precede the bearer's name (§ 88 [2] UG 2002 BGBl. I no. 81/2009).

§ 10 EXAMINATION REGULATIONS

(1) The Master programme in Environment and Bio Resources Management has been completed successfully when the following requirements (corresponds to components in [7] below) have been met:

- positive completion of compulsory courses worth a total of 26 ECTS credits (§ 4),
- positive completion of advanced studies worth a total of 21 ECTS credits (§ 5),
- positive completion of courses in one or two specialist divisions worth a total of 31 ECTS credits (§ 5),
- positive completion of free electives worth a total of 12 ECTS credits (§ 6),
- positive completion of the Master seminar worth a total of 2 ECTS credits (§ 6),

- a positive grade on the Master's Thesis and the defence examination.

(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 under the respective course/module.

(3) 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 and project-based courses 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.

(4) The topic of the Master's Thesis shall be selected from one of the subjects of the Master programme. The student must inform the dean in writing prior to the commencement of the work on the Master's Thesis. Thereby, the student has to state the Master's Thesis topic as well as the name of the supervisor of the Master's Thesis.

(5) The completed Master's Thesis which has been assessed positively by the supervisor shall be publicly presented by the student and defended in the form of an academic discussion (defence examination) after successful completion of all courses. The examination committee shall consist of a committee chair and two additional university lecturers with a *venia docendi* or equivalent qualification. The student's total performance (thesis and defence examination) will be assigned a comprehensive grade. Both thesis and defence examination must receive a passing grade for the student to complete the programme. The written evaluations stating the grounds for the thesis grade and the defence examination grade are included in calculating the comprehensive grade and are documented separately.

The comprehensive grade is calculated as follows:

- Master's Thesis: 70%
- Defence examination (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).

§ 11 TRANSITIONAL PROVISIONS

Students who have not completed the formerly effective Master's curriculum in Environment and Bio Resources Management (H 427) when this new Master's curriculum comes into force are transferred to the currently valid one.

For students in the new Master's curriculum already positively completed exams on courses from the old Master's curriculum are acknowledged based on the equivalence list for the respective study programme.

§ 12 EFFECTIVE DATE

This curriculum shall take effect on Oct. 1st 2018.

ANNEX A TYPES OF COURSES

The following types of courses are available:

Lecture (VO)

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

Lab Course (UE)

Lab 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's 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/Seminar (VS)

Lecture/Lab (VU)

Lecture/Field Trip (VX)

Seminar/Field Trip (SX)

Lab/Seminar (US)

Lab/Field Trip (UX)

Lab/Field Trip (UX)