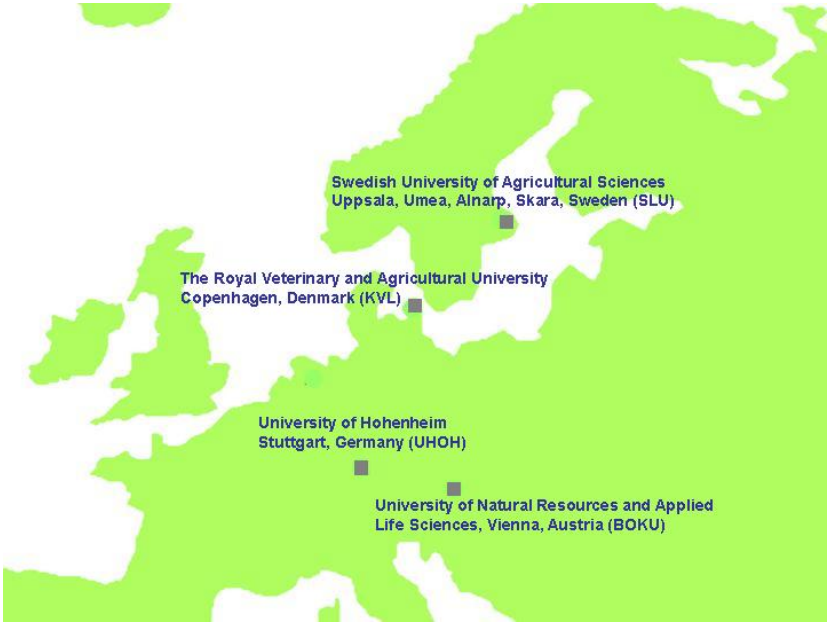
Master Study Course „Environmental Sciences – Soil, Water and Biodiversity

(ENVEURO)



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Summary
This proposal describes the structure, content and organisation of a new joint MSc program in environmental science entitled “Soil, Water and Biodiversity: the European Approach (ENVEURO)”. The program focus on the relationships between natural resource uses in Europe and the effects it has on environment and health, and aims at providing analytical and management tools as well as environmental technologies for sustainable production systems in areas with high pressures on natural resources. Water resources takes a central role in the program as water quantities and quality is a powerful measure of mass and energy balances in agriculture, industries and households including pollutional loads. Furthermore, Europe is at the global frontier with respect to monitoring and regulation of water resources. This provides an excellent platform for development of a MSc program based on European knowledge and experience leading to candidates who will have excellent skills for jobs in all public and industrial sectors working with optimization of production within the regulative and legislative frames set for maintaining high environmental and health standards.
The MSc which initially will comprise four of the ELLS universities (UHOH, BOKU, SLU, KVL) runs over 2 years and has an extent of 120 ects. It is composed of four semester packages – each with an extent of 30 ects: a basic semester package (BSP), two advanced semester packages (ASP) and a thesis work. The BSP comprise a compulsory one-week introcourse and a 15 ects e-learning course on “Environmental Management in Europe”. After having passed the BSP, the student can choose among five different specialisations: water resources, environmental impacts, soil resources and land use, ecosystems and biodiversity, and environmental management. A specialisation implies that the student has at least one ASP plus the thesis work within that specialisation. Each of the partner universities offers ASPs within three specialisations. Semester packages comprise compulsory and elective courses and study activities. A number of semester packages based on courses taught in English at the partner universities have been composed. The thesis work typically has an extent of 30 ects, but may be extended to 45 ects by inclusion of experimental work during the two ASPs. The thesis is co-supervised by two teachers coming from two different partner universities. A three-week summer course is placed between the first and second advanced semester package. The student has to stay at at least two universities during a full MSc and the stay outside the homeuniversity should have a duration of at least one semester. The typical student is expected to spend the first year at the home university. Students can start at any of the four universities, but a common admission system with common admission criteria will be established and managed by an ENVEURO advisory board. This board is responsible for the curriculum development, coordination, evaluation and academic standards of the MSc program – and refers to the study councils at the partner universities.
The MSc program does not substitute already running MSc programs at the partner universities and it brings in new approaches and competences: i) a strong context where management systems sets the frame for all other activities, ii) a strong root in European experience and with focus on water, iii) a strong interaction between students and teachers stimulated by intro- and summer courses, e-learning and shifts between institutions, and iv) good opportunities for composing strong individual study programs assembled from complementary courses offered by the four European universities.

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Background and Vision

The steering group of the subject area Environmental Science – part of the Euro*league* for Life Sciences network – proposes to establish a joint masters programme in Environmental Science entitled "Soil, Water and Biodiversity: the European Approach" given the acronym **ENVEURO**.

Europe has a long history of intensive use of its natural resources and tough lessons on misuse and overuse of land and water resources have been experienced and learned the hard way. This has forced Europeans to pay strong attention to environmental deterioration. Europe is therefore at the cutting edge with respect to environmental research, its use in monitoring, control, legislation, policy and management actions, and development of environmental technology.

The ENVEURO programme will take an overall European approach educating students to look at environmental problems and their solution not as confined to single countries but as transboundary problems needing global solutions. Focus will be on the interactions between land use and the environment, with the aqueous phase placed at the core of the programme.

Water quality is to a large extent determined by the composition, properties, management and pollutant loads of soils and of the atmosphere, and water is the main carrier of pollutants in the terrestrial environment and connects to the atmospheric environment, the aquatic environments and to the biosphere as plants and micro organisms take up nutrients and substrates through the aqueous phase. Ecosystem stability and animal and human health is strongly affected through the quality of water in streams, lakes, marine waters and groundwater and indirectly via the feed and food, the quality of which depends on the inherent quality of soil and irrigation waters. This creates a tight link between land use and water quality with focus on soil quality, animal and human health.

Hence, the quality of the aqueous environment can be used as a collective measure of terrestrial environmental quality, an approach, which is most clearly adopted in the European Water Framework Directive as well as other EU directives. The comprehensive and coordinated environmental framework programs that have been implemented all over Europe are backed up by intensive and common monitoring programs, legislation, regulation, management and policy practices which are here seen as a strong advantage and a solid background for the MSc programme.

The MSc programme aims at providing candidates who can work professionally with soil, water and biodiversity in an environmental context and related to the use of natural resources, and based on insight in European ecosystems and knowledge on current European environmental management. The program offers different possibilities for specialisation and hence should be attractive for both students interested in management and policy, and students inclined to a strict natural science approach focusing on process and system functioning, process dynamics, monitoring and modelling. However, all students will start up with a common introduction to European environmental practises including legislation, regulation, monitoring/data collection and policy. Compared to a national MSc program a joint European master in environmental science will be able to bring a broader range of complementary expertises together ensuring high educational quality in a multi-cultural, -economic and -political

environment. This can help disseminate intercultural understanding and break down barriers in future European cooperation.

In addition the European approach and concepts are also attractive for newly industrialised countries such as Asian countries which are facing tremendous challenges to avoid ecological disasters and which currently are in the process of developing their own environmental management systems. These countries could have a pronounced advantage of learning from the mistakes and experiences already made during the long history of natural resource use in Europe.

Water: main target of environmental quality in European terrestrial ecosystems

In 2000 EU launched the Water Framework Directive (WFD) which set up the future frame for regulation and protection of water resources in Europe comprising lakes, streams, coastal waters and groundwater. The WFD summarizes much of the European experience on pollution, water quality and ecosystem management, and it represents a new and comprehensive way of source-to-sink thinking where the primary goals are to achieve the desired quality of the water resources, to ensure that there is enough clean water for different uses, and to avoid disasters like flooding and droughts. The WFD prescribes that "good ecological quality" and/or "good chemical quality" should be reached in the water bodies no later than 2015. A management system is setup where all regions in Europe is divided into water districts and for each of these districts water management plans are to be developed. There is particular focus on the control of emission of contaminants from industries, households, and agriculture to water bodies and detailed action plans and monitoring systems should be developed in order to achieve the 2015 goals. The WFD are now being implemented in all European countries – the detailed rules are being laid down in national legislation and regulation.

The WFD will bring a regulatory effect on all sources which affects the quality of water bodies. Agriculture has a very pronounced effect on the quality of European surface waters and groundwater, and hence the WFD will boost the development of improved systems for quantification and regulation of pollution from agricultural sources, such as leaching of nitrate, phosphate, pesticides and veterinary drugs from arable soils, ammonia volatilization from animal production facilities and the spread of microbial pathogens and toxins via water. An in depth understanding of hydrology, water chemistry and biology, soil chemistry and physics is needed as a foundation for establishment of models and tools which can be used in future regulation of land use. This will enable land users and planners to calculate the maximum of pollutant load (e.g. fertilizer or pesticides) which can be allowed for particular land areas in order to meet the quality goals set up for the different water bodies. Hence, the WFD is very demanding in terms of mechanistic understanding of natural processes and their quantification. The WFD links to a number of other directives, e.g. REACH (Registration, Evaluation, Authorization and Restriction of Chemicals), the habitat directive, and in 2006 a groundwater directive is planned. Also a soil quality directive may appear.

The WFD is the most comprehensive system for water management applicable on a large scale ever developed – and it integrates almost all pollutional activities caused by man. In ENVEURO we will make use of the directive in different ways, i.e.: i) water quality as an integrated measure of "loads" from natural resource uses such as agriculture, forestry, and mining, ii) development of trans-European cases on how the WFD is implemented in different ecosystem and climatic regions, iii) development of quantitative tools for quantifying distribution and mass balances of pollutants, definition/determination of measurable goals and setup of monitoring schemes, and iv) environmental technology for remediation and improving the quality of polluted water bodies and

The program to a large extent builds on the existing courses at the partner universities. However, the overall approach is different from existing programs as, i) study activities and topics are strongly depending on fit with the general EU environmental management practice and goals, ii) interaction between students and teachers from different learning environments is stimulated through intro- and summer courses, e-learning, co supervision of thesis work and shifts between universities, iii) students have many more options to choose a specialization and a individual study program which fit her/his particular needs, and iv) water resources as a common theme targeting most of current and past activities of man in relation to natural resource uses and production. We are convinced that the program will be appealing to an additional group of students in addition to those students which already sign up with the partner universities.

The ENVEURO program follows up on the goals expressed by the ELLS task force and board; the program will strengthen the cooperation within ELLS and will make the European dimension and quality marks of the network more visible. When initiated and first experiences with ENVEURO have been obtained the program has been so structured that the MSc program can be readily turned into an Erasmus Mundus program. In general we expect that the ENVEURO program will improve the chances to get supporting funding from EU and other sources. In addition it will be possible to build post graduate study activities on top of the MSc program.

Programme structure

The MSc is offered by four partner universities (while at least two east European universities are ready to join in if the master is realised). The four current partner universities comprise:

KVL	- The Royal Veterinary and Agricultural University, Denmark
UHOH	- University of Hohenheim, Germany
SLU	- Swedish University of Agricultural Science, Sweden
BOKU	- University of Natural Resources and Applied Life Science Vienna, Austria

The full program has an extent of 120 ECTS and the program is constructed by 4 semester packages each with a work load of 30 ECTS (basic semester package/BSP, two advanced semester packages/ASPs and a thesis). During the MSc program all students will be studying at two different partner universities as a rule, and at least one ASP (30 ECTS) has to be followed outside the home university. The thesis work has to be assigned to one of the universities where an ASP has been taken.

When the student signs in for the MSc program, the student will be registered at the university chosen to start at, here called the home university. When the student leaves for another university to study for a semester or full year, he/she will be registered also at this second university, which is called the host university.

For practical reasons, we suggest that the first year (BSP + 1st ASP) of the MSc is carried out at one university. One year at the same university ensures that students get the best opportunities for integration and that they are not subjected to frequent shifts from one university to another which is costly and time consuming. In addition, if at least one year is spent abroad is strengthening the international dimension of the MSc. This is important, because it provides good opportunities to get into the learning environments in other countries and at other universities, and it broadens the perspective of the students and offers excellent opportunities to extend language skills and to establish networks. As an example a student who has taken his/her BSc at KVL could choose for example SLU as the home university of the MSc programme. After the first year the student could decide to return to KVL for the 2nd ASP or to go to any other of the partner universities. To carry out the first year at the same university offers time to get integrated and opens up for the possibility that not all BSP courses, which will all be tool-oriented, needs to be taken during the first semester. In this way the second half of the first semester can be exchanged with advanced courses of the 1st ASP. This leaves the student with better possibilities to set up a program for the first year with courses of choice.

The language of the master programme is English and hence all courses offered as well as group work and papers will be conducted in English. Engagement in local language courses during the study is encouraged as this encompass with the spirit of the international focus of the MSc. Students however need to have good language skills in English, which is included among the admission criteria.

Students registering for the MSc programme should have a solid background in natural sciences, while the MSc includes the introducing courses needed in environmental legislation/law, environmental management, environmental impact assessment and policy (see page 14 for details on admission).

The MSc is made up of already existing courses at the partner universities except for the introduction + EME course given during the BSP (see below) and except for the summer course. Building the programme from existing courses ensures that courses will be taught even if only a few ENVEURO students have chosen a specific specialisation (see below) for the ASPs. In this way all specialisations can be carried out every year independent of the number of ENVEURO students choosing them.

On successful completion of the thesis the student receives a joint degree diploma issued by the university where the student has carried out the thesis work and with all partner universities signing.

E-learning is an important and integrated part of the MSc as this is seen as a vital tool for communication and teaching in the MSc programme. The e-learning tools will be used to break down the physical distance barriers and to secure fruitful cooperation between students at the different universities. E-learning reduces travelling of teachers and students and it introduces tools which will be common in future international cooperation on management and problem solution – and hence students capabilities of using up-to date IT tools for communication and cooperation is advantageous for future job possibilities. The EME course given during the first semester, and a summer course placed between the 2nd and 3rd semester include e-learning as very important teaching tools.

Semester structure

The structure of the master is basically the same at the four different universities but as the different universities have different semester structures the exact semester layout will vary between universities.

A full study programme comprises the BSP (30 ECTS) including introduction- and summer-courses, two ASPs (2 x 30 ECTS) and thesis (30 ECTS). There will be an option for making the thesis 45 ECTS, by combining data/experimental work obtained during the 1st or 2nd ASP with the thesis work in the 4th semester. E.g. an experimental work could be carried out during the "elective courses" forming part of the 2nd ASP and this work could be used as part of the thesis. The opportunity to make an extended thesis based on substantial experimental work is important for those students who wish to continue with a Ph.D. after the MSc. For those students it is critical that the thesis work has an extent and quality that allows for international publication in peer-reviewed journals.

General structure of the Joint European Master in Environmental science

University 1	1st semester BSP	Intro-week in August + e-learning in semester. European environmental law & administration
		Compulsory or elective courses, 15 ECTS
	2nd semester 1st ASP	Compulsory courses, 15 ECTS
		Elective courses, 15 ECTS
		Summer course
University 2	3rd semester 2nd ASP	Compulsory courses, 15 ECTS
		Elective courses, 15 ECTS
Univ. 1 or 2	4th semester	Thesis, 30 ECTS

The curriculum consists of the following components:

A. Basic semester package (BSP) including introduction course

B. Advanced semester packages (ASP)

C. Thesis (T)

D. Summer field course (SFC)

A. Basic semester package (BSP)

The BSP comprises a compulsory 15 ECTS course in "Environmental Management in Europe (EME)" plus 15 ECTS elective courses. The aim of the BSP is to bring students to a common level of

knowledge and to establish a general background for the ASPs, and to introduce and train concepts, theories and requisites to be used throughout the programme. The BSP will be offered by all partner universities but its specific form may differ from one university to another. However, the EME course is suggested to be taught by one university only.

The EME course is composed of a 1 week intensive introduction course plus a teaching program which extends for the rest of the 1st of semester. For the one week introduction course, students and lecturers will come physically to the same location. The rest of the EME course is mainly based on E-learning. The aim of the EME course is to introduce students to European natural resources and the environment, European environmental monitoring, data bases and quality assessment, European environmental history and policy, environmental legislation, regulation and management practises. Hence, the EME course delineates the administrative and policy frame within which all environmental management activities take place and are regulated in Europe. This is to ensure that students are aware of the current frame (and limitations) for carrying out environmental management, developing solutions and environmental technology. Through the EME, students inclined to specialisation with natural science topics of the MSc will have the necessary background and perspective for developing useful and realistic solutions. Those students who are more interested in the management part may go deeper into analysis, criticism and development of current environmental management and regulation practices.

The intensive introduction course which is part of the EME has duration of one week and will take place during week 34 in order to avoid overlap with other courses at any of the partner universities. The intro course serves as an introduction to:

- the ENVEURO programme (aim of programme, organisation, regulative, teaching objectives, course structures, teaching principles, examination, evaluation and quality assurance, etc)
- the partner universities (organisation, courses offered, study regulative, student facilities, housing, etc)
- European natural resources and the environment; European environmental history
- Europe in an environmental context with short intros to the current state of the European environment, legislation, management, management principles (e.g. sustainability concepts) and policy – and the challenges a head of us.
- European monitoring, environmental quality assessment and data centres
- environmental research and knowledge centres in Europe
- e-learning tools, the e-learning platform to be used and e-learning systems
- group work on environmental cases (European case studies) partly based on excursion activities and field work.
- presentation and communication techniques

In addition the students get to know each other at the intro course and they will get the opportunity to talk to 2nd year students and to study advisors.

At the introduction course the students will be organised in groups of 5 – 6 individuals and these groups will continue to work together during rest of the EME course - after returning to their

universities. The part of the EME course taking place at the different partner universities will be taught through e-learning (see below for e-learning instruments), and it is suggested that only one of the partner universities gets the overall responsibility for this course. The semester part of the course is a continuation of the topics and tools introduced at the intro course. The main teaching components of the course comprise: lectures given by experts (e.g. experts from EEA, national environmental protection agencies, governmental offices), group work and group presentations, one bigger project to be handed in at end of the course, and theoretical exercises.

The other 15 ECTS of the BSP is devoted to compulsory and elective courses at the chosen home university. The compulsory courses should comprise topics within:

- Statistical handling of large environmental data sets
- Environmental modelling and computation
- Use of GIS systems and handling of GIS data/statistics
- Research methodology and experimental planning
- Ecotoxicology
- Environmental technology

The elective courses have to be chosen from a group of tool oriented courses depending on the level and past courses attended by the student (see appendix D).

B. Advanced semester packages (ASP)

ASPs are selected by the students for the second and third semesters. Both 1st and 2nd ASP is chosen at the end of the first semester. This is done to leave sufficient time for the student to arrange where and how to move between 1st and 2nd ASP.

Through the choice of ASPs the students design her/his profile and specialisation. Five themes of specialisation are possible and there are no limitations to how students may combine the two ASPs, i.e. the student can select the two ASPs within the same specialisation or within two different specialisations.

Each partner university offers ASPs within 3 specialisations according to the following scheme.

ASPs within the five specialisations distributed among the partner universities.

Specialisations	BOKU	UHOH	KVL	SLU
Water Resources	x			x
Environmental Impacts		x	x	
Soil Resources and Land use	x	x	x	x
Ecosystems and Biodiversity	x			x
Environmental Management		x	x	

Each university offers at least two ASPs within the same theme; one ASP to cover the spring and one to cover the autumn semester (see appendices B & C).

The structure of the 2nd and 3rd semesters is such that in the semester package chosen about half/three fifth (depending on the university structure) of the semester is compulsory, while half/two fifth is elective but has to be chosen within a small number of courses given under each semester package. Examples of ASPs are shown in appendices B and C. A student can choose amongst all ASPs offered and can select both ASPs within the same theme but not at the same university. As mentioned above the standard thesis has an extent of 30 ECTS. However, it will be possible to combine 15 ECTS project work or experimental work located in the elective parts of the 1st or 2nd ASP with the thesis work in the 4th semester to get a thesis with a total extent of 45 ECTS.

Even for the ASPs within the same themes repetition of teaching content will be minimal as each university has its own angle on the theme and the number of elective courses makes it easy for the student to choose courses with different teaching contents.

During the 1st and 2nd ASP it is possible to do individual projects of 6-7.5 ECTS points instead of following one of the elective courses. These projects can - as described above - be used as part of the thesis work but can also just be used to explore areas and angels of subjects that are not included in the curriculum but still but which are still within the specialisation chosen.

C. Thesis

The thesis work is performed during the 4th semester and it is in most cases physically located at one of the universities although – in rare cases – the student can choose to do part of the thesis work at both universities attended. A third party such as a public or private research organisation, or an industry may be involved in the thesis work; rights and responsibilities are settled in the thesis agreement made prior to any thesis work and accepted by the ENVEURO study board.

The topic of the thesis is selected at end of the 3rd semester and should fall within one of the above listed themes. The student has to choose a theme for the thesis within the themes where she/he has followed at least one ASP. This is to make sure that the student has the required background and insight for doing the thesis work.

Each thesis student has two supervisors, the main supervisor from the university where the thesis work is physically located and a 2nd supervisor from one of the other partner universities. The expertise of the main supervisor needs to fall within the thesis theme. At least two meetings are organised during the thesis work, one at start of the thesis and another after 4 months. The student and both supervisors are participating in the meetings (physically together, video meetings or other e-meeting form). The thesis work is presented and defended at the university where the thesis work has been physically conducted; both supervisors together with an external censor participate in grading of the thesis. Depending on the rules of the university the main supervisor is responsible for the presentation and defence actions in relation to the thesis.

The thesis work has an extent of 30 ECTS. However, as stated above, students can choose to incorporate experimental data obtained during laboratory- or field-work in the previous ASPs to make a 45 ECTS thesis.

D. Summer course

The summer course takes place during 3 weeks in August and comprises one preparatory week and two weeks at a common location. The aim of the summer course is to train tools and theories introduced at the intro course and learned through the BSP and the first ASP and to draw on the different experiences obtained by the students. Furthermore, it is possible to get hands on the insight in European environmental praxis and environmental problem analysis and to evaluate and follow up on the e-learning activities in the EME course.

The summer course comprises about half field exercises and half laboratory/theoretical work. Groups of students work together on a specific topic (presented before start-up of the course); the project work carried out during the course is summarised as a report and a poster, which is presented to the class. A final written exam ends the course.

The ENVEURO summer course will substitute the existing summer 3-weeks ELLS course "European Field Excursions in Environmental Science (EFEES)" which is currently financed as an Erasmus IP course. These summer courses takes place at different locations in Europe and have shifting topics from year to year depending on what is and what have been the main environmental challenges at the different locations. The ENVEURO summer course will have a similar format, but some of the content will be fixed from year to year as the course forms an integrated part of the MSc program. Thus, e-learning, case studies initiated during the BSc and first ASP, European environmental management systems, monitoring and assessment tools will be permanent activities. The summer course will however be open to students which are not participating in the MSc program, but the preparatory work in advance of the course will be more demanding for non-ENVEURO students. Continued financial support for the summer course will be seeked from the EU.
An example of a EFEES summer course is given in Appendix E.

E-learning

E-learning is initiated at the intro course during the BSP and it will be used as the key teaching tool in the EME course. It is foreseen that several courses will use e-learning. This will be strongly promoted as it is seen as one of the most powerful ways to increase the interaction and exchange of knowledge and data between students and teachers at the different partner universities, and it is believed that this is one of the best tools to avoid students to get isolated for smaller MSc programs running across a number of universities placed far from each other. A common e-learning platform or virtual learning environment will be used and it is suggested that one of the partner universities is given the responsibility to service this tool. The e-learning platform should allow for broadcasting of e-learning lectures, enable group and project work, individual assignments, student-to-student cooperation, student-to-teacher cooperation, and as information and course reference site. Macromedia Breeze seems to be a versatile and optimal platform for broadcasting of lectures and allowing students to respond to the teacher.

Collaborative learning in which students work together and share each others resources will be facilitated during the EME course. The course teacher will work as e-moderator and ensure that

students get the full outcome of using e-learning. It should be realized that learning through e-learning is very different from conventional class room teaching requiring new ways of teacher-student and student-student interactions, which however can be very efficient. Two critical phases are identified. One is to get all started and involved/motivated. This will take place during the intro course where all new students are together. The other critical phase is after return of the students to the partner universities where technical problems and isolation may retard use and progress of e-learning. Here we seek support from the ELLS ICT group which is present at each of the universities. The EME course responsible will act as e-moderator.

E-learning adds an extra aspect to the MSc program. It is expected that coming students are already quite experienced in using computers for communication, e.g. via software such as messenger and Skype or via gaming software. The MSc program attempts to build on this already acquired experience and to make it useful in the learning situation. If successful e-learning opens up many new possibilities for broadcasting courses among the ELLS universities – and even for extending to countries outside Europe.

Acquired competencies and learning outcomes

On completion of the MSc the student will have the following competences:

Competences within basic science

- comprehend and analyse environmental concepts, problems and relationships in a European and global context.
- design and execute a research project at the postgraduate level using methods, instruments and tools acquired and present the outcome in a journal article.
- formulate the kinetics, equilibrium and mass balances for chemical, physical and biological processes affecting matter circulation in ecosystems within the selected area of specialisation for each student.
- develop and use mathematical models describing biological, physical and chemical processes for predictive purposes and in relation to planning and management.
- carry out research projects and dedicated analyses within the area of specialisation of the student by use of up-to-date methods and principles, and based on clear formulation of problems, hypotheses and research methods.

Competences within applied science

- demonstrate capability and knowledge on strategies for handling and solving environmental problems and challenges in a European and a global context.
- understand the systemic and quantitative linkages between natural resource use and water quality.

- present deep insight in structure and functioning of natural and man-influenced rural ecosystems, environmental and health effects of ecosystem perturbations, and be able to develop environmental technologies and measures for achieving sustainable production systems.
- understand and apply the methods and techniques used for environmental monitoring, and subsequent handling, statistical analysis and presentation of environmental data.
- understand the systematic and quantitative linkage between land use and environmental quality, with main focus on water resources.
- understand the fundamental principles behind environmental policy/legislation, regulation and management in Europe.
- create ideas and strategies for development of environmental technology in relation to remediation and reduction of pollution from soils and waters.

Competences within ethics and values

- understand the implications of sustainability concepts, and to demonstrate insight in the environmental and land use history of Europe and the lessons learned from that.
- effectively communicate and collaborate others across distances, cultural and language borders, by use of different medias such as written texts, oral presentations, video conferences and web-forums.
- use professional English in all oral and written communication throughout the master programme.
- discuss and assess environmental issues and creation of public attitudes in a European perspective.

Application, admission, examination criteria, diploma

Students can start the ENVEURO programme at any of the partner universities but the typical student is anticipated to start at another university than the one where the BSc was conducted (if not coming from outside the ELLS universities) given that the national scholarship programs allow for this. Students from all countries of the world can apply but must hold a valid visa for the Schengen states. There is one application term per year (1st of January or 1st of February) with study start 1st of September. The same set of admission criteria is used at all universities. Applications are submitted and handled by the partner university hosting the secretariat of the MSc programme (KVL is suggested), but all applications are assessed by the ENVEURO advisory board (see below).

Applicants should have a background in natural science with documented completion of basic courses comprising at least two of the disciplines: chemistry, biology/microbiology, mathematics/statistics, physics or natural resources. Admission criteria also comprise language skills and these will be based on performance in a TOEFL test. Students with poor English language capabilities are not admitted. If language is somewhat poor and other skills are good students can be admitted given that they register for a course in English language.

A common application form, which can be downloaded from the ENVEURO homepage, is used. The application form comprises personal data, a one-page CV, documentation of student BSc program

(incl. grades), name of the university where the applicant would like to start her/his study and one page on the students motivation to enrol with the program, and the expectations of the student. The student will become registered at the university - the home university - where she/he starts her/his study. The student must accept to study full time and pay all tuition fees as well as show proof of their ability to cover living expenditures.

The ENVEURO advisory board evaluates all applications and ranks the applicants according to grades obtained during the BSc, their academic profiles, and motivation. The final recommendations made by the ENVEURO advisory board with respect to student uptake are transferred to the individual study boards under which the MSc programme belongs, and those study boards make the final decision on admission.

All study activities are graded according to the ECTS scheme. Evaluation of course activities can take a variety of forms: written exams, oral exams, oral project presentations, reports, posters, laboratory and theoretical exercises all following the local institutional regulations. Evaluation and grading of student performance follow the guidelines used at the partner universities; however, the ECTS grading scheme is used throughout (see section "Credits and grading scheme" for detailed information). Co-supervision from two partner universities is mandatory for the thesis work. Also in this case the grading will be carried out according to the guidelines at the university where the student has carried out her/his thesis work, but with the co-supervisor making his comments and taking part in the grading of the thesis. For the summer course grading will be performed by the course teacher(s) and one censor from each of the partner universities. From time to time the advisory board makes an assessment of evaluation criteria at the four universities to ensure that grading criteria are at an equal level.

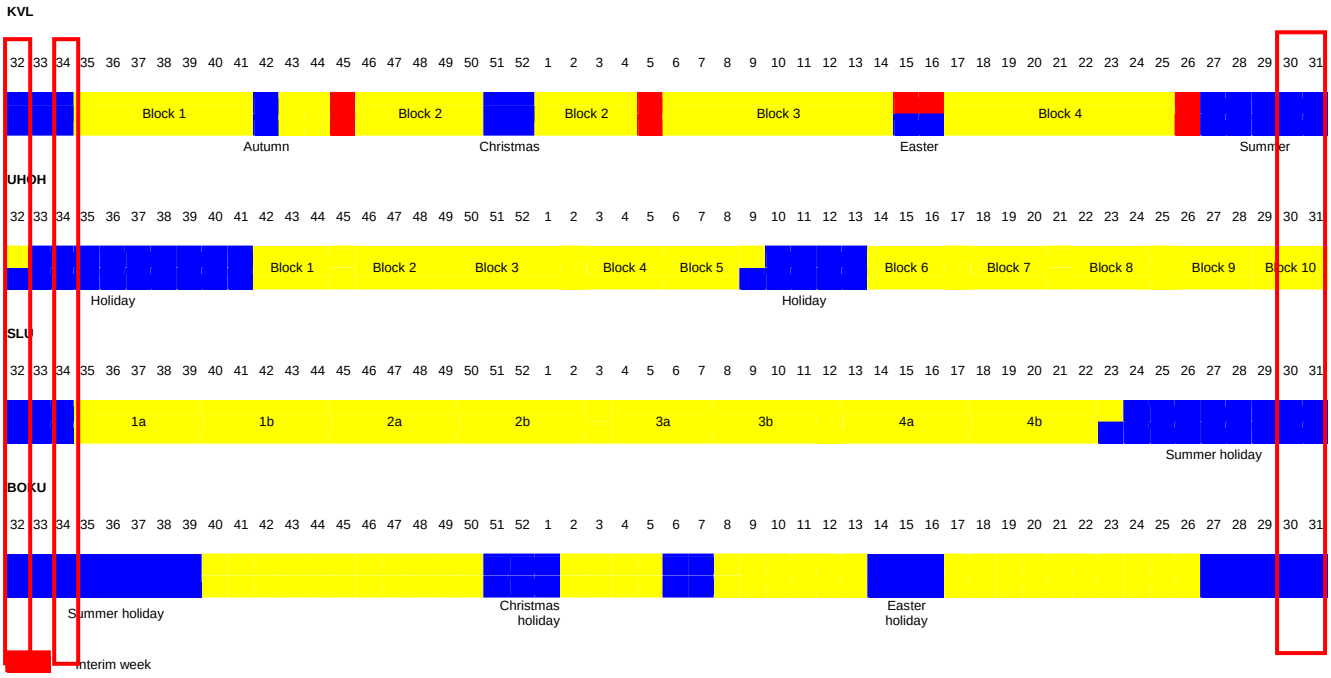
On successful completion of the MSc programme a joint degree diploma is issued by the university at which the thesis work has been performed and with all universities signing.

After completition of all requirements BOKU is issuing the academic degree "Master of Environmental Science (MSc)".

Mobility

The student is required to spend at least one semester at two partner universities. The typical student is expected to spend one year at each of two universities; one year comprising the BSP + 1st ASP at one university and the 2nd year at another university where the 2nd ASP + the thesis work is performed. This setup is recommended because of the different semester structures at the partner universities. Between the BSP and the 1st ASP moving will in general not work due to overlap between semesters. After the 2nd ASP it is possible to move before starting the thesis as the thesis does not have to follow the semester structure so precisely. The thesis can therefore be performed at the home university.

Scheme showing the semester structures at the four partner universities and the possibilities for mobility



The international relation offices will be able to assist with accommodation facilities, visa and insurance problems, guidance on language courses, and other administrative issues concerning the student's period in the country.

Management

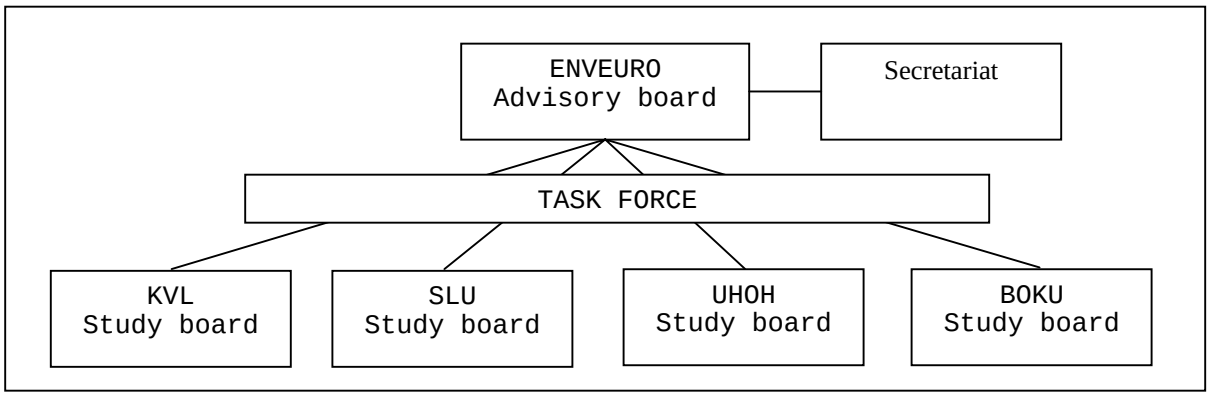
Advisory board

An ENVEURO advisory board is established to coordinate, evaluate and further develop the MSc programme. The board has one professor and one student representative from each of the partner universities. The head of the board has the overall responsibility. The secretariat assists the advisory board in all matters. The board has an advisory role referring to the individual study boards at the partner universities; however, the ENVEURO board cannot make decisions on its own. The detailed tasks of the board comprise:

- Assessment of applicants and assessment of individual study plans
- Evaluation of courses taught in the program (academic level, performance of teachers, prerequisites) and thesis works

- Development and quality assurance of common courses, such as the EME course and summer course including e-learning components
- Coordination of the different components of the curriculum
- Revision, evaluation and acceptance of new semester packages
- Regular evaluation of the whole MSc program
- Information about the MSc program
- Outline and content of the MSc program homepage
- Securing a high academic standard of candidates

Administrative structure of the MSc programme



Secretariat

There will be one coordination secretariat handling all administrative, financial and educational matters in relation to the ENVEURO programme; KVL is suggested to host the secretariat for the first 5-year period. Interested and coming students may contact the secretariat with specific questions to the program but for all other questions the students will have to refer to the local international secretariats at the partner universities. The specific tasks of the secretariat are:

- to assist the advisory board and head of the programme with general administration of the program
- to register all applicants and to assist in handling of all admission matters
- to assist in development, updating and management of the homepage
- to respond to questions from teachers and affiliated students; management of e-mail box
- to assist in evaluation of courses and thesis works
- to assist in quality assurance and to perform statistical analyses of students performance
- to assist in preparation of flyers, posters and news to inform about the MSc program; participation in seminars and conferences related to education marketing.
- to prepare short annual reports and cost statements
- to assist in preparation of proposals, i.e. proposals for the EU
- to assist in management of introductory course and the summer course.

Information, dissemination and "marketing"

A homepage is set up to inform about the MSc programme and to help students find their way through the different options offered. The homepage is developed and supported by the secretariat in cooperation with the advisory board. The minimum content of the homepage comprise: i) person gallery (students, board members, and contact persons), ii) programme structure, iii) semester packages offered (with course listings etc), iv) info material (as posters, flyers), v) contact information and vi) enrolment form.

Information and "marketing" of the MSc program is extremely important in order to increase the number of students applying for the program. An information package comprising description of the program, the partner universities, the job opportunities and covering some European cases targeting the core of the program will be prepared and distributed to universities in Europe and abroad. Next – we strongly encourage the ELLS partner universities to promote ELLS and the MSc programs running under ELLS, i.e. to make these activities easy to pop-up via university homepages, that task force members distribute relevant material when in contact with other universities and that ELLS universities make one or two annual missions to progressing countries as China, Vietnam, Thailand, and Turkey for making contacts with new universities including information about the joint MSc programs offered by ELLS. Members of the Environmental Science steering group will be able to join on these missions. Finally, it is important that the ELLS universities inform about the program in gymnasiums and high schools for recruiting students who would like to develop a true European profile during their university education. Many conferences, workshops etc. on higher education is currently being organised. At such conferences and numerous other conferences the ELLS partner universities shall make strong advertisements of the ELLS MSc programs via posters, flyers, videos and even small "demonstration experiments". The ELSA group is also seen as important actors for spreading information about the ENVEURO program.

Quality assurance and evaluation

To ensure the quality and international acceptance of the MSc different initiatives are carried out.

- The use of the ECTS credit and grading scheme makes sure that there is transparency and international understanding of the extent, workload and level of the MSc taken.
- The fact that the degree will be a joint degree and hence signed by all partner universities ensures the academic level as partner universities are only signing diplomas which meet their own standards.
- Normal evaluation by student questionnaires will be carried out at the course level at the universities as a part of the local university course evaluation. Also the thesis works (quality of supervision, conditions of experimental work, coordination, planning), the introduction and the summer courses will be evaluated.

- The advisory board is responsible for a comprehensive evaluation of the MSc as an entity. The board will, especially the first couple of years where some adjustments to the programme may be expected, evaluate the admission criteria and selection procedures, content and quality of intro course, summer courses, semester packages, implementation of the e-learning tools, and the overall logistics of the MSc. In addition the advisory board will respond to evaluations from both teachers and students.

Credits and grading scheme

All partner universities operate with the ECTS credit system where 60 ECTS represents one year of full study. The fact that this credit system is already functioning at the universities makes it easier to assure that the workload at the different universities will be the same for the master students even when mixing common courses like the e-learning course during the BSP with local courses at the individual universities.

The partner universities still follow different grading scales, which make comparisons of grades difficult. To secure the transparency of grading throughout Europe a common European ECTS scheme has been made (see table below). The ECTS grading scheme will be used for all the courses of the MSc as well as the corresponding grade from the national grading system. This is done to ensure credit transfer and to avoid mistakes during translation as well as to give an integrated European standard that can be used and understood with job applications all over Europe. As stated above grading is carried out according to the rules at the different partner universities, but the The ELLS Quality Assurance Group will be kept informed and involved in further development of quality assurance measures.

Grading schemes and conversion at the partner universities

Country/grading	Insufficient, fail	Sufficient	Satisfactory	Good	Very Good	Excellent
ECTS	**F, FX**	**E**	**D**	**C**	**B**	**A**
Austria	5	4	4	3	2	1
Denmark	0, 3, 5	6	7	8,9	10,11	13
Germany	5, 6	4-, 4, 4+	3-, 3, 3+	2-, 2, 2+	1-	1
Sweden	U	G	G	G	G	G

Cooperation aspects

Fees

For students fees will have to be paid for the two years of the MSc corresponding to the rules at the universities where the individual MSc studies are being carried out.

SLU: Student union fee at 25 Euro per year.

UHOH: All students, national as well as foreign, will have to pay 500 Euro per semester from summer 2007.

BOKU: EU students will have to pay 737 Euro per year and non-European students 1474 Euro per year. Furthermore a student union fee of 28 Euro per year has to be paid.

KVL: There are no fees for students coming from within the European Union. Students from outside Europe have to pay 14000 Euro per year.

Transport to the introduction course as well as the summer course will have to be paid by the individual student while the stay will be financed by the partner universities.

For some courses small financial contributions need to be paid to be able to go to excursions. These will not be higher than 50 Euro per semester.

General structure at the four universities:

30 ECTS →

KVL

1 semester & **3 semester**	Block 1 first course	Block 2 first course
	Block 1 second course	Block 2 second course
2 semester & **4 semester**	Block 3 first course	Block 4 first course
	Block 3 second course	Block 4 second course

SLU

1 semester & **3 semester**	Block 1A & Block 1B	Block 2A & Block 2B
2 semester & **4 semester**	Block 3A & Block 3B	Block 4A & Block 4B

UHOH

1 semester & **3 semester**	Block 1	Block 2	Block 3	Block 4	Block 5
2 semester & **4 semester**	Block 6	Block 7	Block 8	Block 9	Block 10

In addition, there are unblocked modules which run from the first to the last week of a semester, respectively. Blocks modules have their contact time in the afternoon, and unblocked modules in the morning.

BOKU

BSP

1 semester (fall)	**E Learning**
Basic	Block B1

1 semester (spring) Basic	**Block B2**	Block WR2, Block SRL, Block ECO2

ASP
Theme name: Water Resources, Soil Resources and Land use, Ecosystems and Biodiversity

2 semester (Fall)	- Block WR3, Block SRL3, Block ECO3

2 semester (Spring)	- Block WR2, Block SRL, Block ECO2

ASP
Theme name: Water Resources, Soil Resources and Land use, Ecosystems and Biodiversity

3 semester (Fall)	- Block WR3, Block SRL3, Block ECO3

3 semester (Spring)	- Block WR2, Block SRL, Block ECO2

Semester Packages at the different universities

KVL:
BSP:

	Block 1 (15 ECTS)	*Block 2(15 ECTS)*
1 semester (fall) Basic	- E-learning, European environmental law and administration - Exploratory data analysis (7.5) B - (Qualitative methods in agricultural development (7.5) A) - Climate, weather and plants (7.5) A - Landscape Ecology (7.5) B - Natural resource sampling and modelling (7.5) B	- Applied Statistics (7.5) A

	Block 3 (15 ECTS)	*Block 4 (15 ECTS)*
1 semester (spring) Basic	- Analytical chemistry (7.5) C	- GIS (7.5) C

ASP:

Soil and land use

	Block 1 (15ECTS)	*Block 2 (15 ECTS)*
3 semester (fall) Advanced	- Environmental soil chemistry (7.5) C - Pedology (7.5) A - Pesticide use, Mode of action and ecotoxicology (7.5) A - Biological control of pests and diseases: Theory, Application and Perspectives (7.5) C	- Advanced Microbiology (15) - Project (7.5) - Molecular plant biochemistry and physiology (7.5) A - Applied Statistics (7.5) A
	Block 3 (15 ECTS)	*Block 4 (15 ECTS)*
2 semester (spring) Advanced	- Analytical Chemistry (7.5) C - Pest and Beneficials of arable fields (7.5) C - Applied plant nutrition (7.5) C - Project (7.5) - Environment and agriculture (15)	- Plant Ecophysiology (7.5) B - Weed Science (7.5) C - GIS (7.5) C - Plants in populations, communities and ecosystems (7.5) A - Advanced Chemometrics with MATLAB (7.5) outside schedule

Environmental Management

	Block 1 (15 ECTS)	*Block 2 (15 ECTS)*
3 semester (fall) Advanced	- Landscape ecology (7.5) B - Economic Theory of Environmental Policy (7.5) A - Mind and Nature – Landscape values (7.5) C	- Environmental and Natural Resource Economics (7.5) C - Applied forest and natural resource economics (7.5) A - Applied Statistics (7.5) A - Economic valuation and cost benefit analysis (15)
	Block 3 (15 ECTS)	*Block 4 (15 ECTS)*
2 semester (spring) Advanced	- Applied environmental and natural resources (7.5 (15 total)) A Block 3+4 - Environmental and ecotechnology (7.5) C - Project (7.5)	- Environmental Management (7.5) B - EIA (7.5) C - GIS (7.5) C - Applied environmental and natural resources (7.5 (15 total)) A Block 3+4 - Advanced Chemometrics with MATLAB (7.5) outside schedule

Environmental Impacts	*Block 1 (15 ECTS)*	*Block 2 (15 ECTS)*
3 semester (fall)	- Pesticide use, Mode of action and ecotoxicology (7.5) A	- Advanced Microbiology (15) - Applied ecology (7.5) A - Molecular plant biochemistry and physiology (7.5) A

Advanced	- Applied plant nutrition (7.5) C - Natural resource sampling and modelling (7.5) B - Landscape ecology (7.5) B - Biological control of pests and diseases: Theory, Application and Perspectives (7.5) C	- Applied Statistics (7.5) A - GIS (7.5) C - Project (7.5)
	Block 3 (15 ECTS)	*Block 4 (15 ECTS)*
2 semester (spring) Advanced	- Environmental and Ecotechnology (7.5) C - Analytical chemistry (7.5) C - Pest and beneficials of arable soils (7.5) C - Project (7.5)	- Plant Ecophysiology (7.5) B - Environmental Management (7.5) B - Plants in populations, communities and ecosystems (7.5) A - EIA (7.5) C - Weed Science (7.5) C - Advanced Chemometrics with MATLAB (7.5) outside schedule

SLU:
BSP:

	Block 1a + 1b (15 ECTS)	*Block 2a + 2b (15 ECTS)*
	- E-learning, European environmental law and administration (15)	
1 semester (fall) Basic	- Statistics for biologists 1 (7.5) 1a + 1b (50%) - Mathematics for biologists (7.5) 1a + 1b (50%)/ 1b (100%) - Natural resources and environmental economics (15) 1a + 1b (100%)	- Statistics for biologists 2 (7.5) 2a + 2b (50%) - Systems ecology - tools to analyse society and environment (15) 2a + 2b (100%) - Mathematics for biologists (7.5) 2b (100%)
	Block 3a + 3b (15 ECTS)	*Block 4a + 4b (15 ECTS)*
1 semester (spring) Basic	- Applied environmental assessment (15) 3a + 3b (100%) - Strategies in sustainable natural resource management (15) 3a + 3b (100%) - Image Analysis (7.5) 3a + 3b (50%)	- Basic ecology (15) 4a + 4b (100%) - Multivariate methods (7.5) 4a + 4b (50%) - Natural resource and environmental economics, review course (7.5) 4a (50%)

ASP:
Water Resources

	Block 1a + 1b (15 ECTS)	*Block 2a + 2b (15 ECTS)*
3 semester *(fall)* Advanced	- Water and solute transport in the soil-plant system (15) 1a + 1b (100%)	- Water Quality Management and Hydrology (15) 2a + 2b (100%)
	Block 3a + 3b (15 ECTS)	*Block 4a + 4b (15 ECTS)*

2 semester *(Spring)* Advanced	- Applied biogeochemistry - element cycles and climate change (15) 3a + 3b (100%)	- Water management, soil conservation and land evaluation (15) 4a + 4b (100%)

Soil Resources and Land use

	Block 1a + 1b (15 ECTS)	*Block 2a + 2b (15 ECTS)*
3 semester *(fall)* Advanced	- Soils of the world - processes, classification and use (7.5) period not yet decided	- Biological waste treatment - technology for urban wastes (15) 2a + 2b (100%) - Soil chemistry (7.5) 2a + 2b (50%)
	Block 3a + 3b (15 ECTS)	*Block 4a + 4b (15 ECTS)*
2 semester *(Spring)* Advanced	- Soil biology (15) 3a + 3b (100%) - Applied biogeochemistry - element cycles and climate change (15) 3a + 3b (100%)	- Soil sampling methodology and data evaluation (7.5) 4a + 4b (100%)

Ecosystems and biodiversity

	Block 1a + 1b (15 ECTS)	*Block 2a + 2b (15 ECTS)*
3 semester *(fall)* Advanced	- Sustainable forest management and forest certification - international distance course (7.5) out of schedule (25%)	
	- Botany and Mycology: relationships and inventory techniques (15) 1a + 1b (100%) - Non-vascular plants and nature conservation (7.5) 1b (100%)	- Applied population biology (15) 2a + 2b (100%) - Ecological methods (15) 2a + 2b (100%)
	Block 3a + 3b (15 ECTS)	*Block 4a + 4b (15 ECTS)*
2 semester *(Spring)* Advanced	- Forest environment and conservation (15) 3a + 3b (100%) - Insect ecology (15) 3a + 3b (100%) - Soil biology (15) 3a + 3b (100%) - Vertebrate zoology (7.5) 3b (100%)	- Flora and fauna conservation and management (15) 4a + 4b (100%) - Bees, apiculture and pollination (7.5) 4b (100%)

UHOH:

BSP

	Block 1	*Block 2*	*Block 3*	*Block 4*	*Block 5*
1 semester (fall) Basic		Agriculture and food policy (6)	Matter cycling in agroecosystems (6)		

- Quantitative methods in biosciences and economics (unblocked) (6 ECTS)
- Cartography and GIS (unblocked) (6 ECTS)

- Methodology of scientific working (unblocked) (6 ECTS)

ASP

Environmental impacts

	Block 1	*Block 2*	*Block 3*	*Block 4*	*Block 5*
3 semester (fall) Advanced	- Air pollution & air control (6) - Agr. Production & Residues (6)	Ecotoxicology & Environmental Analytic (6)		- Global change issue (6) - Environmental microbiology (6)	

- Animal hygiene (unblocked) (6 ECTS)
- Waste management and waste techniques (unblocked) (6 ECTS)

	Block 6	*Block 7*	*Block 8*	*Block 9*	*Block 10*
2 semester (Spring) Advanced	Environmental pollution & soil organisms (6)	Environmental science project (6)		-Advanced env. & animal hygiene Project (6)	-Advanced env. & animal hygiene Lab. Work (6) - Spatial data analysis with GIS (6)

- Mapping course: Soil & vegetation (unblocked) (6)

Soil Resources and Land Use

	Block 1	*Block 2*	*Block 3*	*Block 4*	*Block 5*
3 semester (fall) Advanced	Plant nutrition in the Tropic & Subtropic (6)	Tropical Soils & land Evaluation (6)			

- Project in soil science (Unblocked) (6)
- Advanced Soil Biology (Unblocked) (6)
- Soil genesis Classification & geography (Unblocked) (6)

	Block 6	*Block 7*	*Block 8*	*Block 9*	*Block 10*
2 semester (Spring) Advanced					

- Project in soil science (Unblocked) (6)
- Advanced Excursion in Pedology (Unblocked) (6)
- Interdisciplinary advanced soil science project (Unblocked) (6)
- Mapping course: Soil & vegetation (Unblocked) (6)
- Field course in site Ecology (Unblocked) (6)

Environmental management

Block 1	*Block 2*	*Block 3*	*Block 4*	*Block 5*

3 semester (fall) Advanced	Farm level modelling (6)	- Farming & rural systems development (6) - - Dev. of agriculture in transition economies (6)	International food & agricultural trade (6)	Project evaluation methods (6)	- Advanced policy analysis modelling (6) - Food & nutrition security (6)

- Environmental management (Unblocked) (6)

	Block 6	*Block 7*	*Block 8*	*Block 9*	*Block 10*
2 semester (Spring) Advanced		Applied Econometrics (6)	Environmental & Resource Economics (6)	Advanced Resource Management (6)	Farming System Research (6)

- Environmental Policy & Legislation (Unblocked) (6)

Semester Packages split by themes

Basic packages

KVL

	Block 1 (15ECTS)	*Block 2 (15 ECTS)*
1 semester (fall) Basic	- E-learning, European environmental law and administration	
	- Exploratory data analysis (7.5) B - (Qualitative methods in agricultural development (7.5) A) - Climate, weather and plants (7.5) A - Landscape Ecology (7.5) B - Natural resource sampling and modelling (7.5) B	- Applied Statistics (7.5) A

	Block 3 (15 ECTS)	*Block 4 (15 ECTS)*
1 semester (spring) Basic	- Analytical chemistry (7.5) C	- GIS (7.5) C

SLU

	Block 1a + 1b (15 ECTS)	*Block 2a + 2b (15 ECTS)*
1 semester (fall) Basic	- E-learning, European environmental law and administration (15)	
	- Statistics for biologists 1 (7.5) 1a + 1b (50%) - Mathematics for biologists (7.5) 1a + 1b (50%)/ 1b (100%) - Natural resources and environmental economics (15) 1a + 1b (100%)	- Statistics for biologists 2 (7.5) 2a + 2b (50%) - Systems ecology - tools to analyse society and environment (15) 2a + 2b (100%) - Mathematics for biologists (7.5) 2b (100%)

	Block 3a + 3b (15 ECTS)	*Block 4a + 4b (15 ECTS)*
1 semester (spring) Basic	- Applied environmental assessment (15) 3a + 3b (100%) - Strategies in sustainable natural resource management (15) 3a + 3b (100%) - Image Analysis (7.5) 3a + 3b (50%)	- Basic ecology (15) 4a + 4b (100%) - Multivariate methods (7.5) 4a + 4b (50%) - Natural resources and environmental economics, review (7.5) 4a (50%)

UHOH

	Block 1	*Block 2*	*Block 3*	*Block 4*	*Block 5*
1 semester (fall) Basic		Agriculture and food policy (6)	Matter cycling in agroecosystems (6)		

- Quantitative methods in biosciences and economics (unblocked) (6 ECTS)
- Cartography and GIS (unblocked) (6 ECTS)
- Methodology of scientific working (unblocked) (6 ECTS)

Water Resources

SLU

	Block 1a + 1b (15 ECTS)	*Block 2a + 2b (15 ECTS)*
3 semester *(fall)* Advanced	- Water and solute transport in the soil-plant system (15) 1a + 1b (100%)	- Water Quality Management and Hydrology (15) 2a + 2b (100%)

	Block 3a + 3b (15 ECTS)	*Block 4a + 4b (15 ECTS)*
2 semester *(Spring)* Advanced	- Applied biogeochemistry - element cycles and climate change (15) 3a + 3b (100%)	- Water management, soil conservation and land evaluation (15) 4a + 4b (100%)

Environmental Impacts

KVL

	Block 1 (15 ECTS)	*Block 2 (15 ECTS)*
3 semester (fall) Advanced	- Pesticide use, Mode of action and ecotoxicology (7.5) A - Applied plant nutrition (7.5) C - Natural resource sampling and modelling (7.5) B - Landscape ecology (7.5) B - Biological control of pests and diseases: Theory, Application and Perspectives (7.5) C	- Advanced Microbiology (15) - Applied ecology (7.5) A - Molecular plant biochemistry and physiology (7.5) A - Applied Statistics (7.5) A - GIS (7.5) C - Project (7.5)

	Block 3 (15 ECTS)	*Block 4 (15 ECTS)*
2 semester (spring) Advanced	- Environmental and Ecotechnology (7.5) C - Analytical chemistry (7.5) C - Pest and beneficials of arable soils (7.5) C - Project (7.5)	- Plant Ecophysiology (7.5) B - Environmental Management (7.5) B - Plants in populations, communities and ecosystems (7.5) A - EIA (7.5) C - Weed Science (7.5) C - Advanced Chemometrics with MATLAB (7.5) outside schedule

UHOH

	Block 1	*Block 2*	*Block 3*	*Block 4*	*Block 5*
3 semester (fall) Advanced	- Air pollution & air control (6) - Agr. Production & Residues (6)	Ecotoxicology & Environmental Analytic (6)		- Global change issue (6) - Environmental microbiology (6)	

- Animal hygiene (unblocked) (6 ECTS)
- Waste management and waste techniques (unblocked) (6 ECTS)

	Block 6	*Block 7*	*Block 8*	*Block 9*	*Block 10*
2 semester (Spring) Advanced	Environmental pollution & soil organisms (6)	Environmental science project (6)		-Advanced env. & animal hygiene Project (6)	-Anvanced env. & animal hygiene Lab. Work (6) - Spatia data analysis with GIS (6)

- Mapping course: Soil & vegetation (Unblocked) (6)

Soil Resources and Land use

KVL

	Block 1 (15 ECTS)	*Block 2 (15 ECTS)*
3 semester (fall) Advanced	- Environmental soil chemistry (7.5) C - Pedology (7.5) A - Pesticide use, Mode of action and ecotoxicology (7.5) A - Biological control of pests and diseases: Theory, Application and Perspectives (7.5) C	- Advanced Microbiology (15) - Project (7.5) - Molecular plant biochemistry and physiology (7.5) A - Applied Statistics (7.5) A

	Block 3 (15 ECTS)	*Block 4 (15 ECTS)*
2 semester (spring) Advanced	- Analytical Chemistry (7.5) C - Pest and Beneficials of arable fields (7.5) C - Applied plant nutrition (7.5) C - Project (7.5) - Environment and agriculture (15)	- Plant Ecophysiology (7.5) B - Weed Science (7.5) C - GIS (7.5) C - Plants in populations, communities and ecosystems (7.5) A - Advanced Chemometrics with MATLAB (7.5) outside schedule

SLU

	Block 1a + 1b (15 ECTS)	*Block 2a + 2b (15 ECTS)*
3 semester *(fall)* Advanced	- Soils of the world - processes, classification and use (7.5) period not yet decided	- Biological waste treatment - technology for urban wastes (15) 2a + 2b (100%) - Soil chemistry (7.5) 2a + 2b (50%)

	Block 3a + 3b (15 ECTS)	*Block 4a + 4b (15 ECTS)*
2 semester *(Spring)* Advanced	- Soil biology (15) 3a + 3b (100%) - Applied biogeochemistry - element cycles and climate change (15) 3a + 3b (100%)	- Soil sampling methodology and data evaluation (7.5) 4a + 4b (100%)

UHOH

	Block 1	*Block 2*	*Block 3*	*Block 4*	*Block 5*
3 semester (fall) Advanced	Plant nutrition in the Tropic & Subtropic (6)	Tropical Soils & land Evaluation (6)			

- Project in soil science (Unblocked) (6)
- Advanced Soil Biology (Unblocked) (6)
- Soil genesis Classification & geography (Unblocked) (6)

	Block 6	*Block 7*	*Block 8*	*Block 9*	*Block 10*
2 semester (Spring) Advanced					

- Project in soil science (Unblocked) (6)
- Advanced Excursion in Pedology (Unblocked) (6)
- Interdisciplinary advanced soil science project (Unblocked) (6)
- Mapping course: Soil & vegetation (Unblocked) (6)
- Field course in site Ecology (Unblocked) (6)

Ecosystems and biodiversity

SLU

	Block 1a + 1b (15 ECTS)	*Block 2a + 2b (15 ECTS)*
3 semester *(fall)*	- Sustainable forest management and forest certification - international distance course (7.5) out of schedule (25%)	
Advanced	- Botany and Mycology: relationships and inventory techniques (15) 1a + 1b (100%) - Non-vascular plants and nature conservation (7.5) 1b (100%)	- Applied population biology (15) 2a + 2b (100%) - Ecological methods (15) 2a + 2b (100%)

	Block 3a + 3b (15 ECTS)	*Block 4a + 4b (15 ECTS)*
2 semester *(Spring)*	- Forest environment and conservation (15) 3a + 3b (100%) - Insect ecology (15) 3a + 3b (100%) - Soil biology (15) 3a + 3b (100%) - Vertebrate zoology (7.5) 3b (100%)	- Flora and fauna conservation and management (15) 4a + 4b (100%) - Bees, apiculture and pollination (7.5) 4b (100%)
Advanced		

Environmental Management

KVL

	Block 1 (15 ECTS)	*Block 2 (15 ECTS)*
3 semester (fall)	- Landscape ecology (7.5) B	- Environmental and Natural Resource Economics (7.5) C - Applied forest and natural resource economics (7.5) A - Applied Statistics (7.5) A - Economic valuation and cost benefit analysis (15)
Advanced	- Economic Theory of Environmental Policy (7.5) A - Mind and Nature – Landscape values (7.5) C	

	Block 3 (15 ECTS)	*Block 4 (15 ECTS)*
2 semester (spring)	- Applied environmental and natural resources (7.5 (15 total)) A Block 3+4 - Environmental and ecotechnology (7.5) C - Project (7.5)	- Environmental Management (7.5) B
Advanced		- EIA (7.5) C - GIS (7.5) C - Applied environmental and natural resources (7.5 (15 total)) A Block 3+4 - Advanced Chemometrics with MATLAB (7.5) outside schedule

UHOH

	Block 1	*Block 2*	*Block 3*	*Block 4*	*Block 5*
3 semester (fall) Advanced	Farm level modelling (6)	- Farming & rural systems development (6) - - Dev. of agriculture in transition economies (6)	International food & agricultural trade (6)	Project evaluation methods (6)	- Advanced policy analysis modelling (6) - Food & nutrition security (6)

- Environmental management (Unblocked) (6)

	Block 6	*Block 7*	*Block 8*	*Block 9*	*Block 10*
2 semester (Spring) Advanced		Applied Econometrics (6)	Environmental & Resource Economics (6)	Advanced Resource Management (6)	Farming System Research (6)

- Environmental Policy & Legislation (Unblocked) (6)

BOKU

BOKU Structure of Semesterpackages

1. Semester			Σ ECTS
Introduction			15
Basic Winter Term B1[1)]			
Compulsory	816335	1,5 ECTS	
	814301	3 ECTS	4,5
Elective out of 28,5 ECTS			10,5
			30 ECTS
2. Semester			
Basic Summer Term B2			
Compulsory	911317	3 ECTS	3
Elective out of 19,5 ECTS[2)]			what is missing to 15 ECTS
Water Resources Summer Term WR2			
Compulsory	816343	3 ECTS	3
Elective out of 16,5 ECTS			
Soil Resources and Land Use Summer term SRL2			
Compulsory	816343	3 ECTS	
or	874300	4 ECTS	3 or 4
Elective out of 38,5 ECTS			
Ecosystems and Biodiversity ECO2			
Compulsory	731328	3 ECTS	
or	812330	3 ECTS	3
Elective out of 21,5 ECTS			**Σ Elective[3)]**
			30 ECTS

3. Semester

Water Resources Winter Term WR3			
Compulsory	811356	3 ECTS	3
	816338	3 ECTS	3
Elective out of 31,5 ECTS			12
Soil Resources and Land Use Winter term SRL3			
Compulsory	871305	3 ECTS	3
	815310 or 815311	4,5 or 3 ECTS	4,5 or 3
Elective out of 30 ECTS			
Ecosystems and Biodiversity ECO3			
Compulsory	811334	3 ECTS	
Elective out of 16,5 ECTS			**Σ Elective[3]** 30 ECTS

4. Semester

Thesis work **30 ECTS**

[1] 1 → 1. Semester, 2 → 2. Semester, 3 → 3. Semester

[2] Additional to 1. Semester, if an ASP was taken earlier

[3] One package e.g. SRL2 has to be selected and lectures(including compulsory) taken = 15 ECTS, rest may from same package or from the other packages of the semester.

Prüfungsordnung

(1) Für Studienteile an den Partner-Universitäten ist die Prüfungsordnung der jeweiligen Partner-Universität anzuwenden

(2) An der Universität für Bodenkultur Wien ist das Masterstudium **Environmental Sciences – Soil, Water and Biodiversity** (ENVEURO) abgeschlossen, wenn folgende Voraussetzungen erfüllt sind: Die positive Absolvierung der Lehrveranstaltungen an der Universität für Bodenkultur und den notwendigen Anteilen an einer oder mehrerer Partneruniversitäten wie im Programm festgelegt:

A. Basic semester package (BSP) including introduction course	30 ECTS
B. Advanced semester packages (ASP) + Summer field course (SFC)	90 ECTS
C. Thesis (T)	30 ECTS
	Summe = 120 ECTS

davon sind Lehrveranstaltungen im Ausmaß von **mindestens 30 ECTS** an einer der Partner-Universitäten außerhalb der Universität für Bodenkultur Wien zu absolvieren, die positive Absolvierung eines **Masterseminars (2 ECTS,** die positive Beurteilung der Masterarbeit. Die Beurteilung des Studienerfolges erfolgt in Form von Lehrveranstaltungs-Prüfungen. Die Lehrveranstaltungs-Prüfungen können schriftlich und/oder mündlich nach Festlegung durch den Leiter der Lehrveranstaltung absolviert werden. Studierende sind berechtigt, bei der Anmeldung zur Prüfung eine von der festgelegten Prüfungsmethode abweichende Methode bei dem Leiter der Lehrveranstaltung zu beantragen.

Die Prüfungsmethode hat sich am Typ der Lehrveranstaltung zu orientieren: Vorlesungen sind mit mündlichen oder schriftlichen Prüfungen abzuschließen, sofern diese nicht vorlesungsbegleitend beurteilt werden. Lehrveranstaltungen des Typs SE, VS, VSX, SX und USX können mit selbständig verfassten schriftlichen Seminararbeiten, deren Umfang vom Leiter der Lehrveranstaltung festzulegen ist, abgeschlossen werden. Bei allen anderen Lehrveranstaltungen wird die Prüfungsmethode vom Leiter der Lehrveranstaltung festgelegt. Die Masterarbeit ist eine wissenschaftliche Arbeit, die dem Nachweis der Befähigung dient, ein wissenschaftliches Thema selbständig sowie inhaltlich und methodisch vertretbar zu bearbeiten (§51 (1) Z. 8 UG2002).

Die abgeschlossene Masterarbeit ist zu präsentieren und in einem wissenschaftlichen Fachgespräch öffentlich zu verteidigen. Der für die Beurteilung der Magisterarbeit verantwortliche Universitätslehrer ist auch für die Organisation der Präsentation bzw. Verteidigung verantwortlich.

Zusätzlich zum Beurteiler sind mindestens zwei Universitätslehrer mit einschlägiger fachlicher Kompetenz zu nominieren, welche an der Präsentation und dem anschließenden Fachgespräch teilnehmen. Die Kandidaten haben ein Vorschlagsrecht. Die beigezogenen Universitätslehrer sind zeitgerecht im voraus über das Thema und den Inhalt der Magisterarbeit zu informieren.