



## Programme Syllabus:

# International Master's Programme in Ecotechnology and Sustainable Development, 120 higher education credits

## General data

|                              |  |
|------------------------------|--|
| <b>Code</b>                  | NEKAA  |
| <b>Cycle</b>                 | Second cycle   |
| <b>Ref no</b>                | MIUN 2006/1394   |
| <b>Credits</b>               | 120  |
| <b>Answerable department</b> | Department of Ecotechnology and Sustainable Building Engineering |
| <b>Answerable faculty</b>    | Faculty of Science, Technology and Media                         |
| <b>Established</b>           | 2007-04-18   |
| <b>Date of change</b>        | 2015-03-04   |
| <b>Version valid from</b>    | 2013-09-01   |

## Aim

The Master's programme will develop the students' ability to analyse and evaluate how natural resources can be used in the broad perspective of sustainable development.

## Programme objectives

OUTCOMES ACCORDING TO THE HIGHER EDUCATION ORDINANCE  
Knowledge and understanding

For a Master of Arts/Science (60 credits) degree the student shall  
- demonstrate knowledge and understanding in the main field of study, including both an overview of the field and specialised knowledge in certain areas of the field as well as insight into current research and development work, and

- demonstrate specialised methodological knowledge in the main field of study.

#### Competence and skills

For a Master of Arts/Science (60 credits) degree the student shall

- demonstrate the ability to integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
- demonstrate the ability to identify and formulate issues autonomously as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames
- demonstrate the ability in speech and writing to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrate the skills required for participation in research and development work or employment in some other qualified capacity.

#### Judgement and approach

For a Master of Arts/Science (60 credits) degree the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

#### Knowledge and understanding

For a Master of Arts/Science (120 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and
- demonstrate specialised methodological knowledge in the main field of study.

#### Competence and skills

For a Master of Arts/Science (120 credits) the student shall

- demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
- demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work
- demonstrate the ability in speech and writing both nationally and internationally

to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and

- demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

#### Judgement and approach

For a Master of Arts/Science (120 credits) the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

### SPECIFIC OUTCOMES FOR THE INTERNATIONAL MASTER'S PROGRAMME IN ECOTECHNOLOGY AND SUSTAINABLE DEVELOPMENT

#### Knowledge and understanding

The student should after completed education demonstrate:

- good knowledge about the relationships between nature and society and conditions to move towards sustainable development,
- good knowledge about technical systems (for instance housing, energy, industry, communication) relevant to sustainable development,
- knowledge about technology relevant to sustainable development,
- good knowledge about conditions for implementing environmental policy objectives from e.g. legal and economic perspectives, and conditions for a sustainable development in different parts of the world,
- very good knowledge about causes of climate change and of possible strategies to decrease emissions of greenhouse gases.

A student that take the two year Master's will in addition to the above after completed education also demonstrate:

- very good knowledge about current research methodology.

#### Skills and abilities

The student should after completed education demonstrate:

- good skills in methodology used to identify, describe and analyze environmental scientific problems in relation to a sustainable development, and in suggesting and evaluating possible solutions to problems,
- very good skills in methodology for broad systems analysis on products, services and technical systems, from natural resources to societal functions, with regard to

the entire life cycle,

- good skills in utilising methods for scenario analysis,
- very good ability to synthesise and use results from research and development within the field of environmental science and engineering, and
- good ability to plan, write and present an individual scientific thesis.

A student that take the two year Master's will in addition to the above after completed education also demonstrate:

- very good skills in methodology used to identify, describe and analyze environmental scientific problems in relation to a sustainable development, and in suggesting and evaluating possible solutions to these problems,
- demonstrate a good ability to link environmental scientific problems in a system perspective to the deepened and/or broadened knowledge the student has received within the programme's eligible courses.

Judgement and approach

The student will after completed education be able to:

- independently discuss and deal with current definitions of sustainable development and strategies for such a development,
- understand how different systems, innovations and technologies can be developed and disseminated in order to contribute to a sustainable development,
- explain functions of governing systems for the environment, and
- explain the transformation of environmental problems into political objectives and the implementation of such goals.

## **Content**

The International Master's Programme in Ecotechnology and Sustainable Development takes either one year or two years to complete.

The first year of the two-year version of the programme is devoted to mandatory courses in environmental science and engineering. The second year includes student's choice of courses in the autumn semester, and a master's thesis (20 weeks) on a relevant topic in the spring semester.

First cycle courses:

Environmental Science BA (A), Technology and Society from an Environmental Perspective, 7.5 Credits

Second cycle courses:

Environmental Engineering MA, Innovation Systems and Diffusion of Technology, 7.5 Credits

Environmental Engineering MA, Energy and Material Flows in the Built Environment, 7.5 Credits

Environmental Science MA, Instruments for Sustainable Development in an International Perspective, 7.5 Credits  
 Environmental Science MA, Methodology from a Systems Perspective, 7.5 Credits  
 Environmental Engineering MA, Climate Change, Impact and Action Strategies, 7.5 Credits  
 Environmental Engineering MA, Ecotechnology, 15 Credits  
 Environmental Science MA, Master's Thesis (Individual Assignment), 30 Credits

Elective courses, 30 Credits (of which at least 7.5 Credits must be in second cycle)

The one-year version of the programme consists of 45 credits courses and a thesis of 15 credits (10 weeks).

First cycle courses:

Environmental Science BA (A), Technology and Society from an Environmental Perspective, 7.5 Credits

Second cycle courses:

Environmental Engineering MA, Energy and Material Flows in the Built Environment, 7.5 Credits  
 Environmental Science MA, Instruments for Sustainable Development in an International Perspective, 7.5 Credits  
 Environmental Science MA, Methodology from a Systems Perspective, 7.5 Credits  
 Environmental Engineering MA, Climate Change, Impact and Action Strategies, 7.5 Credits  
 Environmental Engineering MA, Industrial Ecology, 7.5 Credits  
 Environmental Science MA, Master's Thesis (Individual Assignment), 15 Credits

## Entry requirements

Degree of Bachelor of at least 180 Credits (180 ECTS) or equivalent, with at least 45 Credits (45 ECTS) in Environmental Science or Environmental Technology/Engineering.

Proven language proficiency in English (English course B), for example shown from one of the following international English tests:

- TOEFL with a minimum score of 575 on a paper based test and not below 4.5 on the TWE
- TOEFL with a minimum score of 90 on internet based test and not below 20 on the TWE
- IELTS Academic Training with a minimum overall score of 6.5 and a minimum score on the specific parts of at least 5.5.

## **Description of programme**

The International Master's Programme in Ecotechnology and Sustainable Development leads to either a one-year, or two-year Master's degree in Environmental Science.

## **Selection rules and procedures**

The selection process is in accordance with the Higher Education Ordinance and the local order of admission.

## **Programme with restricted admissions**

Specific requirements for course within the programme are provided in the course syllabus.

## **Teaching and examination**

Teaching and assessment methods are shown in the syllabus.

The programme is taught in English.

Programme studies are full-time including field studies, laboratory work, project work, field trips, seminars and lectures. The courses are given at campus but some parts may also be studied remotely by some students. Parts of the studies are thematically oriented. The student is trained systematically to solve problems of increasing difficulty. Students are examined orally and/or in writing. Grading is specified in the syllabus.

Teaching and assessment methods are shown in the syllabus.

## **Title of qualification**

Degree of Master of Arts/Science (120 credits)

Magisterexamen or Masterexamen med huvudområdet miljövetenskap, translated into Degree of Master of Science (60 credits) or Degree of Master of Science (120 credits) with a major in Environmental Science.

## **Other information**

The programme's knowledge and skills should be useful when working with environmental and development issues within companies, organizations and government agencies in different parts of the world. The programme also provides a basis for graduate studies.

The training is conducted at Mid Sweden University Campus in Östersund. During the programme course names, contents, credit units and schedules may change. The students have some opportunities to select courses while studying. Information about optional course availability and how the selection shall be made is given during the programme. Admission to an optional course requires that the student meets the qualifications for that course. Optional courses may be cancelled if there are too few applicants.