Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

SLUkurs

Soil and Water Management - Master´s Programme

Version 3. Is valid between autumn 2011 and spring 2012

Programme code:
NM010

Scope:
120 ECTS

Level affiliation:
2 - Second cycle

Degree
Degree of Master of Science

Responsibe faculty:
Faculty of Natural Resources and Agricultural Sciences

Appendices

- Appendix for students admitted in 2011 autumn term

1. Decision

The Board of the Swedish University of Agricultural Sciences (SLU) decided on June 12-13 2006 to establish Soil and Water Management - Master's Programme.

The programme syllabus was approved by the Faculty Board at the Faculty for Natural Resources and Agricultural Sciences in May 3, 1977 to be valid from academic year 2007/2008. Revised in accordance with decision of Vice Chancellor on September 24, October 22, December 17, 2007, and May 10, 2010. The syllabus is also change November 18, 2009 (dnr SLU ua 30-3401/09) and December 1, 2010. The latest change is valid from 2011/12 (dnr SLU.ua.Fe.2010.3.1-3820).

Students who have fulfilled all the requirements for a degree within Soil and Water Management – Master's programme, corresponding to 120 credits will be awarded a Master of Science (120 credits). The programme has the following programme code: NM010.

2. Prior knowledge and other requirements

2.1 Previous studies
For admission to Soil and Water Management - Master's Programme requires a

degree at first level comprising 180 credits and specialised studies comprising 90 credits within one of the following subjects/disciplinary domains:

- biology
- agricultural sciences
- soil sciences, geo sciences
- environmental sciences
- forestry
- technology

Furthermore the applicant shall have knowledge corresponding to
- at least 20 credits within biology and
- at least 20 credits within chemistry
- at least 10 credits within soil or earth sciences
alternative

- at least 15 credits within chemistry
- at least 15 credits within biology and
- at least 20 credits within soil or earth sciences

The demands on specific entry requirements according to the above can be fulfilled by those who have equivalent knowledge through foreign degree or equivalent knowledge acquired in other ways.

The student must also have knowledge corresponding to English B from upper secondary school. This is fulfilled by the person who has an undergraduate degree from SLU comprising of 180 hp. For applicants with a degree from Nordic countries and some English-speaking countries, special rules apply.

For admission to the various courses included in the programme, the specific requirements defined for each individual course must be fulfilled.

3. Intended learning outcomes

3.1 General learning outcomes
According to "The Swedish Higher Education Act, Chapter 1 Sektion 9 (Högskolelagen 1 kap, 9 §)
"Second-cycle courses and study programmes shall be based fundamentally on the knowledge acquired by students during first-cycle courses and study programmes, or its equivalent.

Second-cycle courses and study programmes shall involve the acquisition of specialist knowledge, competence and skills in relation to first-cycle courses and study programmes, and in addition to the requirements for first-cycle courses and study programmes shall:
- further develop the ability of students to integrate and make autonomous use of their knowledge
- develop the students´ ability to deal with complex phenomena, issues and situations, and
- develop the students´ potential for professional activities that demand considerable autonomy, or for research and development work. Ordinance (2006:173)."

3.2 Specific learning outcomes for a Master of Science (120 credits)
The student shall comply with the following learning outcomes, in accordance with the supplement to The Ordinance for Swedish University of Agricultural Sciences SLU:

Knowledge and understanding
For a Master of Science (120 credits) students must
- demonstrate knowledge and understanding in their main field of study, including both a broad knowledge of the field and substantially deeper knowledge of certain parts of the field, together with deeper insight into current research and development work; and
- demonstrate deeper methodological knowledge in their main field of study.

Competence and skills
For a Master of Science (120 credits) students must
- demonstrate an ability to critically and systematically integrate knowledge and to analyse, assess and deal with complex phenomena, issues and situations, even when limited information is available;
- demonstrate an ability to critically, independently and creatively identify and formulate issues and to plan and, using appropriate methods, carry out advanced tasks within specified time limits, so as to contribute to the development of knowledge, and to evaluate this work;
- demonstrate an ability to clearly present and discuss their conclusions and the knowledge and arguments behind them, in dialogue with different groups, orally and in writing, in both national and international contexts; and
- demonstrate the skills required to participate in research and development work or to work independently in other advanced contexts.

Judgement and approach

For a Master of Science (120 credits) students must
- demonstrate an ability to make assessments in their main field of study, taking into account relevant scientific, social and ethical aspects, and demonstrate an awareness of ethical aspects of research and development work;
- demonstrate insight into the potential and limitations of science, its role in society and people's responsibility for how it is used; and
- demonstrate an ability to identify their need of further knowledge and to take responsibility for developing their knowledge.

3.3 Detail learning outcomes for Soil and Water Management – Master's programme

Within the general objectives of a Master of Science (120 credits), SLU has specified the following learning outcomes for Soil and Water Management - Master's programme.

Knowledge and understanding
For a Master of Science(120 credits) students must
- demonstrate knowledge within soil science at advanced level, which is relevant to various types of soil and water use, geographic areas and soil types,
- demonstrate knowledge about how soil and water is used and handled in the landscape and about the dependence of soil and water use on the interaction between natural factors and societal factors,
- demonstrate knowledge about how climate, soil type and land use impact on the water supply and the movement of water and its function as carrier substance for mineral substances,
- demonstrate knowledge about the flow of substances in different landscapes, drainage areas and cultivation systems and about the environmental impact and effect on soil fertility of these substance flows,
- demonstrate knowledge showing understanding of the interactions between the atmosphere, plants and soil and how these interactions are dependent on the use of soil and water,
- demonstrate in-depth understanding of the connections that exist between soil, water management, climate, production and environmental impact,
- demonstrate in-depth insight into current research and development work within soil and water use,
- demonstrate in-depth knowledge about methodology specifically relevant to soil and water use.

Competence and skills
For a Master of Science (120 credits) students must
- demonstrate ability to critically and systematically integrate knowledge and to

analyse, assess and handle complex phenomena, questions and situations even with limited information,
- demonstrate ability to evaluate the properties of soil and water, both in a pure science and an applied perspective,
- demonstrate ability to apply the knowledge in both national and international contexts,
- demonstrate ability to independently and critically identify and formulate questions relating to sustainable use of soil and water,
- demonstrate ability to assess the need for measures and make suggestions for solutions to problems within soil and water management,
- demonstrate ability to use simulation models and other relevant tools for assessment,
- demonstrate ability to plan and carry out sampling of soil and water,
- demonstrate ability to select relevant analysis methods, evaluate and statistically process analysis data received and evaluate his/her work,
- demonstrate ability to speak and write about sustainable use of soil and water in English, adapted to various target groups,
- demonstrate ability to account for and discuss his/her conclusions and the knowledge and arguments that these are based on,
- demonstrate such skills as are required to participate in research and development work or to work independently with other advanced activities,
- demonstrate knowledge about the potential labour market and be able to evaluate his/her own skills in relation to the requirements of the labour market.

Judgement and approach
For a Master of Science (120 credits) degree students must
- demonstrate ability to make overall assessments, with reference to relevant scientific, environmental, ethical and societal aspects, in particular in relation to the consequences of different types of soil and water use and measures within the area in relation to productive ability and sustainability,
- demonstrate insight into the opportunities and limitations of science, and its role in humankind´s sustainable use of biological natural resources,
- demonstrate insight into humankind´s responsibility for how science is used,
- demonstrate ability to realise the importance of independently summarising, critically evaluating and reporting quantitative data,
- demonstrate ability to identify his/her need for further knowledge and to continuously develop his/her competence.

4. Possibilities for further study

The student who has completed Soil and Water Management – Master's programme with a Master of Science (120 credits) meets the special requirements needed for admission to further studies on third cycle level at SLU.

Which postgraduate subjects at the NL-faculty as it is possible to be admitted to is presented in appendix to the programme syllabus which is approved by the Study programmes board.

Degree of Master (60 credits)
The student has a possibility to get a Master of Science (60 credits) after studies in one year, including an independent work comprising 15 credits. Master of Science (60 credits) satisfies the general eligibility requirements for admission to further studies on third cycle at SLU.

5. Content and outline

5.1 Courses
Courses included in Soil and Water Management – Master's programme are approved by the Study programmes board. They are presented in appendix to the programme syllabus which also contains description of programme structure (framework schedule). The learning outcomes and the content of the courses are presented in the course syllabus for each course. For the independent project (degree project) there are special instructions, which are approved by the Study programmes board.

5.2 Outline
The programme provides a comprehensive description of processes in soil and water seen from a landscape perspective. The programme emphasises important soil properties and important flow paths for water, nutrients and other substances through the soil and the plants to the atmosphere, or through the soil to ground and surface water. Students will be trained in the ability to assess the effects of various types of soil use on soil and water quality, and to design and apply relevant management methods. The studies are facilitated if the student has basic knowledge in one of the subjects ecology, geology, natural geology, hydrology or soil science.

The first year of the programme covers 60 credits, consisting of in-depth elements in soil science and applied elements in sustainable soil and water use. The second year includes mainly applied elements worth 30 credits and an independent project worth 30 credits.

Independent project (degree project)
The studies conclude with an independent project (degree project), where the

student can implement his/her knowledge, abilities and attitudes on a current issue within the subject area of sustainable soil and water use.

6. Examination

Each course is examined through one or many tests. The terms U, 3, 4 or 5 are used for grading the courses, unless there is an exemption decision.
Grading criteria are shown in appendix to the syllabys.

Grades are determined by an examiner appointed by SLU. General rules and guidelines for assessment and grading are found in the "Internal rules for grading and examination rights" and in "Regulations for education in first and second cycle at the Swedish University of Agricultural Sciences (SLU)".

7. Degree

7.1 Degree that are obtained after completion of the programme (120 credits)
A Master of Science (120 credits) within the main field Soil Science, as described in the programme syllabus for Soil and Water Management – Masters's programme, is obtained after completed course requirements (passed courses) of 120 credits according to the following:
- at least 30 credits in courses with specialised study in the main field soil science (second cycle A1N, A1F)
- at least 30 credits independent project (degree project / second cycle A2E) in soil science,
- maximum 15 credits may consist of passed courses on first cycle.

Course requirements shall at the same time comply with the following demands:
- 30 credits compulsory programme courses according to approved study plan,
- at least 45 credits elective courses according to approved study plan,
- independent project within soil science according to approved study plan and instructions for the programme.

In addition the student must have a degree of Bachelor or professional qualification consisting of at least 180 credits.

A student that fulfils the requirements for a Master of Science(120 credits) will, upon request, receive a degree certificate. The degree certificate will state that the student has obtained a Master of Science (120 credits)with a major in Soil Science).

The degree certificate will also state that the requirements have been fulfilled according to the programme syllabus for Soil and Water Management – Master's programme. Detailed course requirements are shown in the study plan, which is

approved by the Study programmes board and is presented in an appendix to the programme syllabus.

A Master of Science (120 credits) within the main field Environmental Science, as described in the programme syllabus for Soil and Water Management – Masters's programme, is obtained after completed course requirements (passed courses) of 120 credits according to the following:
- at least 30 credits in courses with specialised study in the main field environmental science (second cycle A1N, A1F)
- at least 30 credits independent project (degree project / second cycle A2E) in environmental science,
- maximum 15 credits may consist of passed courses on first cycle.

Course requirements shall at the same time comply with the following demands:
- 30 credits compulsory programme courses according to approved study plan,
- at least 45 credits elective courses according to approved study plan,
- independent project within environmental science according to approved study plan and instructions for the programme.

In addition the student must have a degree of Bachelor or professional qualification consisting of at least 180 credits.

A student that fulfils the requirements for a Master of Science (120 credits) will, upon request, receive a degree certificate. The degree certificate will state that the student has obtained a Master of Science (120 credits) with a major in Environmental Science).

The degree certificate will also state that the requirements have been fulfilled according to the programme syllabus for Soil and Water Management – Master's programme. Detailed course requirements are shown in the study plan, which is approved by the Study programmes board and is presented in an appendix to the programme syllabus.

7.2 Other degrees the student may be awarded after completion of the study programme
The courses included in the programme also makes it possible to get the following degrees on condition that SLU's demands for general qualification are fulfilled:

- Master of Science (60 credits) with the main field soil science
- Master of Science (60 credits) with the main field environmental science

- Master of Science (120 credits) with the main field soil science
- Master of Science (120 credits) with the main field environmental science

8. Miscellaneous

8.1 Credit transfer
Credits for courses from another institution, within or outside the country, can be transferred and be included in the degree. Deduction of points can be made if there is significant overlap between the courses that are approved at SLU and the external courses for which the student applies for to include in the degree. Credit transfer can not be done if there is a considerable difference between the courses

Determination of credit transfer takes place in the individual case. Following this examination may also equivalent knowledge and skills acquired professionally be recognized.