



Sveriges lantbruksuniversitet  
Swedish University of Agricultural Sciences

## GOVERNING DOCUMENT

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## General syllabus for the doctoral programme in the subject of:

### SOIL SCIENCE with specialisations

Valid as of 19/05/2025

Department to which the study plan applies  
See appendix 2

Subject code:  
See appendix 2

The objectives and design of courses in this subject may vary between faculties (see point 4. Miscellaneous).

The subject of soil science ("markvetenskap") includes the study of soil composition, different chemical, physical and biological processes in the soil, soil as the basis for plant production and soil-plant-atmosphere interactions. This includes the study of water flows, water quantity and quality, as well as the management of water as a resource in the landscape and how soil and plants

[A general syllabus must indicate the following: the main content of the programme, specific entry requirements and any other regulations required. All general syllabuses must be approved by the faculty board.]

## 1. Programme content and scope

The programme has two main components: courses and the doctoral thesis.

### Thesis work

The student should conduct independent research work to be presented in a compilation thesis written in English.

A compilation thesis comprises 3–5 papers. All the papers must be of such a standard that they may be published in peer-reviewed international scientific journals. These journals should be available in one of the databases Web of Science, Web of Knowledge or Scopus. The summarising chapter (“kappa”) of a compilation thesis must place the student's work in an international academic context and provide a synthesis of the various papers.

### **Courses**

The student is required to undertake coursework which corresponds to 30–60 higher education credits (HEC) for a Degree of Doctor, and 15–30 HEC for a Degree of Licentiate. This must include suitable general courses as well as elective subject courses.

## **2. Specific entry requirements**

Those admitted must meet the following specific entry requirements.

The specific entry requirements for the subject soil science are normally knowledge corresponding to at least 60 HEC in subjects relevant to soil science. This must include a degree project, and at least 30 credits must be at the advanced level. For persons who have received a degree in a main subject other than soil science, or who have studied at a university other than SLU, eligibility is assessed on a case-to-case basis based on the requirement above.

## **3. Overall rules for doctoral education at SLU**

Third-cycle (doctoral) education is regulated by the Higher Education Ordinance (SFS 1993:100) and the Ordinance for the Swedish University of Agricultural Sciences (SFS 1993:221).

The local governing documents that regulate doctoral education at SLU level can be found on the page [Regulations and forms for doctoral education](#).

The programme is organised in a way that allows doctoral students to meet the qualitative targets for third-cycle courses and programmes specified in *the Higher Education Ordinance's Annex 2 – System of Qualifications* (see appendix 1).

## **4. Miscellaneous**

Each faculty offering the third-cycle subject can choose to specify specialisations or requirements in addition to the general syllabus. These requirements must be documented in an appendix.

## **5. Appendixes**

Appendix 1 – Higher Education Ordinance's Annex 2 – System of Qualifications

Appendix 2 - Faculty of Natural Resources and Agricultural Sciences,  
specific entry requirements.

## Appendix 1

### Higher Education Ordinance Annex 2 – System of Qualifications.

#### ***Degree of Doctor***

##### *Scope*

*A Degree of Doctor is awarded after the third-cycle student has completed a study programme of 240 credits in a subject in which third-cycle teaching is offered.*

##### *Outcomes*

##### *Knowledge and understanding*

*For the Degree of Doctor the third-cycle student shall*

- *demonstrate broad knowledge and systematic understanding of the research field as well as advanced and up-to-date specialised knowledge in a limited area of this field, and*
- *demonstrate familiarity with research methodology in general and the methods of the specific field of research in particular.*

##### *Competence and skills*

- *demonstrate the capacity for scholarly analysis and synthesis as well to review and assess new and complex phenomena, issues and situations autonomously and critically*
- *demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames and to review and evaluate such work*
- *demonstrate through a dissertation the ability to make a significant contribution to the formation of knowledge through his or her own research;*
- *demonstrate the ability in both national and international contexts to present and discuss research and research findings authoritatively in speech and writing and in dialogue with the academic community and society in general*
- *demonstrate the ability to identify the need for further knowledge and*
- *demonstrate the capacity to contribute to social development and support the learning of others both through research and education and in some other qualified professional capacity.*

##### *Judgement and approach*

- *demonstrate intellectual autonomy and disciplinary rectitude as well as the ability to make assessments of research ethics, and*
- *demonstrate specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used.*

## Degree of Licentiate

### Scope

*A Degree of Licentiate is awarded either after a third-cycle student has completed a study programme of at least 120 credits in a subject in which third-cycle teaching is offered, or after a third-cycle student has completed one part comprising at least 120 credits of a study programme intended to conclude with the award of a PhD, if a higher education institution decides that a Degree of Licentiate of this kind may be awarded at the institution.*

### Outcomes

#### *Knowledge and understanding*

*For a Degree of Licentiate the third-cycle student shall demonstrate knowledge and understanding in the field of research including current specialist knowledge in a limited area of this field as well as specialised knowledge of research methodology in general and the methods of the specific field of research in particular. demonstrate knowledge and understanding in the field of research including current specialist knowledge in a limited area of this field as well as specialised knowledge of research methodology in general and the methods of the specific field of research in particular.*

#### *Competence and skills*

- *demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to plan and use appropriate methods to undertake a limited piece of research and other qualified tasks within predetermined time frames in order to contribute to the formation of knowledge as well as to evaluate this work;*
- *demonstrate the ability in both national and international contexts to present and discuss research and research findings in speech and writing and in dialogue with the academic community and society in general, and*
- *demonstrate the proficiency required to participate autonomously in research and development work and to work autonomously in some other qualified capacity.*

#### *Judgement and approach*

- *demonstrate the ability to make assessments of ethical aspects of their own research;*
- *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 their ongoing learning.*

## Appendix 2

### Specific entry requirements at the Faculty of Natural Resources and Agricultural Science

#### Courses

According to the rules for doctoral education at SLU ([Regulations and forms for doctoral education | Medarbetarwebben](#)), all doctoral and licentiate degrees at SLU must include credit awarding courses of philosophy of science and research ethics at PhD-level. These courses should also cover rules on cheating and plagiarism.

Some departments require credit-awarding components such as an introductory paper and/or seminar course. If this is the case, this is governed at department level through a decision by the head of department.

#### Subject codes and definitions

##### Soil science

The subject of soil science (“markvetenskap”) includes the study of soil composition, different chemical, physical and biological processes in the soil, soil as the basis for plant production and soil-plant-atmosphere interactions. This includes the study of water flows, water quantity and quality, as well as the management of water as a resource in the landscape and how soil and plants respond to different agricultural practices and environmental disturbances.

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Departments offering this specialisation	Subject code
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Ecology	
Soil and Environment	
Crop Production Ecology	

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##### Soil science specialising in biogeophysics

Biogeophysics (“biogeofysik”) is the study of the transport and storage of water, heat and related matter (nutrients and other substances) in the soil-plant-atmosphere continuum. This includes studies of physical soil processes and their role for various biological and chemical processes as well as interactions between soil, plants and the atmosphere.

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Departments offering this specialisation	Subject code
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Soil and Environment	
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### Soil science specialising in soil chemistry

Soil chemistry (“markkemi”) is the study of chemical processes in soil. Soil is a key component for understanding the biogeochemical flows, which are studied at different levels from a molecular level to entire ecosystems, in both arable land and forests.

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Departments offering this specialisation	Subject code
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Soil and Environment
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### Soil science specialising in soil biology

Soil biology (“markbiologi”) is the study of the soil's organisms, the processes that are governed by these organisms and the factors that affect organisms and processes.

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Departments offering this specialisation	Subject code
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Soil and Environment
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### Soil science specialising in soil nutrient cycling

Soil nutrient cycling (“markens näringsomsättning”) is the study of interactions between soil physical, chemical and biological processes and their importance for nutrient dynamics within the soil-plant system. The subject includes process-based studies ranging from micro-scale to field-scale in various ecosystems.

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Departments offering this specialisation	Subject code
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Soil and Environment
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### Soil science specialising in soil mechanics and soil management

Soil mechanics and soil management (“markmekanik och jordbearbetning”) study the impact of physical and biological processes and cultivation measures on the structure and structural dynamics of soil. The specialisation also covers the study of the impact of soil structure on physical, biological and chemical functions and processes in the soil as well as the development of sustainable soil management systems.

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Departments offering this specialisation	Subject code
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Soil and Environment
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### Soil science specialising in agricultural water management

Agricultural water management (“jordbrukets vattenhushållning”) includes

studies of hydrological processes, as well as technologies for drainage, irrigation and water quality measures. The subject includes studies at soil profile, field and landscape level for sustainable management of land and water resources in agricultural production.

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Departments offering this specialisation	Subject code
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Soil and Environment	
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