

# **GENERAL STUDY PLAN FOR RESEARCH EDUCATION (THIRD LEVEL HIGHER EDUCATION) IN BIOLOGY WITH SPECIALISATION IN MICROBIOLOGY at the Faculty of Natural Resources and Agricultural Sciences at the Swedish University of Agricultural Sciences (SLU)**

## **1. Objective and purpose of the programme**

The objective of the programme is to familiarise research students with general scientific tools, as well as the research methods that are typical of microbiology. The purpose is to meet the qualifications for research education specified by Chapter 6, Sections 4-5 of the Higher Education Ordinance (HEO).

Students are also to acquire knowledge about, and an attitude to, ethical issues associated with research in the subject. In addition, students are to obtain education in, and experience of, pedagogy and research information.

Research education can lead to both a degree of Licentiate and a degree of Doctor. The degree of Licentiate can be credited toward continuing studies for a degree of Doctor.

## **2. Eligibility**

People are eligible for admission to research education who have taken a second level (Master level) qualification and meet the requirements for basic eligibility (Chapter 7, Section 39 of HEO (2006:1053)), i.e., at least 240 higher education credits, including 60 credits at the second level (Master level) or acquired essentially the same knowledge in some other way, either in Sweden or abroad. The Faculty Board may exempt an individual applicant from the requirement for basic eligibility if special grounds exist. In such cases, SLU demands that the applicant has taken a first level (Bachelor level) qualification and presents a written account of an independent project the scope of which is equivalent to 15 higher education credits and the content of which corresponds to the knowledge and skills required for a degree project toward a degree of Master, or a relevant independent project of similar difficulty and extent. The project should be written in English.

Those who are admitted must also meet the special eligibility requirements adopted for the subject (Chapter 7, Section 40 of HEO (2006:1053)).

Special eligibility for admission to research education leading to a doctor of agronomy degree in microbiology requires an agronomist, horticulturalist or landscape architect degree, as well as knowledge in microbiology equivalent to 37 higher education credits at SLU, including an individual course representing 15 higher education credits or a grade of Pass on a degree project in microbiology or a closely related subject.

Special eligibility for research education leading to a PhD in microbiology requires a degree from the SLU master programme or a study programme in natural sciences. Knowledge in microbiology equivalent to 37 higher education credits, including a grade of Pass on a project representing at least 15 higher education credits in microbiology or a closely related subject, must be included.

The department's committee for research education reviews special eligibility on an individual basis.

### **3. Selection and admission**

Applicants are to be selected on the basis of their ability to benefit from the research education programme (Chapter 7, Section 41 of HEO (2006:1053)). The head of the department to which the applicant wishes to be admitted as a research student proposes admission to the Faculty Board. The board makes admissions decisions.

### **4. Scope, content and organisation**

#### ***4.1 Scope***

The programme for a degree of Doctor consists of four years of full-time studies (240 higher education credits). Two years of full-time studies (120 higher education credits) are required for a degree of Licentiate.

#### ***4.2 Content***

The programme contains two primary components: a scientific project and course-related studies.

##### *Scientific project*

During the period of education, the research student shall conduct a scientific project, presented in a doctoral thesis that represents 160 higher education credits. The thesis should be written in English and be presented in compilation form, normally including 34 papers. All papers are to be of sufficient quality as to be publishable, and at least 12 with the research student as the primary author shall be accepted or published in journals that use a peer review system. If the papers of the thesis have multiple authors, the contribution of the research student must be suitable for presentation in connection with the defence, etc.

A scientific project equivalent to at least 80 higher education credits is required for a degree of Licentiate. The thesis is expected to include 1-2 papers. All papers shall be of sufficient quality as to be publishable. The thesis should be written in English.

If the papers of the thesis have multiple authors, the contribution of the research student must be clearly specified in the thesis.

##### *Coursework*

The coursework shall consist of 45 higher education credits for a degree of Doctor and 25 higher education credits for a degree of Licentiate. Coursework shall include suitable basic courses (approximately 1/3 of the course credits), as well as individually selected courses on special subjects (approximately 2/3 of the course credits). The basic courses should include pedagogy. In consultation with supervisors, the research student may otherwise choose courses or literature (such as research ethics, patent law and bioinformatics) that are of general interest and relevance while providing preparation for future work. The courses on special topics shall provide in-depth knowledge in the student's specialisation, including approximately 7.5 higher education credits in microbiology. That requires the student to follow current literature in the area of the research project.

### *Miscellaneous*

Evaluations shall be performed when 50% and 75% of the net period of studies has been used. During each academic year, the research student is to hold a seminar concerning the research project. The seminar shall be immediately followed by a session with the department's committee for research education that involves an evaluation and general discussion about the research student's progress. Particular attention is paid to the evaluation when 50% of the net period of studies has been used. Active participation in the literature and project seminars of each primary area, as well as the department's general seminar series, is mandatory for the research student.

The research student shall also be given the opportunity to take part in the department's basic education.

During the period of education, research students are to present their results by means of lectures or posters at international conferences. It is desirable that students also present their findings outside the research community.

### **4.3 Organisation**

The individual study plan (Chapter 6, Section 36 of HEO (2006:1053)) for research education is drawn up in consultation between the research student and supervisor/supervisor group during the application process for admission. The faculty's guidelines for research education specify what should appear in the individual study plan. Evaluation and any modifications of the plan are to be on an annual basis. The research student and supervisor shall attest in writing that they have read the plan and any modifications to it. The study plan signed by the research student and supervisor is subsequently ratified in writing by the head of the department.

## **5. Examination**

A doctoral thesis must be defended orally in public and assessed by a grading committee consisting of three or five members appointed by the Faculty Board. A licentiate thesis is to be defended orally at a public seminar and approved by a grading committee appointed by the Faculty Board. The grading committee consists of three members.

The faculty's guidelines for research education specify the provisions that apply to the examination of doctoral theses and licentiate theses at the Faculty of Natural Resources and Agricultural Sciences.

The degrees of Doctor and Licentiate require that the student receives a grade of Pass on examinations and the thesis.

## **6. Supervision**

Anyone admitted as a research student is entitled to supervision throughout the period of study, i.e., full-time studies toward a degree of Doctor for four years. Each student is assigned at least two supervisors, one of whom is the principal supervisor (Chapter 6, Section 31 of HEO (2006:1053)). Without a decision having been made in each individual case, the

principal supervisor must have documented qualifications as a docent and hold a position at SLU. At least one of the assistant supervisors must hold a position at SLU.

The supervisor group consists of the principal supervisor and one or more assistant supervisors. The supervisors assist the research student on both practical and theoretical issues, while continually monitoring the progress of studies in cooperation with the student. The supervisors are also to help the student select literature and courses. The student must keep the supervisors up to date about the progress of studies so that corrections can be made when needed.

In consultation with the supervisor, the research student may choose a mentor with whom scientific issues and/or career planning may be discussed. The mentor may not be on the student's research team and does not have to be a member of the supervisor group.

## **7. Additional information**

Additional information about research education appears in Swedish Code of Statutes 2006:1053, including information about study grants in 1995:938 with amendments 1998:81 (reprint), as well as 1998:161 and 2006:1053. Information about research education at SLU appears in Guidelines for research education (third level programmes) in the Faculty of Natural Resources and Agricultural Sciences (Reg. no. SLU ua 40-1244/08).