



Karlstad University  
Faculty of Social and Life Sciences

# **Curriculum for Doctoral Studies in**

## **Biology**

Approved by the Faculty Board of Social and Life Sciences on 24 October 2007 Reg.no.  
FAK3 2007/355 and is valid from 1 November 2007. Revised on and valid from 8 Sept 2011.

## Curriculum Approval

The curriculum was approved by the Faculty Board of Social and Life Sciences on 24 October 2007, and is valid from 1 November 2007.

General stipulations for PhD programmes are provided in the *Higher Education Act* and in the *Higher Education Ordinance*. The PhD programme is offered to the extent permitted by available funding.

### Revision

Faculty Board 8 Sept 2011: Addition of eligibility requirements for doctoral studies in biology education. Updated in accordance with the current Higher Education ordinance (2011).

## 1. General Information

Biology is the science of life spanning various levels from the molecule to the ecosystem. Biology studies organisms and their environments: their organisation, need and ability to absorb energy, to reproduce, genetic material, growth and development, metabolism, and how organisms react to their environment and to changes in it. Doctoral research in Biology at Karlstad University is primarily focused on ecology and physiology, especially aquatic, but also includes biology education.

## 2. Aims and Objectives

The general objectives of licentiate or doctoral studies in terms of knowledge and understanding, skills and abilities, and judgement and approach are specified as follows in the *Higher Education Ordinance, attachment 2, SFS 2006:1053*):

### *Knowledge and understanding*

For a degree of *Licentiate research* students must

- demonstrate knowledge and understanding in the field of research, including current specialist knowledge in a defined part of the field and a deeper knowledge of scientific methods in general and of methods in the specific field of research in particular.

For a degree of *Doctor research* students must

- demonstrate broad knowledge in and systematic understanding of the field of research, together with deep and up-to-date specialist knowledge in a defined part of the field of research; and
- demonstrate familiarity with scholarly methods in general and with methods in the specific field of research in particular.

### *Skills and abilities*

For a degree of *Licentiate research* students must

- demonstrate an ability to identify and formulate issues, critically, independently and creatively, and proceeding with scientific precision; to plan a limited research project and other advanced tasks and to carry them out using appropriate methods 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 research and research results in dialogue with the scholarly community and society in general, orally and in writing, in both national and international contexts; and
- demonstrate the skills required to independently participate in research and development work and to work independently in other advanced contexts.

For a degree of *Doctor research* students must

- demonstrate an ability to engage in scholarly analysis and synthesis and in independent, critical examination and assessment of new and complex phenomena, issues and situations;

- demonstrate an ability to identify and formulate issues, critically, independently and creatively, and proceeding with scientific precision, and to plan and, using appropriate methods, conduct research and other advanced tasks within specified time limits, and to scrutinise and evaluate such work;
- demonstrate, in a dissertation, their ability to make a substantial contribution to the development of knowledge by their own research;
- demonstrate an ability to present and discuss research and research results with authority, in dialogue with the scholarly community and society in general, orally and in writing, in both national and international contexts;
- demonstrate an ability to identify their need of further knowledge; and
- demonstrate a potential to contribute to the development of society and support other people's learning, both in the field of research and education and in other advanced professional contexts.

### ***Judgement and approach***

For a degree of *Licentiate research* students must

- demonstrate an ability to make ethical assessments in their own research;
- demonstrate insight into the possibilities 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.

For a degree of *Doctor research* students must

- demonstrate intellectual independence and scholarly integrity and an ability to make ethical assessments relating to research; and
- demonstrate deeper insight into the potential and limitations of scholarship, its role in society and people's responsibility for how it is used.

### ***Licentiate dissertation/doctoral dissertation***

For a degree of *Licentiate* the research students must have received a pass grade on a scholarly dissertation of at least 60 ECTS credits.

For a degree of *Doctor* the research students must have received a pass grade on a doctoral dissertation of at least 120 ECTS credits.

## **2.2 Subject Specific Objectives**

For a degree of **Licentiate** in Biology at Karlstad University the research student must be able to

- demonstrate ability to carry out a limited research project and to teach Biology at Bachelor's level independently, and also to work in agencies and corporations that require biological expertise and/or some research skills.

For a degree of **Doctor** in Biology at Karlstad University the research student must be able to

- demonstrate ability to carry out research and teach Biology at Master's level independently, and also to work in agencies and corporations that require biological expertise and/or research skills.

For a degree of **Licentiate** the research students must have received a pass grade on a scholarly dissertation of 90 ECTS credits. For a degree of **Doctor** the research students must have received a pass grade on a doctoral dissertation of 180 ECTS credits.

## **3. Admission Requirements**

Applicants to doctoral studies must meet the general admission requirements as well as the specific

admission requirements and be judged to have the ability otherwise required to pursue the programme successfully (*Higher Education Ordinance*, Ch.7, § 35).

### **3.1 General eligibility**

A person who has earned a master's degree of at least 240 ECTS credits of which at least 60 ECTS are studies at master's level, or who in some other way in the country or abroad has acquired largely equivalent knowledge has general eligibility for admission. If there are special reasons for doing so, the higher education institution may grant an individual applicant exemption from the general eligibility (*Higher Education Ordinance*, Ch.7, § 39).

### **3.2.a Special eligibility**

A person who has completed courses in biology totalling 120 ECTS cr including a Master's level degree project of 30 ECTS cr has special eligibility for admission to doctoral studies in biology.

### **3.2.b Specific eligibility for admission to doctoral studies in biology education**

A person who has a Master's degree with courses totalling 90 ECTS cr in natural sciences, including a degree project of at least 15 ECTS cr in an area of relevance to the doctoral programme in biology, or has a teacher education degree, or equivalent in accordance with previous ordinance, and at least two years professional experience of teaching biology, has specific eligibility for admission to doctoral studies in biology education.

### **3.3. Transitional Provisions**

Students who met the general admission requirements for admission to doctoral studies before 1 July 2007 shall be considered generally eligible for admission to the doctoral level until 30 June 2015 (SFS 2006:1053).

## **4. Admission Procedure**

Applications for admission to doctoral studies are processed in accordance with the procedures prescribed by the Board of Karlstad University.

## **5. Selection**

Candidates will be selected on the basis of their assessed capacity to successfully complete a programme at the doctoral level. In the ranking and selection of the candidates, special attention will be paid to previous study records, the quality of previously performed research or development work, especially at Master's level, language skills, the relevance of the proposed research area to the departmental research programme and supervision capacity and to the candidates' intention to be present and participate in the research environment.

## **6. Content and Outline**

The doctoral programme can lead to a doctoral or licentiate degree. The licentiate degree can be seen as a step towards the doctor's degree and be included in it. The doctoral degree requires four years of study, the equivalent of 240 ECTS credits, and the licentiate degree two years or 120 ECTS credits.

The studies include course work as well as independent thesis work. To earn a doctoral degree, the candidate must complete 60 ECTS credits of course work plus 180 ECTS credits of thesis work. To earn a licentiate degree, the candidate is required to complete 30 ECTS credits of course work and 90 of thesis work.

## 6.1 Courses

Mandatory courses for all doctoral students at Karlstad University must be included in the programme to the extent required by local regulations.

### ***General mandatory course***

For the *Licentiate* degree:

The History and Philosophy of Science, 7.5 ECTS credits

For the *Doctor's* degree:

The History and Philosophy of Science, 7.5 ECTS credits, and  
Communicating Science, 4.5 ECTS credits

### ***Subject Specific Courses***

Subject specific courses for the degree of licentiate must total 30 ECTS cr and for the degree of Doctor 60 ECTS cr.

Mandatory courses for the *Licentiate* degree in biology:

- Introductory essay 7.5 ECTS cr, and
- Biology literature course 12 ECTS cr.

Students are also credited for participation in courses, conferences, symposia etc. (7.5 ECTS cr). The non-mandatory subject-specific courses (7.5 ECTS cr) are chosen in consultation with the examiner and the advisor and in consideration of the student's need of further theoretical and practical knowledge.

Mandatory courses for the *Doctor's* degree in biology:

- Introductory essay 7.5 ECTS cr, and
- Biology literature course 7.5 ECTS cr.

Students are also credited for participation in courses, conferences, symposia etc. (28.5 ECTS cr). The non-mandatory subject-specific courses (28.5 ECTS cr) are chosen in consultation with the examiner and the advisor and in consideration of the student's need of further theoretical and practical knowledge.

### ***Course description***

The *introductory* essay is an introduction to the dissertation project and is written in the first year of the programme. Students summarize and analyse literature related to their dissertation, thereby gaining insight into the general situation in their respective research fields and developing critical thinking ability.

The *literature* course is individual and designed in consultation with the advisor. The aim of the course is that students have the opportunity to broaden and deepen knowledge in adjacent and relevant areas to the dissertation topic but beyond its scope. The course should be completed within the first two years of the programme.

The *non-mandatory subject-specific courses* include courses, conferences, symposia, excursions etc. Courses at Karlstad University and other universities, nationally and internationally, and in other subjects can be included in the degree programme. The examiner decides on the number of credits earned in consultation with the candidate and the advisor.

Active contribution (presentation or poster) to conference or symposium of at least two days can, subject to the examiner's decision, yield 1.5 ECTS cr. per conference, but no more than a total of 7.5 ECTS cr. Excursions can, subject to the examiner's decision, yield 1.5 ECTS cr a week, but no more than a total of 4.5 ECTS cr.

The examiner decides if any of the general or subject-specific mandatory courses can be replaced by equivalent qualifications. Candidates choose relevant courses in consultation with the advisor and the examiner.

Doctoral seminars, at which candidates present their dissertation plans and articles, are continuously arranged. The candidate is required to make presentations on several occasions at actively participate in seminars throughout the programme.

## **6.2 Other doctoral activities**

In addition to the doctoral coursework components described above, candidates are expected to actively participate in departmental concerns, such as:

- departmental seminar and lecture series
- seminar and lecture opportunities outside of their own department
- establishing international contacts
- steps in the research project process, i.e. planning
- teaching undergraduate level

## **6.3 Doctoral and Licentiate Dissertations**

Doctoral students are required to write a dissertation for a doctoral or a licentiate degree, Dissertations should be a unified collection of previously published papers in English. Candidates are required to defend their licentiate dissertation at a seminar and their doctoral dissertation at a public examination. One of the grades Pass or Fail is awarded in the examination of dissertations. Further information is provided by the policy documents “Doctoral Dissertation Requirements” and “Licentiate Dissertation Requirements”.

The dissertation topic is chosen by the candidate in consultation with the advisor and the examiner.

## **6.4 Supervision**

Doctoral students are entitled to advisors in accordance with the principles stated in the current policy document at Karlstad University.

## **6.5 Individual Study Plan**

Each doctoral student must draw up an individual study plan in conjunction with the advisors. The plan should include a realistic estimate of time for course work, thesis work and supervision as well as an introduction to the proposed research field, problem, aim, methodological and theoretical frames, and relevant ethical considerations.

The individual study plan is subject to continual revision (at least once a year).

## **6.6 Examination**

Doctoral students are examined in accordance with the requirements of each individual course syllabus. Doctoral or licentiate dissertations are examined in accordance with the *Higher Education Ordinance* (Ch.6, §§ 33-34) and Karlstad University's current policy document.