

General syllabus for third-cycle studies in molecular biology

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Scope: 240 higher education credits

The Degree: Degree of Doctor

Study level: Third-cycle

Established by: General syllabus established by the Faculty of Science and Technology Board on 17/10/2007; revised on 20/03/2014

Enters into force: 17/10/2007

Responsible body: Faculty of Science and Technology

1. Learning outcomes

Learning outcomes for the degree in question

(Higher Education Ordinance, Chapter 6, Sections 4 and 5)

Knowledge and understanding

For the degree of Doctor of Philosophy 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

For the degree of Doctor of Philosophy the third-cycle student shall

- 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 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 in 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

For the degree of Doctor of Philosophy the third-cycle student shall

- 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 this is used.

Local learning outcomes for the degree in question

Knowledge and understanding

For the degree of Doctor of Philosophy the third-cycle student shall

- demonstrate broad knowledge within and a systematic understanding of molecular biology, and in-depth and current specialist knowledge within a specific field of molecular biology, and
- demonstrate familiarity with scientific methodology and with methodologies specific to molecular biology in particular.

Competence and skills

For the degree of Doctor of Philosophy the third-cycle student shall

- demonstrate a good ability in verbal and written presentations in English, and their ability to discuss research and research results in English.
- demonstrate the ability to independently initiate and conduct a research project within a specific field.

Judgement and approach

For the degree of Doctor of Philosophy the third-cycle student shall

- demonstrate the ability, both verbally and in writing, to participate in discussions concerning ethical questions within the field of cellular and molecular biology.

2. Entry requirements and prior knowledge required

General entry requirements

To be admitted for studies at third-cycle level the applicant is required to have completed a second-cycle level degree, or completed course requirements of at least 240 ECTS credits, of which at least 60 ECTS credits are at second-cycle level, or have an equivalent education from abroad, or equivalent qualifications.

Specific entry requirements

To fulfil the specific entry requirements to be admitted for studies at third-cycle level within the subject of molecular biology, the applicant is required to have completed courses comprising at least 30 ECTS credits within the main field of chemistry, of which at least 7.5 ECTS credits shall have been acquired in biochemistry. They shall also have acquired 45 ECTS credits within the main field of biology or molecular biology, of which at least 7.5 credits shall have been acquired in genetics and 22.5 ECTS credits within microbiology, physiology, and cellular and molecular biology. In addition to this, 45 ECTS credits at second-cycle level are required within the field of cellular and molecular biology, including independent work comprising at least 15 ECTS credits.

Applicants who have undergone eight semesters of study within the medical programme comprising medical biochemistry, cellular and molecular biology, genetics, physiology, microbiology and independent work are also eligible.

Applicants who in some other system either within Sweden or abroad have acquired largely equivalent skills are also eligible.

Specific entry requirements also include the necessary language skills in English, both verbal and written. Assessment of these skills is conducted by the department's post-graduate study committee.

3. Selection process

Selection process

The selection among those applicants who meet the entry requirements will be conducted with reference to their ability to benefit from third-cycle studies, and is based on the following assessment grounds:

- personal suitability
- previous study results and

- other merits

However, applicants must not be given preference over other applicants in the selection process solely based on the assessment that the applicant can receive accreditation for previous education or professional activities. (Higher Education Ordinance, Chapter 7, Section 41)

Decisions regarding admissions to studies at third-cycle level concluding in a doctoral degree are made in accordance with Umeå University's delegation of authority.

4. Contents and scheduling

4.1 General

An individual study plan is to be established for each doctoral student which shall give details of financing, supervision, courses, thesis-related work, etc. For a degree of doctor to be awarded, the studies shall entail 240 ECTS credits. A doctoral student who is admitted for third-cycle studies that are to conclude with a doctoral degree can, if he/she so wishes, study for a licentiate degree as an intermediate goal.

Studies at third-cycle level that are to be concluded with a doctoral degree shall comprise a net study period of four years and consist of a course component of 30-60 ECTS credits and a doctoral thesis of 180-210 ECTS credits, according to that which is stated in the individual study plan.

4.2 Contents

4.2.1 Courses

Third-cycle studies in molecular biology shall comprise a course component of 30-60 ECTS credits, of which 23.5-28 ECTS credits are comprised of mandatory courses.

Mandatory courses for the doctoral degree:

- Frontiers in molecular biology I, 12 ECTS credits
- Introduction to teaching at the department, 1.5 ECTS credits
- Courses that develop generic skills amounting to 10 ECTS credits. 8 of these ECTS credits are to consist of courses within philosophy of science, ethics and conduct, oral presentation and written presentation.

For doctoral students using laboratory animals in their research, a 4.5 ECTS credit course providing knowledge relating to research animals is obligatory.

Elective courses for doctoral degrees:

These are chosen following consultation with the supervisor and examiner.

4.2.2 Doctoral thesis

The doctoral thesis may either take the form of a single coherent work (a monograph) or a compilation consisting of an introduction, a number of scientific papers, and a summary and discussion of the papers (compilation thesis). In both cases the thesis is to contain a popular scientific description aimed at readers outside of academia. The thesis is to comprise 180-210 ECTS credits.

The doctoral thesis shall be defended verbally in public. The thesis is assessed with the following grades: G (Pass) or U (Fail). When setting the grade, attention will be paid to the content of the thesis and its defence.

5. Examination

The degree of doctor can be awarded following the student's completion of third-cycle studies equivalent to 240 ECTS credits within molecular biology, and where the applicant has received the grade of pass for the tests included in the studies in addition to writing and publicly defending a doctoral thesis approved by the Examining Committee. Degree certificates are issued following application to Student Services/Examina.

6. Other instructions

The provisions that apply in respect of third-cycle studies can be found in:

- The Higher Education Ordinance: Chapter 5 Employment of doctoral students, Chapter 6 Courses and study programmes, and Chapter 7 Admission to courses and study programmes, Annex 2 Qualifications ordinance.
- Admission regulations for doctoral studies at Umeå University.
- Local system of qualifications at Umeå University.
- Regulations for doctoral studies at Umeå University.
- Handbook for postgraduate students at the Faculty of Science and Technology at Umeå University.