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General syllabus for third-cycle studies in experimental physics
with a degree of licentiate as the final goal

General syllabus for third-cycle studies in experimental physics (Licentiate)

Scope: 120 higher education credits
The Degree: Degree of Licentiate
Study level: Third-cycle
Established by: General syllabus established by the Faculty of Science and Technology Board on 04/06/2014
Enters into force: 04/06/2014
Responsible body: Faculty of Science and Technology

1. Learning outcomes

National learning outcomes for the degree in question

Knowledge and understanding

For the 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.

Competence and skills

For the degree of Licentiate the third-cycle student shall

- 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 in dialogue with the academic community and society in general, and
- demonstrate the skills required to participate autonomously in research and development work and to work autonomously in some other qualified capacity.

Judgement and approach

For the degree of Licentiate the third-cycle student shall

- demonstrate the ability to make assessments of ethical aspects of his or her own research,
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how its is used, and
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

Local learning outcomes for the degree in question

Knowledge and understanding

For the degree of Licentiate the third-cycle student shall

- demonstrate in-depth knowledge within any of the possible specialisations, such as condensed matter physics, laser physics, quantum optics, space physics and fields with a biological or chemical connection,

Competence and skills

For the degree of Licentiate the third-cycle student shall

- demonstrate ability in oral and written presentation in English, and ability to discuss research and research results in English, primarily within the fields of physics represented in the department,
- demonstrate ability to identify questions, and to plan and describe future projects in such a way that this can form the basis of applications to those financing research work.

Judgement and approach

For the degree of Licentiate the third-cycle student shall

- demonstrate ability to convey information regarding physics and natural science to the general public in a manner that provokes interest.

2. Entry requirements and prior knowledge required

To be admitted for studies at third-cycle level the applicant is required to meet the general entry requirements and any specific entry requirements that the Faculty of Science and Technology Board may have prescribed, and shall be considered as otherwise possessing that required to benefit from the studies. (Higher Education Ordinance, Chapter 7, Section 35).

General entry requirements
Applicants who have completed a degree at second-cycle level, completed course requirements of at least 240 credits, of which at least 60 credits are at second-cycle level, or have in some other system either within Sweden or abroad acquired largely equivalent skills are also eligible. The Faculty of Science and Technology Board may, in the case of a specific applicant, consent to an exemption from the general entry requirements, if there are special reasons to do so. (Higher Education Ordinance, Chapter 7, Section 39)

Applicants who meet the general entry requirements that applied in respect to admission to third-cycle studies prior to 1 July 2007, i.e. first-cycle studies of at least 120 credits or the equivalent, knowledge acquired in some other system either within Sweden or abroad, shall also be considered to meet the current general entry requirements for admission to third-cycle studies, up to and including the end of June 2015. (Higher Education Ordinance, Chapter 12, Paragraph 11)

Specific entry requirements
To fulfil the specific entry requirements to be admitted for studies at third-cycle level within the subject of experimental physics, the applicant is required to have completed courses within the field of physics comprising at least 120 credits.

If special reasons exist, for example, if the planned research work has a strong interdisciplinary element, then the Head of Department may consent to up to 30 of these 120 credits being replaced by courses within another relevant field of natural science or engineering.

The prior knowledge requirements in respect of the above are also deemed to be fulfilled by applicants who in some other system either within Sweden or abroad have acquired largely equivalent skills.

3. Selection process

Selection process
The selection among those applicants who meet the entry requirements will be conducted with reference to their ability to successfully perform 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 licentiate to be awarded, the studies shall entail 120 credits.

Studies at third-cycle level that are to be concluded with a licentiate degree shall comprise a net study period of two years and consist of a course component of 30 credits and an academic thesis of at least 75 credits.

4.2 Contents

4.2.1 Courses

Third-cycle studies in experimental physics consist of a course component of 30 credits, of which 8 credits are comprised of mandatory courses.

Mandatory courses for the licentiate degree: Courses that develop general skills amounting to 8 credits are to consist of courses within philosophy of science, ethics and conduct, oral and written presentation

The elective courses are chosen by the student in consultation with the supervisor and can be largely adapted to the student's interests and area of specialisation.

The following are examples of elective courses: biophysics, atomic and molecular physics, quantum mechanics, laser physics, quantum optics, electrodynamics, advanced materials, nanotechnology, solid state physics and space physics. Generic courses other than the above can also be included within a licentiate degree.

4.2.2 Academic thesis
The academic thesis may either take the form of a single coherent work (a monograph) or a compilation of a number of academic papers incorporating an introduction, a summary and discussion of the papers (compilation thesis) and is to be at least 75 credits.

The academic thesis is to be defended at a public licentiate seminar. The thesis is assessed with the following grades: G (Pass) or U (Fail). When setting the grade, attention will be paid to both the content of the thesis and its defence.

5. Examination

The degree of licentiate can be awarded following the student's completion of third-cycle studies equivalent to 120 credits within experimental physics, 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 licentiate 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 (Ref. no. FS 1.1.2-25-14).
- Local system of qualifications at Umeå University (Ref. no. 500-2958-11).
- Regulations for doctoral studies at Umeå University (Ref. no. 500-953-13).
- Handbook for postgraduate students at the Faculty of Science and Technology at Umeå University.