Faculty of Science and Technology
Umeå University, 901 87 Umeå
Telephone: +46 (0) 90-786 50 00
www.teknat.umu.se

Ref. No. FS 4.1.4-1421-14
Date 10/10/2014

Page 1 (5)

General syllabus for third-cycle studies in computational science and engineering

General syllabus for third-cycle studies in computational science and engineering

Scope: 240 higher education credits
The Degree: Degree of Doctor
Study level: Third-cycle
Established by: Programme syllabus established by the Faculty of Science and Technology Board on
27/08/2009, revised on 10/10/2014
Enters into force: 27/08/2009
Responsible body: Faculty of Science and Technology
Specialisations: Biology, computing science, ecology, physics, chemistry, mathematics, and mathematical statistics

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 the subject area of computational science and engineering, and in-depth and current specialist knowledge within their chosen specialisation

Competence and skills

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

- demonstrate their ability in verbal and written presentations in English, and their ability to discuss research and research results in English,
- demonstrate the ability to identify and formulate relevant computational science and engineering questions,
- demonstrate the ability to conduct computational science and engineering research projects.

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 credits, of which at least 60 credits are at second-cycle level, or have an equivalent education from overseas, or equivalent qualifications.

Applicants who meet the general entry requirements that applied prior to 1 July 2007, i.e. at least 120 credits or the equivalent, meet the current general entry requirements up to and including 30 July 2015.

Specific entry requirements
To fulfil the specific entry requirements to be admitted for studies at third-cycle level in computational science and engineering, the applicant is required to have completed at least 90 credits in computational science and engineering courses, of which at least 30 credits shall have been acquired at second-cycle level. Computational science and engineering courses refers to courses with major quantitative, statistical or computing science elements, such as courses in computing science, mathematics and mathematical statistics, and relevant courses in biology, ecology, physics and chemistry. Applicants who in some other system either within Sweden or abroad have acquired largely equivalent skills are also eligible.

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 doctor to be awarded, the studies shall entail 240 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 60-120 credits and a doctoral thesis of 120-180 credits.

4.2 Contents

4.2.1 Courses
Third-cycle studies in computational science and engineering consist of a course component of 60-120 credits. At least 30 credits are to be within the field of computational science and engineering. At least 15 credits are to be within the subject of specialisation.

Mandatory courses for the doctoral degree:
Courses that develop general skills amounting to 10 credits. 8 of these credits are to consist of courses within philosophy of science, ethics and conduct, oral presentation and a written presentation.

A course involving active participation in seminar series or another form of research presentation comprising at least 7.5 credits.

4.2.2. Doctoral thesis
The doctoral thesis may either take the form of a single coherent work (a monograph) or a compilation of a number of academic essays incorporating an introduction, a summary and discussion of the essays (compilation thesis) and is to comprise 120-180 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 both 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 credits within computational science and engineering, 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 (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.