Translation of Subject Curriculum (Study Plan) for Third-cycle (PhD) Education

Applied Mathematics and Statistics

Swedish title: Tillämpad matematik och statistik

TNMAST01

Swedish curriculum adopted by the Board of the Faculty of Science and Technology (Third-cycle Educational Board) on 2015-09-08

The Study Plan for third-cycle studies consists of three parts: a general part, this subject specific study plan, and each doctoral student's individual study plan.

Objective

Example: Building on basic research, the third-cycle studies are expected to provide further insight into the most important areas of the subject as well as in-depth knowledge within at least one subdivision. By conducting a degree project guided by a supervisor, the doctoral student shall also be able to present her/his goals and results orally and in writing to different target groups in English and, in the case of Swedish-speaking doctoral students, in Swedish.

Subject description

Applied mathematics and statistics includes applied mathematics, mathematical modelling, statistical methods and applications of statistical methods. Research in applied mathematics and statistics has strong connection to medicine, technical sciences, natural sciences and similar areas. The core of applied mathematics and statistics is by now well established but the subject has grown considerably during the last decade and new subareas appear constantly. A PhD student should have good understanding of research in various areas of mathematics, applied mathematics and statistics and also the way these areas can be applied in different ways.

Information about current research areas at the Department of Mathematics can be found at the institute webpage: Information om aktuella forskningsområden vid matematiska
http://www.math.uu.se/ se även www.math.uu.se/~cim

Version 2014-01-22
Eligibility

Basic Eligibility
The basic eligibility for third-cycle studies is described in the general part of the study plan.

Special Eligibility
A person who has passed at least 90 higher education credits worth of courses in mathematics or in subjects relevant for mathematics, or who has corresponding education from abroad, has special eligibility. Normally, a thesis of at least 15 higher education credits is also required.
Examples of educational programs which give special eligibility are the following:
- Bachelor's program in mathematics (provided that the basic eligibility criteria are fulfilled)
- Bachelor's program in computer sciences (provided that the basic eligibility criteria are fulfilled)
- Bachelor’s program in statistics (provided that the basic eligibility criteria are fulfilled)
- Master's program in mathematics
- Master's program in computer sciences
- Master’s program in statistics
- Civil engineering program with specialization in technical physics
For other programs additional mathematics courses may be needed for special eligibility. For questions in individual cases contact the Graduate Chair.

Admission
Applicants for third-cycle studies in applied mathematics and statistics must submit an application to the Head of the Department of Mathematics. Admission to doctoral studies takes place normally one time per year.

At the time of admission, the department must provide a financial assistance plan demonstrating sufficient support to cover the maintenance of the applicant as well as her/his research.

Program structure
At the time of admission, each doctoral student and her/his supervisor shall draw up an individual study plan after consultation with the professor in charge of third-cycle studies. The plan is to be approved.
by the Head of the Department (by delegation of the Faculty Board) at the time of admission.

The individual study plan shall be annually reviewed by the doctoral student and her/his supervisor jointly, and supplemented with a summary of the achieved results and the plans for the coming year. Significant changes as well as any disagreement on the individual study plan shall be reported to the Head of the Department or, if deemed necessary, to the Third-cycle Educational Board.

Courses

The third-cycle studies may include different kinds of courses, such as lectures, literature studies, practical training, field studies, etc. The courses are intended to provide a wider insight into the subject as a complement to the competence acquired during research. The courses included in the individual study plan may be selected among courses in mathematics and computer sciences as well as relevant courses in applied areas. For example, if a PhD student does research in the area of mathematical biology, the student can take courses in biology/ecology.

A course in research ethics (of at least 2 higher education credits) is mandatory for licentiate and doctoral degree, as well as university educational theory for doctoral students who teach at basic or advanced level. Courses in the individual study plan are to be decided by the student and the main supervisor.

A selection of the following courses, or similar, should be included into education: partial differential equations, scientific computing III, complexity theory, measure theory and stochastic integration, theoretical statistics, mathematical statistics, analysis of time series, Markov processes, Computer intensive statistics and data-mining, selected topics in mathematical statistics, applied mathematics, Bayesian methods, validated numerical methods, mathematical biology, stochastic processes, modelling of complex systems, stational stochastic processes, stochastic processes with applications, probability theory.

The PhD student should follow various research activities at the institute, in particular, taking part at research seminars and attending guest lectures.
Requirements for doctoral degree

The requirements for the doctoral degree consist of passed examinations in the courses included in the approved individual study plan of each doctoral student, as well as a passed public defense of the degree project. The studies awarded a doctoral degree comprise 240 higher education credits (four years of full-time studies), of which the doctoral thesis comprises a minimum of 120 higher education credits and the course part a minimum of 80 higher education credits.

Requirements for licentiate degree

A doctoral student who has acquired at least 120 higher education credits (two years of full-time studies) is eligible for a licentiate degree. The requirements consist of passing the examinations included in the program stage and receiving a passing grade on an academic paper of at least 60 higher education credits. The part of the course amounts to a minimum of 40 higher education credits.

Other

Research in applied mathematics and statistics is conducted in extensive international cooperation and requires extensive global information flow. It is therefore necessary that the student has the ability to read scientific works in other languages. The student should know how to write scientific texts in English and Swedish.

The thesis work is individual but cooperation with other graduate students is very valuable. This is encouraged e.g. through graduate student seminars. During the education graduate students should take part and present their research results at international research conferences.

The graduate students should also take notice of the activities in applied mathematics at Stockholm University, the Royal Institute of Technology in Stockholm and the Institute Mittag-Leffler. In order to widen the perspective and to increase the ability to use mathematical methods in the future career, contacts with other subjects at the university are valuable. This applies pure mathematics, as well as to subjects outside the department, e.g. biology, computer sciences, economy, geo sciences, chemistry, medicine, technical sciences, theoretical physics, and theoretical philosophy.