Translation of Curriculum Statement for Graduate Level (Third-level) Education

Engineering science with specialization in Applied Mechanics

Swedish title: Teknisk fysik med inriktning mot Tillämpad mekanik

TNTEKF18

Swedish Curriculum adopted by the Board of the Faculty of Science and Technology (Board for Third-level Education) on 2011-03-22. Revised on 2020-01-15. Translation approved on 2020-01-15.

The Curriculum Statement for Third-level Education consists of three parts: a general part, this subject specialized curriculum statement, and each doctoral student's individual study plan.

Objective
Starting from the basic education within the field of research, the education on a research level should give additional insights in the most important aspects of the discipline, and deeper understanding in at least one sub-discipline. Though guidance by the advisers and thesis work, the PhD candidate should become well-prepared for independent research work and other profession activities, where high demands are required on the insight in the discipline and research training.

The doctoral student shall also be able to present her/his own 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
In the discipline of Applied mechanics, practical use of mechanics is in focus, such as effects of loading on solid bodies and fluids. Applied mechanics comprises what is usually meant by Solid mechanics and Fluid mechanics. In Solid Mechanics, the behaviour of solid bodies under load is treated, with respect to phenomena such as deformation, damage accumulation, fracture, stability, dynamics and wave motion.
In fluid mechanics, the forces acting on these media are analyzed, both from a kinematic and dynamic viewpoint. The discipline applied mechanics is of great importance for e.g. applied physics, energy technology, materials science, mechanical engineering and vehicle engineering.

At Uppsala University, research in Applied mechanics is focused on material mechanics and wave motion, as well as applications of these phenomena. Equal emphasis is placed on experimental work, analytical modeling and numerical simulations.

Eligibility

Basic Eligibility
The basic eligibility for third level education is described in the general part of the curriculum statement.

Special Eligibility
Special eligibility is assigned to a candidate who has taken courses within all relevant areas in the subject with sufficient breadth and depth. Thus, special eligibility is considerer a candidate with one of the following:

a) has obtained a degree in civil engineering from a Swedish technical University/College and hence taken courses within the relevant areas of the subject
b) in a different way has gained knowledge principally to the same extent as in a), irrespectively of the country of study

Admission
Applicants for third level program in Engineering science with specialization in Applied mechanics must submit an application to the head of the Department of Materials Science and Engineering. Admissions to places in third level programs take place normally six times per year.

Upon admission to postgraduate education, the Swedish title of the degree is to be specified in the application. According to decision (TEKNAT 2012/215), postgraduate education in Engineering science with specialization in Applied Mechanics shall lead to a teknologiedoktorsexamen. The English rendering will be a licentiate/doktorsexamen. The English rendering will be a licentiate/doctorate degree of philosophy.
In connection with the admission it must be stated how it is planned to finance both the personal maintenance of the doctoral student, and her/his research.

Program structure

In connection with the admission, each doctoral student and her/his supervisor shall draw up an individual study plan after consultation with the professor in charge of the third level program. The plan is to be approved by the head of the department (by delegation of the Faculty Board), in connection with the admission.

The individual study plan shall be reviewed jointly by the doctoral student and her/his supervisor, annually, and be provided with a summary of the achieved results and the plans for the coming year. Significant changes and any disagreement on the individual study plan shall be reported to the head of the department or, if deemed necessary, to the Board for Third-level Education.

Courses

Within the third level program there may be different kinds of courses, such as lectures, literature studies, practical training, field studies, etc. The courses are intended to provide wider insight into the subject as a complement to the specialist competence acquired in the research work.

A course in research ethics of at least 2 higher education credits is mandatory for licentiate and doctoral degree. A course in university educational theory is also mandatory for doctoral students who teach at basic and advanced level.

A course in Continuum mechanics (18 credit points) and one in Scientific writing (2 credit points) are mandatory at both licentiate and doctoral level. Other courses are distributed in important sub-disciplines as Theory of elasticity, Theory of plasticity, Stability, Fracture mechanics, Material mechanics, Fluid mechanics, Hydrodynamics, as well as courses on topics as Applied mathematics, Numerical methods, Thermodynamics, Measurement technology and Materials science.

PhD students that participate in the teaching at the undergraduate level should pass courses in university didactics, if not corresponding knowledge has been acquired elsewhere.
Requirements for doctoral degree
The requirements for doctoral degree consist of on one hand passed examinations in the courses included in the approved individual study plan of each doctoral student, and on other hand passed public defense of the doctoral thesis. The program leading to the doctoral degree amounts to 240 higher education credits (four years of full-time studies), of which the thesis part amounts to a minimum of 120 higher education credits and the course part to a minimum of 60 higher education credits.

Requirements for licentiate degree
A stage of at least 120 higher education credits (two years of full-time studies) in the third level program may be completed with a licentiate degree. The requirements for this are that the doctoral student both has passed the examinations included in the program stage and has got an academic paper amounting to a minimum of 60 higher education credits passed. The course part amounts to a minimum of 40 higher education credits.

Other
Some participation in undergraduate teaching within the subject Applied mechanics may be part of the employment, e.g. as teaching or laboratory assistant. These tasks should not exceed 20% of the total time, and should not restrict the effective research time (four years of full-time study) on the doctoral level.

Research in Applied mechanics largely relies on international collaboration. It is therefore necessary that the PhD candidate has a good command of the English language, both in writing and orally.