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

Earth Science with specialisation in Environmental Analysis
Hydrology
Earth Science with specialisation in Physical Geography

TNGEFY05, TNHYDR00, TNGEVE07

Swedish curriculum adopted by the Board of the Faculty of Science and Technology (Third-cycle Educational Board) on 2008-07-02, revisions established 2016-01-20, 2016-10-05.

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

Third-cycle education shall provide skills that are at the research frontier in the subject area/specialization on the basis of basic education in the subject area. The candidate shall achieve a substantial theoretical subject knowledge and extensive practical skills in the subject methodology through active participation in courses and conducting thesis work under supervision. Furthermore, the third-cycle studies shall lead the doctoral student to actively participate in scientific discussion.

The doctoral student shall 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.

The holder of a doctoral degree shall be able to independently plan and conduct research in the subject area/ subdivision. The doctor shall be able to be responsible for research and development in both academic environment as well as in management and business.

The holder of a licentiate degree shall have experience of independent research work and have reached the necessary subject area and methodological skills required for active participation in research projects in the chosen specialization, as well as being able to critically evaluate scientific developments in the subject area.
Subject description
The three subjects /specializations in the program of Air, Water and Landscape Sciences at the Department of Earth Sciences coordinate their study plans for third-cycle studies:

*Geovetenskap med inriktning mot miljöanalys, Earth Science with specialisation in Environmental Analysis.* TNGEFY05. The subject of Earth Sciences with a specialization in Environmental Analysis comprises studies of how society’s use of natural resources influences the environment, the measures taken to reduce that influence, and strategies to achieve society’s goals for sustainable development with respect to ecosystem services. An important aspect of this is the understanding the biogeochemical processes. This facilitates both the distinction of human influences from natural dynamics, as well as the recommendation of cost-effective measures to achieve environmental goals while satisfying human needs for natural resources, recreation and a respect for ecosystem integrity. One goal of this work is to provide solutions to fundamental environmental problems while at the same time managing environmental risks.

*Hydrologi, Hydrology.* TNHYDR00. The research in hydrology at Uppsala University focuses on the physical and chemical processes in the hydrological cycle, both natural and manmade, their modeling with theoretical and experimental methods, and the use of basic hydrological process knowledge to improve water management and environmental planning in Sweden and internationally. The research covers both surface water and groundwater hydrology with a strong connection between the two areas.

*Geovetenskap med inriktning mot naturgeografi, Earth Science with specialisation in Physical Geography.* TNGEVE07. Subjects studied include physical geography and landscape, environment, and climate dynamics in time and space, with and without human intervention. The approach is to use both quantitative and qualitative analyzes of nature's own archives, field mapping and monitoring, GIS / remote sensing, the study of processes and model studies. Research in Physical Geography at Uppsala University is primarily focused on glaciology and climate and environmental development.

Information on current research in these three subjects/specializations can be obtained via [http://www.geo.uu.se/luval/](http://www.geo.uu.se/luval/).
Eligibility

Basic Eligibility

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

Special Eligibility

Special eligibility for the education has a graduate that has passed examinations in courses in the subject area/specialization or courses in the subject area/specialization relevant areas for at least 90 credit points or who otherwise has acquired sufficient knowledge.

Examples of educational programs that give special eligibility in Hydrology and Earth Science with specialization in Environmental Analysis are Natural Science Programs with specialization in Hydrology as well as program in Environmental and Water Engineering. Examples of programs that give special eligibility in Earth Science with specialization in Physical Geography are Natural Science Programs with specialization in Physical Geography as well as program in Environmental and Water Engineering. Whoever wishes to be admitted to third-cycle education and does not qualify for special eligibility can invoke this as a reason for a priority when applying for additional education.

Admission

Applicants for third-cycle studies must submit an application to the Head of the Department of Earth Sciences. Admissions to doctoral studies take place continuously during the year.

At the time of admission, the financial assistance plan must be provided 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.
The research studies will begin with an introductory essay that counts as a course of 15 higher education credits. The introductory essay aims to rapidly guide the doctoral student into the current literature and the early practice at writing. The purpose of the introductory essay is to give a realistic focus on subsequent research. If there are no special reasons, which shall be presented in the annual revision of the individual study plan, the introductory essay should be completed during the first 18 months.

The PhD student shall present his/her progress in a half-time seminar if the education does not contain a licentiate degree. The PhD student must have received her/his introductory essay and mandatory courses (see below) approved before the licentiate or half-time seminar can be implemented.

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 are in significant degree taken from outside the department where the selection of courses is limited. The range of courses offered is revised continuously.

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.

In some cases, can lower level courses get credited as graduate courses. Normally, such courses are valued at half the score. Examples of courses that may be included are numerical analysis, environmental analysis, electronics and oceanography.

Examples of courses that are more or less regularly given at the Air, Water and Landscape Sciences program are:

Fully or partially overlapping core courses and graduate courses:
- Statistical analysis and modeling of water resources
- Environmental analysis
- Glaciology and glacial processes
- Environmental changes in the geological time scal

Graduate Courses:
- Management of uncertainty in modeling

Other courses can also be given - for details see the Air, Water and
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 60 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

In addition to the third-cycle studies providing possibilities to a continued research career, it is desirable that doctoral students have the opportunity to gain teaching qualifications during their studies. Active participation in information activities (the so-called third task) is also seen positively.

It is desirable that the doctoral student, in conjunction with the defense, writes a popular science essay in Swedish summarizing the Thesis.