



Programme syllabus

Faculty of Technology

Nätverkssäkerhet, 180 högskolepoäng

Network Security Programme, 180 credits

Level

First Level

Date of Ratification

Approved 2009-12-15

Revised 2014-01-24 by the Faculty Board within the Faculty of Technology

The programme syllabus is valid from autumn semester 2014

Prerequisites

General entry requirements and Mathematics 3c or Mathematics D (Field-specific entry requirements 8/A8).

Description of Programme

The degree programme will provide students with a good knowledge of the computer science field with a focus on network and data security. Studies prepare the student for work in computer intensive environments where security requirements are high. In addition, the programme will prepare the student for further study at second (advanced) level in computer science.

The programme will provide the student with the theoretical and practical knowledge of how computer networks are structured, how networks are managed and administered and how to work with security-related problems associated with computers and networks.

Network security primarily focuses on computer science, but also incorporates some elements from Mathematics and Informatics. Subjects included are information security, computer security, encryption and security in distributed systems.

Objectives

Knowledge and understanding

For a Degree of Bachelor students must

- demonstrate knowledge and understanding in their main field of study, including knowledge of the scientific basis of the field, knowledge of applicable methods in the field, in-depth knowledge of some part of the field and a general sense of current research issues.

Skills and abilities

For a Degree of Bachelor students must

- demonstrate an ability to seek, gather and critically interpret information that is relevant to a problem and to critically discuss phenomena, issues and situations;
- demonstrate an ability to independently identify, formulate and solve problems and to perform tasks within specified time limits;
- demonstrate an ability to present and discuss information, problems and solutions in dialogue with different groups, orally and in writing; and
- demonstrate the skills required to work independently in the field that the education concerns.

Judgement and approach

For a Degree of Bachelor students must

- demonstrate an ability to make assessments in their main field of study, taking into account relevant scientific, social and ethical aspects;
- demonstrate insight into the role of knowledge in society and into people's responsibility for how knowledge is used; and
- demonstrate an ability to identify their need of further knowledge and to upgrade their capabilities.

Programme-specific objectives

Knowledge and Understanding

Upon completion of the degree programme, students should be able to demonstrate:

- a good knowledge of various computer security threats and how these can be handled,
- a good knowledge of the structure and composition of computer networks, and
- a good knowledge of concepts, methods and tools in the field of software engineering and computer security

Skills and abilities

Upon completion of the degree, the student should be able to:

- collect, summarize and present technical material,
- examine, evaluate and implement security solutions in complex computing environments and
- implement and document a software development project (individually or in groups).

Judgement and approach

Upon completion of the degree, the student should be able to:

- evaluate and respond to ethical and moral problems in connection to computer crime, surveillance and privacy.

Content

Organization

A programme director is responsible for the administration of the programme. A programme council is established and is responsible for the quality assurance routines of the programme, the programme's on-going development and relevance to the outside world.

Programme Overview

The study programme comprises 180 credits and includes a final degree dissertation project of 15 credits.

The programme consists primarily of courses in Computer Science. These are divided into general introductory courses, advanced courses in key areas and courses in the study programme's specialization, network security.

In addition to courses in computer science there are also courses in other subjects, mainly Mathematics. These courses aim to prepare students for in-depth courses in Computer Science and to provide students with a solid background as a basis for their future professional role.

The study programme's objectives are fulfilled in varying degrees by individual courses given within the study programme. Knowledge of software engineering is for instance given in a variety of courses, while skills in security are provided in network security courses. For all objectives, there are several different courses meeting these objectives.

The programme can be studied entirely in English and international students participate in many of the courses. Parts of the programme can also be studied in Swedish.

Programme Courses

Year 1

Computer Science (G1N), 7.5 credits * - Basic program language theory and programming skills. Use of different algorithms and data types.

Computer Science (G1F), 15 credits * - Further skills in programming. Introduction in software development methods, tools and how to work in projects.

Elective courses, 7.5 credits – There are two options. The first option is an introductory course in academic English, both in writing and orally. The second option is an introduction in Computer Science with a focus on methods for problem solving.

Technical Information and Communication (G1F), 7.5 credits * - Focus is on the students ability to create an academic report and present it orally. The course contains literature search, how to make references, structures of a report and tools to create it.

Mathematics (G1N) 7.5 credits - Introductory in mathematics which deals with numbers, algebraic expressions, equations, functions, trigonometry, exponential functions, logarithm, prime numbers, divisors, combinatorics and complex numbers.

Mathematics (G1F), 7.5 credits – Discrete mathematics with further studies in number theory, set theory, induction, relations, combinatorics and graph theory.

Network Security (G1F), 7.5 credits * - Introduction in IT Security. Concepts like risk, threat and security services are introduced and exemplified. Focus is on security for a stand alone computer system.

Year 2

Computer Science (G1F), 15 credits * - This is a block of general core courses in Computer Science treating areas like Object oriented analysis and design and Operating system. Object oriented analysis and design builds on the basic programming courses but focus is on the object abstraction. In Operating systems basic concepts like processes, memory management and file systems is studied.

Computer Engineering (G1F), 7.5 credits – Computer Engineering aims at giving an understanding on the connection between hardware and software. Computer organization and low level programming are important modules.

Network Security (G1F), 22.5 credits * - This block have two main parts. The first part is about the foundations for data communication with a focus on protocols and network programming. The second part is more practical and covers system and network administration.

Mathematics (G1F), 7.5 credits – A course giving the basics in encryption and code theory. Focus is on encryption algorithms and their properties.

Elective courses, 7.5 credits

Year 3

Computer Science (G1F), 15 credits * - This block give further knowledge in two important areas within Computer Science; Data bases and Web Programming.

Network Security (G2F), 15 credits * - This block contains courses in IT Security building on previous courses in security and networking. Focus is on IT Security in networks, both communication security and device security.

Elective courses, 15 credits

Degree Project (G2E), 15 credits *

* Courses in the main subject area of Computer Science

All courses except elective courses are obligatory.

Detailed descriptions of the courses are given in separate course syllabuses.

The sequence in which courses are provided may change from the outline given above.

Work Experience

During the programme, students will meet representatives from working life at regular intervals. Several courses involve the participation of guest speakers in teaching. In a couple of courses projects are carried out together with companies or other organizations. Degree dissertation work can be conducted in cooperation with a company.

Studies Abroad

During the third year of the programme, studies abroad can be arranged over one or two terms within the framework for the degree programme. Course selection is carried out in consultation with the programme director to ensure future validation within the degree programme.

Scope of Programme

Computer science, the main subject in this study programme, is largely about developing and adapting new technologies for use by human beings. The target audience for this is increasingly international. Ethical and legal questions around IT security are present in many of the programme's courses. Concepts like usefulness, user experience, target group adaption, availability, etc. are common in many courses. Thus, the concepts of sustainable development, gender and equal opportunities, diversity and internationalization constitute natural parts of the degree programme.

Quality Development

Course evaluations are carried out for all courses in the programme. Every year there is also an annual programme evaluation. It is predominantly the programme council that monitors quality assurance and ongoing development of programme. Students are represented in all these bodies and participate in course and programme evaluations. Both the programme and course evaluations are filed and are available for inspection at the University.

Degree Certificate

After completing programme studies, corresponding to the requirements expressed in the Higher Education Ordinance Degree Ordinance as well as Linnaeus University Local Degree Ordinance, the student may apply for a degree.

Students who have completed the Network Security Programme may obtain the following degree:

Filosofie kandidatexamen med inriktning mot nätverkssäkerhet (Huvudområde: Datavetenskap)

Bachelor of Science with specialisation in Network Security. Main field of study: Computer Science.

The degree certificate is bilingual (in Swedish/English). The Degree Certificate is accompanied by a Diploma Supplement (in English).

Other Information

For the student to be admitted to further studies within the programme the following requirements for totals of completed higher education credits within the program have to be met:

1 to begin term 3: At least 45 credits in total
of which at least 22.5 credits should be in Computer Science.

1 to begin term 5: At least 90 credits in total

The degree certificate is bilingual (in Swedish/English). The Degree Certificate is accompanied by a Diploma Supplement (in English).

Students who do not meet these requirements must obtain an agreement for an individual programme of study drawn up by the programme manager.

In some courses excursions or practical training that may require travelling to various organizations is part of the programme. The student will normally bear the costs of these trips themselves.