Linnæus University

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Programme syllabus

Faculty of Technology

Programvaruteknik, 180 högskolepoäng
Software Technology 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 D or Mathematics 3c (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 software technology. Studies will prepare for work in organisations where software is used and developed. In addition, it will prepare students for further studies at second (advanced) level in computer science.

Today, computers used in all sectors of society. There is therefore a need for trained professionals to develop the software that controls current and future systems. Both large and small companies / organisations will have a need for software developers and operators of their 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 have:
- a good knowledge of theories and methods of problem solving,
- a good knowledge of theories and methods of software engineering in different programming languages, and
- a good knowledge of the concepts, methods and tools in the field of software technology

Skills and abilities
Upon completion of the degree programme, the student will be able to:
- collect, summarize and present technical material,
- specify, design, implement, evaluate and document software systems, and
- implement and document a software development project (individually or in groups).

Judgement and approach
Upon completion of the degree programme, the student will be able to:
- evaluate different programming techniques, and select appropriate technology for a given problem.

Content

Organization
A programme director will have overall administrative responsibility for the programme. A programme council is established and is responsible for the quality assurance routines of the programme, its development and connection with the outside world.

Programme Overview
The study programme consists of 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 degree programme's area of specialization in software technology.

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 a solid foundation for students in their future professional role.

The degree programme's objectives are fulfilled in various extents by individual courses offered within the framework of the programme e.g. knowledge of software technology is part of the majority of courses in the programme while skills in dealing with technical material are included in the course in information and communication technology and in

project 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.
Software technology (G1F), 7.5 credits * - Introduction in Software Engineering. The course focus on tools for different phases in the development process like modelling, configuration management and testing.

Year 2

Computer Science (G1F), 22.5 credits * - This is a block of general core courses in Computer Science. One part is about the basics in data communication with a special emphasis on fundamental protocols and network programming. A second part is about basic Operating systems basic concepts like processes, memory management and file systems. The last part introduces theoretical concepts in Computer Science like finite automata, regular expressions, context free grammars and first order predicate calculus.
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.
Software technology (G1F), 7.5 credits * - Object oriented analysis and design that builds on the basic programming courses but with a focus on the object abstraction.
Software technology (G2F), 22.5 credits – A block of courses giving further knowledge in Software Engineering where each step in the process is studied in both theory and practice. Phases in the process like analysis, design, configuration and testing are studied.

Year 3

Computer Science (G1F), 15 credits * - This block give further knowledge in different important areas within Computer Science. It contains Database theory, advanced algorithms and their properties and finally advanced data structures e.g. graphs.
Software technology (G1F), 7.5 credits * - Introduction to Web Programming using different frameworks and tools.
Software technology (G2F), 15 credits * - Further courses introducing advance techniques and concepts mainly in Web Programming and in Software architectures in which maintenance of product families is included.
Elective courses, 7.5 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 in the programme are offered may vary from time to time.

Work Experience
During the programme, students will meet representatives from working life at regular intervals . Several courses involve the participation of guest speakers in the 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 courses. Thus, the concept of sustainable development, gender and equal opportunities, diversity and internationalization are a natural part 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.

Those who have completed the Software Technology Programme may obtain the following degree:

Filosofie kandidatexamen med inriktning mot programvaruteknik (Huvudområde: Datavetenskap)

Bachelor of Science with specialisation in Software Technology.
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 completed credits within the programme have to be met:
• to begin term 3: at least 45 credits in total of
which at least 22.5 credits should be in Computer Science.
• to begin term 5: at least 90 credits in total of
which at least 45 credits should be in Computer Science.
Students who do not meet these requirements must consult the programme director to draw up an individual study plan.

In some courses excursions or practical training that may require travel to various organizations are part of the programme. Students must normally bear the costs of these trips themselves.