



## Programme syllabus

Faculty of Technology

Utveckling och drift av mjukvarusystem, 180 högskolepoäng  
Software Development and Operations, 180 credits

### Level

First Level

### Date of Ratification

Approved by the Faculty Board within the Faculty of Technology 2014-12-12  
The programme syllabus is valid from autumn semester 2015

### Prerequisites

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

## Description of Programme

The education will prepare for professional roles in areas requiring skills in development and operations of software systems. The program is computer science with a specialization in software development as well as the operations of software systems. The program mix software development courses with courses in system administration and IT security. Iterative development models are taught to prepare the student for an Agile approach in a changing industry. Students are trained in software development with continuous delivery and sustainable operation.

## Objectives

### *Knowledge and understanding*

For a Degree of Bachelor students must:

- demonstrated knowledge and understanding in the main field of study, including awareness of the disciplinary foundation of the field and knowledge of some applicable methodologies in the field.

### *Competence and skills*

For a Degree of Bachelor students must:

- demonstrated the ability to search for, gather and critically interpret the relevant information in order to formulate answers to well defined issues in the main field of study
- demonstrated the ability to identify, formulate and solve problems and to complete tasks within specified time limits,
- demonstrated the ability to present and discuss his or her knowledge with different audiences, and
- demonstrated the skills required to work autonomously with specific tasks in the main field of study.

### *Judgement and approach*

For a Degree of Bachelor students must

- demonstrate skills in the major field of study make judgments with respect to the relevant scientific, social and ethical aspects,
- demonstrate insight into the role of knowledge in society and people's responsibility for how it is used, and
- ability to identify their need of further knowledge and develop their skills.

### **Programme-specific objectives**

#### *Knowledge and understanding*

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

- demonstrate knowledge of the theories and methods of problem solving in in the educational field,
- demonstrate knowledge of the theories and practices of software engineering in different programming languages, and
- demonstrate knowledge of the theories and methods for continuous delivery and operation of software systems.

#### *Competence and skills*

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

- programming robust applications with high code quality,
- manage and implement engineering development of software systems,
- develop and maintain software systems for continuous updating, and
- deploy and maintain various server system via automated processes.

### *Judgement and approach*

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

- evaluate various software development solutions and choose the relevant technologies for a given problem, and
- evaluate different operational solutions, cloud-based as well as private, and choose the correct solution for a given software system.

## **Content**

### *Organization*

The program is three years, but the opportunity is given to levy a general degree in computer science after two years.

### *Program Overview*

Education of a 180 credits, 3 years of study, and a final degree dissertation project of 15 credits.

The program consists primarily of courses in computer science. These are divided into general introductory courses, advanced courses in key areas, as well as courses in the program specialization.

In addition to courses in computer science courses in other subjects can be included, such as media technology and informatics. These courses aim to prepare students for advanced courses in computer science and to strengthen the student in their future profession.

The education's various learning outcomes are achieved in different degrees in each course. For example, given the knowledge of software engineering in several courses while proficiency in server operations and maintenance are given in system

administration courses. For all of the objectives, there are several courses where the objectives are to learning.

Students select courses from the program, or other equivalent courses after interest, to their own profile in consultation with the program. The prerequisites for the various courses and degree requirements for the degree must always met.

### **Year 1**

- Introduction to Programming 7.5 credits, G1N \* (Construction of well-structured programs in JavaScript.)
- Web Technology 1 7.5 credits, G1N (Basic web design with client-based technology.)
- Problem Solving and Programming 7.5 credits, G1N \* (Introduction to object-oriented programming techniques in Java programming language, focusing on object-oriented theory and practical programming skills.)
- Software Engineering 7.5 credits, G1F \* (Introduction to mjukaruutveckling with a focus on processes for software development.)
- Programming and Data Structures 7.5 credits, G1F. \* (Advanced course in object-oriented programming (Java), provides specialized knowledge of object-oriented modeling and an introduction to algorithms and data structures.)
- System Administration 1 7.5 credits, G1N \* (Introduction to network and server administration.)
- Individual software development projects 7.5 credits, G1F. \* (Implementation of a software project in which a working software will be developed with the help of the theoretical and practical considerations given in the previous courses.)

Courses that are possible to replace in consultation with the program:

- Client-Based Web Programming 7.5 credits, G1F \* (Programming the browser APIs.)

### **Year 2**

- Object Oriented Analysis and Design using UML 7.5 credits, G1F. \* (Knowledge of how systems can be described and developed using an object oriented approach to ensure long-term sustainability and quality.)
- System Administration 2 7.5 credits, G1F \* (Specialization in network and server administration and server virtualization.)
- Software testing 7.5 credits, G1F \* (Web-based software development with high code quality.)
- Database Technology 7.5 credits, G1F \* (Methods and theories of database design. Query Language, Document and relational databases, SQL.)
- Software Engineering - Design 15 credits, G2F \* (Advanced techniques and methods for software design.)
- Server-based Web Programming 7.5 credits, Computer Science, G1F\* (Construction of Web server based applications and understanding of different types of web servers and its communication with the web client)

Courses that are possible to replace in consultation with the program:

- Computer Science, Independent Project 7.5 credits, G1E \* (Thesis extensive theoretical and experimental work, with accompanying report writing and oral presentation.)
- Elective course in another subject

### **Year 3**

- Server Configuration Management 7.5 credits, G1F \* (Knowledge of server configuration management, server automation and hybrid cloud management.)
- Internet security, G2F \* (Threats and security mechanisms for computer and software system that uses the Internet.)
- Continuous delivery 7.5 credits, G1F \* (Theories and techniques for continuous delivery of software systems.)
- Software Architectures 7.5 credits, G2F \* (Introduction to the architecture design, patterns and tactics related to the quality standards.)
- Thesis 15 credits, G2E \*

Courses that are possible to replace in consultation with the program:

- Entrepreneurship 7.5 credits, G1N (Entrepreneurship and basic business development.)
- Elective course in another subject

\* Course in the main field.

The courses in the program may change places.

### **Work Experience**

The program's students have, on several occasions during the program meet representatives from the world of work. Several courses invite guest speakers. In a couple of the courses undertaken projects can be located or carried out together with companies or other organizations. These can be advantageously carried out in cooperation with a company.

### **Studies Abroad**

In particular the third year studying abroad can be conducted in one or two semesters. Course selection is made in consultation with the program coordinator to facilitate a subsequent validation within the training program.

### **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**

Continuous evaluation and improvement of the program is done, in consultation with students in the form of programme advisory board, through academic evaluations, and through collaboration with businesses and other stakeholders, and by benchmarking against other colleges and Universities.

Summaries of programme committee are available on the program website. Program Coordinator is responsible for the evaluation undertaken and that any quality problems in the program are fixed.

## 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 Development and Operations 180 credits may obtain the following degree:

Filosofie kandidatexamen med inriktning mot utveckling och drift av mjukvarusystem  
(Huvudområde: Datavetenskap)

*Bachelor of Science (Main field of study: Computer Science)*

The Degree Certificate is accompanied by a Diploma Supplement (in English).

## Other Information

The majority of the education learning resources are open through the courses' public Web sites.

### **For the campus**

The education requires its own access to the laptop.

### **For distance**

The education requires its own access to a computer, headset, webcam and internet connection.