Study Plan

Master Programme in Computer Science

Programme Code: TAMCS

Programme Title: Master Programme in Computer Science

Credits: 120 ECTS

Approval: The programme Study Plan was approved by the Faculty Board of Health, Science and Technology on 14/06/2018 and is valid from the autumn semester of 2019 at Karlstad University.

Language of Instruction: English

Degree Level: Master

Degree Type: General

Prerequisites: Upper Secondary English course B or equivalent, and a Bachelor of Science degree of 180 ECTS with at least 90 ECTS in Computer science, or equivalent, including the following:
Programming Technique 7.5 ECTS
Software Development Methodology 7.5 ECTS
Operating Systems 7.5 ECTS
Computer Networking I 7.5 ECTS
Mathematical Statistics 7.5 ECTS
(or equivalent courses to the above named)

Introduction
The aim of the programme is that students acquire advanced qualifications in the field of Computer Science, with a specialisation in Computer Networking, Computer Security, and Software Engineering.
Objectives
For a Master’s degree in engineering students must meet the following requirements as specified in the Higher Education Ordinance (SFS 2008:944):

Knowledge and understanding
Upon completion of the master programme students must demonstrate knowledge and understanding of Computer Science as well as substantially deeper knowledge within Computer Networking, Computer Security, and Software Engineering together with insight into research and development work within Computer Networking, Computer Security, and Software Engineering.

Skills and abilities
Upon completion of the master programme students must
- demonstrate ability to critically and systematically integrate knowledge and analyse, evaluate and handle complex phenomena, issues and situations even with limited information,
- demonstrate critical, independent and creative ability to identify and formulate issues, and to plan and carry out qualified tasks using appropriate methods within specified time limits, so as to contribute to knowledge development and evaluate the work,
- demonstrate ability to clearly present and discuss their conclusions and the data and arguments behind them in dialogue with different groups, orally and in writing, in national and international contexts, and
- demonstrate the ability required to participate in research and development or to work independently in other qualified professions.

Judgement and approach
Upon completion of the master programme students must
- demonstrate ability to make assessments in Computer Networking, Computer Security, Software Engineering taking into account relevant scientific, social and ethical aspects, and show awareness of the ethics of research and development,
- demonstrate insight into the potential and limitations of science, its role in society and people’s responsibility for its use, and
- demonstrate ability to identify their need of further knowledge and continuously upgrade their knowledge.

Programme Structure
The programme consists of terms the last of which includes the degree project. The first term consists of preparatory courses in data communication, computer security, software engineering, and research methods. The second term consists of advanced elective courses in computer science. The third semester consists of advance elective course that enable students to create their own profile. Parts of the studies are in form of projects. Students will practice to present their work in writing and orally.

Programme Curriculum
The programme consists of 120 ECTS including the final project, of which a minimum of 75 ECTS is in Computer Science and 90 ECTS is on the advanced level.

År 1
Year 1 provides a common base within Computer Networks, Computer Security, Software Engineering and Research Methods. It contains mandatory courses of total 30 ECTS, one course in each of the four areas:

Mandatory Courses (30 ECTS)
Distributed Systems and Applications, 7.5 ECTS
Computer Security I, 7.5 ECTS
Software Systems Architecture, 7.5 ECTS
Research Methods in Computer Science, 7.5 ECTS

The first year also consists of course for deepening the student’s knowledge in the three areas of data communication, computer security and software engineering. Students choose two of these three areas and attend courses of 15 ECTS for each area they chose.

Selectable courses are for example:

*Datakommunikation:*
Mobile and Wireless Systems, 7.5 ECTS
Performance Modeling and Simulation, 7.5 ECTS
Topics in Computer Networking, 7.5 ECTS

*Datasäkerhet*
Datosäkerhet II, 7.5 ECTS
Inbyggd integritet, 7.5 ECTS
Topics in Computer Security, 7.5 ECTS

*Mjukvaruutveckling*
Software Engineering II, 7.5 ECTS
Topics in Software Engineering, 7.5 ECTS

Other courses than the listed can be selected as long as they fall into one of the areas listed above. Each selection is subject to approval by the program director. If a course is elected that falls into more than one area, the ECTS obtained upon completion of the course may only be counted for one of the areas.

**Year 2:**
During this term, the student can take elective courses which allow the student to further shape his/her own profile. The student can for example choose to deepen his/her knowledge of Computer Science by undertaking a research project or an external project in industry or another organisation. Alternatively, the student can take courses in another subject area in order to create a wider profile.

The student also has the possibility to study internationally during this term.

Mandatory Courses (30 ECTS)
Degree Project, 30 ECTS

**Degree Title**
Degree of Master of Science
Major: Computer Science

**Credit Transfer**
According to the "Higher Education Ordinance (Ch. 6 ½ 12-14), students may transfer credits from previously completed university courses subject to approval.

**Additional information**
In order to start the final degree project, students must have obtained at least 60 ECTS from the courses in the programme.

The local regulations for first and second cycle education at Karlstad University stipulate the obligations and rights of students and staff.