



Faculty of Health, Science and Technology

Programme Study Plan

Bachelor of Science in Engineering: Computer Science

Programme Code	TGDDI
Programme Title	Bachelor of Science in Engineering: Computer Science Högskoleingenjör Datateknik
ECTS Credits:	180 ECTS credits
Approval	The Programme Study Plan was approved by the Faculty Board of Health, Science and Technology on 24 May 2017 and is valid from the autumn semester of 2017 at Karlstad University.
Language of Instruction	Swedish and English
Degree Level	Bachelor's
Degree Type	Professional and/or general degree
Prerequisites	General admission requirements plus upper secondary school level Physics 2 and Mathematics 3c (field-specific eligibility A8 with the exception of Chemistry 1), or field-specific eligibility 8 with the exception of Chemistry A.

Introduction

This engineering programme is designed to provide qualifications for working in the field of computer science with opportunity to specialise in, for example, computer security, Internet technology, or programme development.

Aims

Theory and application continuously alternate in a way that promotes learning and reflection. The theory components provide knowledge and understanding while practical exercises develop skills and abilities. The students' attitudes and judgement ability develop and increase as a natural part of the educational progression.

Knowledge and understanding

For a Degree of Bachelor of Science in Computer Engineering, students should:

- demonstrate knowledge of the disciplinary foundation of computer science and its proven experience as well as awareness of current research and development work, and
- demonstrate broad knowledge of computer science and relevant knowledge of mathematics and natural science

Competence and skills

For a Degree of Bachelor of Science in Computer Engineering, students should:

- demonstrate the ability to identify, formulate and deal with computer science issues independently and creatively using a holistic approach and to analyse and evaluate technological solutions,
- demonstrate ability to plan and carry out tasks in computer science within specified parameters, using appropriate methods,
- demonstrate ability to use knowledge critically and systematically and to model, implement, predict and evaluate computer science artefacts and processes based on relevant information,
- demonstrate ability to design and manage products, processes and systems taking into account people's situations and needs as well as society's objectives for economically, socially and ecologically sustainable development,
- demonstrate the capacity for teamwork and collaboration with various constellations, and
- demonstrate the ability to present and discuss information, problems and solutions in speech and writing and in dialogue with different audiences.

Judgement and approach

For a Degree of Bachelor of Science in Computer Engineering, students should:

- demonstrate ability to make assessments based on relevant disciplinary, social and ethical aspects,
- demonstrate insight into the potential and limitations of technology, its role in society and responsibility for its use, including social and economic aspects as well as environmental and work environment aspects, and
- demonstrate ability to identify their need of further knowledge and to continuously upgrade their skills.

Independent project (degree project)

A requirement for the award of a Degree of Bachelor of Science in Engineering is completion by the student of an independent project (degree project) for at least 15 credits.

Programme Structure

In the first two years of the programme, students study basic courses in primarily computer science, but also mathematics and electrical engineering.

In the third year, students take specialisation courses in computer safety, Internet technology, programme development or other areas of computer science. In addition, there is one semester of optional courses. Students are free to study further courses in computer science to enhance their major field or courses in other disciplines to create a unique degree profile. There are also opportunities to study abroad. Karlstad University had exchange agreements with universities in many countries. The International Office at the university can give more information.

A degree project, which is usually carried out in conjunction with a company, public agency, or one of the computer science research groups, concludes the study programme. The programme takes for the most part the form of lectures, laboratory work and project work.

Programme Curriculum

Basic courses

The following basic courses are taken during the first two years:

Computer science (67.5 ECTS credits)

- Programming techniques (7.5 ECTS cr.)
- Software development methodology (7.5 ECTS cr.)
- Computer engineering (7.5 ECTS cr.)
- Operating systems (7.5 ECTS cr.)
- Data structures and algorithms (7.5 ECTS cr.)
- Computer networking I (7.5 ECTS cr.)
- Database techniques (7.5 ECTS cr.)
- Green computing and real-time systems (7.5 ECTS cr.)
- Programming language (7.5 ECTS cr.)

Mathematics (30 ECTS credits)¹

- Mathematics for engineers I (7.5 ECTS cr.)
- Mathematics for engineers II (7.5 ECTS cr.)
- Discrete mathematics (7.5 ECTS cr.)
- Mathematical statistics (7.5 ECTS cr.)

Electrical engineering (22.5 ECTS credits)²

- Circuits analysis (7.5 ECTS cr.)
- Analogue electronics (7.5 ECTS cr.)
- Digital electronics (7.5 ECTS cr.)

Specialisation courses

The following mandatory courses are taken during the third year:

- Software engineering (7.5 ECTS cr.)
- Computer security I (7.5 ECTS cr.)
- Project work in computer science (7.5 ECTS cr.)
- A course of 7.5 ECTS credits in the area of humans, technology and society

Optional courses (15 ECTS credits)

Optional courses of 15 ECTS credits are included in the programme. A number of specialisation courses in computer networking, information security and software engineering are offered during this period, but we also encourage students to create a broader degree profile by selecting courses in other subjects.

Degree project (15 ECTS credits)

- Computer Science: Degree project/Bachelor's project (15 ECTS cr.)

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Högskoleingenjörsexamen Datateknik

Credit Transfer

Students have the right to transfer credits from previously completed university courses in Sweden or abroad, subject to approval according to the current regulations.

Additional information

¹ The courses can, after consultation with the programme coordinator, be replaced by other courses in mathematics relevant to the programme.

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