



Faculty of Health, Science and Technology

Programme Syllabus

Study Programme in Engineering – Computer Science

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| Programme Code: | TGDDI |
| Programme Title: | Study Programme in Engineering – Computer Science Högskoleingenjörsprogrammet i datateknik |
| Credits: | 180 ECTS credits |
| Approval: | The programme syllabus was approved by the Faculty Board of Health, Science and Technology on 19 March, 2020, and applies as of the autumn semester of 2020, Rev. 1 Dec. 2022. |
| Language of Instruction: | Swedish and English |
| Education Cycle: | First cycle |
| Degree Type: | Degree of Bachelor of Science in Engineering. The programme also meets the requirements for Degree of Bachelor of Science. |
| Degree Type: | Degree of Bachelor of Science in Engineering Computer Science Högskoleingenjörsexamen Datateknik |
| Entry Requirements: | General admission requirements and Physics 2, Mathematics 3c/Mathematics D |

Introduction

This programme is designed to provide qualifications for working in the field of Computer Science with the opportunity to specialise in, for example, cybersecurity, computer networking, or software development. Graduates are equipped to work in the IT sector, for example as programmers, IT consultants, or tech industry engineers.

Programme Outcomes

The Higher Education Ordinance, System of Qualifications, specifies the outcomes required for certain degrees. The outcomes for a Degree of Bachelor of Science in Engineering are as follows:

Knowledge and understanding

For a Degree of Bachelor of Science in Engineering the student shall

- demonstrate knowledge of the disciplinary foundation of the engineering field chosen and proven experience in this field as well as awareness of current research and development work, and
- demonstrate broad knowledge in the engineering field chosen and relevant knowledge of mathematics and the natural sciences.

Competence and skills

For a Degree of Bachelor of Science in Engineering the student shall

- demonstrate the ability to identify, formulate and deal with issues autonomously and creatively using a holistic approach and to analyse and evaluate technological solutions
- demonstrate the ability to plan and using appropriate methods undertake tasks within predetermined parameters
- demonstrate the ability to use knowledge critically and systematically to model, simulate, predict and evaluate series of events on the basis of relevant information
- demonstrate the ability to design and manage products, processes and systems while taking into account the circumstances and needs of individuals and the targets for economically, socially and ecologically sustainable development set by the community
- 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 Engineering the student shall

- demonstrate the ability to make assessments informed by relevant disciplinary, social and ethical aspects
- demonstrate insight into the possibilities and limitations of technology, its role in society and the responsibility of the individual for how it is used, including social and economic aspects as well as environmental and occupational health and safety aspects, and
- demonstrate the ability to identify the need for further knowledge and undertake ongoing development of his or her 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.

Local outcomes

In addition to the national outcomes as stated in the Higher Education Ordinance, the student shall acquire knowledge in the humanities, social sciences, and gender studies that is relevant to the engineering role.

Programme Structure

The first two years of the programme comprise basic courses in primarily Computer Science,

but also Mathematics and Electrical Engineering. Many courses for the first two years are taken with students from the Master of Science in Computer Engineering Programme and the Bachelor Programme in Computer Science.

In the third year, students take specialisation courses in Cybersecurity, Computer Networking, Software Development, or other areas of Computer Science. There is a lot of interaction between the programme and the department's research. Students can also take optional courses for 15 ECTS credits. 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.

A degree project, which is usually carried out in partnership with a company, government agency, or one of the Computer Science research groups, concludes the study programme. The programme primarily takes the form of lectures, laboratory work, and project work.

In the course of the programme, students will have the opportunity to interact with the larger community to network with future employers and find an interesting degree project. These opportunities are created through activities connected to SNITS, a network group that facilitates exchange between business and IT students at Karlstad University, and through guest lectures.

Internationalisation

Karlstad University wants to promote collaboration and exchange with other universities. Karlstad University has partnerships with many other universities in Sweden and abroad, and has an organisation in place to support students who want to make use of this opportunity. Students are therefore encouraged to complete part of the programme at a university abroad.

Students have the opportunity to complete a semester abroad during the third year. Some restrictions may apply with regard to course selection to ensure the programme outcomes can be met.

Programme Curriculum

The first two years comprise:

- Computer Science (at least 60 ECTS credits), including Programming Techniques, Software Development Methodology, Database Techniques, and Data Structures and Algorithms;
- Mathematics (30 ECTS credits)¹, including Mathematics for Engineers I and II, Discrete Mathematics, and Mathematical Statistics;
- Electrical Engineering (15 ECTS credits)², including Circuits Analysis and Digital Electronics;
- and a course of at least 7.5 ECTS credits in the area of humans, technology, and society.

The third year comprises:

- Computer Science (30 ECTS credits), including Sustainable Computing, Embedded Systems, and specialisation courses in Cybersecurity, Computer Networking, or another area of Computer Science;
- Optional courses for 15 ECTS credits;
- and a mandatory degree project in Computer Science (15 ECTS credits).

¹ Student can consult with the programme director to exchange courses for other courses in Mathematics relevant to the programme.

² Student can consult with the programme director to exchange courses for other courses in Electrical Engineering relevant to the programme.

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

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

This programme syllabus replaces the previous version approved [24 May, 2017, reg.no. HNT 2017/275] and applies as of the autumn semester 2020.