IT FACULTY

UNIVERSITY OF
GOTHENBURG

Computer Science, Master's Programme, 120 credits

Computer Science, Master's Programme, 120 högskolepoäng

Programme code: N2COS

Second cycle / Avancerad nivå

1. Confirmation

This programme syllabus was confirmed by the IT Faculty Board on 10-10-2018 (G 2018/510) and was last revised on 02-09-2021 (GU 2021/2277) to be valid from 29-08-2022, Autumn semester 2022.

Responsible Department/equivalent: Department of Computer Science and Engineering

2. Purpose

The aim of the programme is to equip students with the knowledge, skills, and abilities required for a successful professional career in a large variety of information technology areas, both in industry and in academia. The emphasis on modelling, design, and on conceptual abilities aims at providing students with a great flexibility, allowing them to adjust to emerging work requirements. In particular, the programme aims at enabling future IT professionals to conceive, design, and implement systems which are functional (i.e., delivering the correct service), maintainable (i.e., able to undergo modifications and repairs), and reliable. In addition, the programme also covers ethical aspects of computer science.

3. Entry requirements

A Bachelor's degree of 180 credits within the field of Computer Science or equivalent.

Independent project (degree project) of at least 15 credits; at least 15 credits from programming or equivalent; and at least 7.5 credits in discrete mathematics or equivalent.

Applicants must prove their knowledge of English: English 6 / English B from Swedish Upper Secondary School or the equivalent level of an internationally recognized test, for example TOEFL, IELTS.

Specific entry requirements for admission to a course within the study programme

Within the study programme there can be specific entry requirements for admission to individual courses. These specific entry requirements are documented in each course syllabus and state which entry requirements are necessary to be registered on a course within the study programme.

Selection

Selection is according to the Higher Education Ordinance and the University of Gothenburg admission regulations for education on first and second cycle.

4. Higher education qualification and main field of study

This programme leads to a Degree of Master of Science (120 credits) with a major in Computer Science (Filosofie masterexamen med huvudområdet Datavetenskap).

5. Outcomes

General outcomes for Degree of Master (120 credits)

Knowledge and understanding

For a Degree of Master (120 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and
- demonstrate specialised methodological knowledge in the main field of study.

Competence and skills

For a Degree of Master (120 credits) the student shall

- demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
- demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work
- demonstrate the ability in speech and writing both nationally and internationally to clearly report and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

Judgement and approach

For a Degree of Master (120 credits) the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

Local outcomes

Knowledge and understanding

For a Degree of Master of Science (120 credits) with a major in Computer Science the student shall

- be generally competent in the Computer Science discipline,
- be familiar with existing scientific knowledge in the major Computer Science areas,
- have the competence to increase and develop this through study,
- have a thorough mastery of parts of the relevant fields extending to the forefront of knowledge, i.e., latest theories, methods, and techniques, and
- be competent in acquiring new scientific knowledge.

Competence and skills

For a Degree of Master of Science (120 credits) with a major in Computer Science the student shall

- have a scientific approach, characterised by the development and use of theories, models and coherent interpretations,
- be competent in designing systems in accordance with predefined requirements
- be able to deal with the changeability of the design process through external circumstances or advancing insight
- have a critical attitude, and has insight into the nature of science and technology,
- have skills in the development and validation of models, and
- be able to consciously choose between modelling techniques.

Judgement and approach

For a Degree of Master of Science (120 credits) with a major in Computer Science the student shall

- possess general intellectual skills, i.e., competence in reasoning, reflecting, and forming judgements independently,
- be competent in cooperating and communicating, which includes adequate interaction, a sense of responsibility and leadership,
- be able to participate in a scientific or public debate about computer technology,
- take into account the context of computer science and technology in society,

- be aware of the origins of beliefs and methods in computing,
- be aware that decisions have social consequences, and can integrate these insights into her/his work, and
- be able to discuss the ethical consequences of actions within the computer technology.

6. Content and structure

The programme consists of a large number of courses that cover the major topics within Computer Science. The programme offers courses on topics such as computability; type theory; programming languages and the technology behind them; machine learning and AI; data science and big data; distributed computing and networking; hardware construction; graphics; natural language processing; human computer interaction and game design.

It is a particular feature of the programme that students enjoy a large degree of freedom in choosing courses. In spite of that, the studies of each individual student are guided by the study counsellor of the programme, whom the students are strongly recommended to consult when planning their course selection. The study counsellor guides the students to take a meaningful path through the variety of courses, developing a profile which matches both personal inclinations and prospective career opportunities.

The program constraints the freedom by a few rules: to complete the degree students must complete 120 credits of which at least 45 credits in second-cycle courses within the main field of study Computer Science, excluding the thesis project. In addition a Master's thesis project of at least 30 credits has to be completed within the main field of study Computer Science.

The following course is compulsory:

- DIT199 The Computer Scientist in Society, 7.5 credits.

In addition one of the following two courses have to be completed:

- DIT910 Master's Thesis in Computer Science and Engineering, 30 credits.
- DIT920 Master's Thesis in Computer Science and Engineering, 60 credits.

The academic year is divided into two semesters and four study periods. A semester includes two study periods, each of 15 credits. Students normally attend two courses in parallel in each study period.

The education is conducted in the form of lectures, seminars, teacher-led exercises, and tutoring as well as projects in which students apply and deepen their knowledge.

Language of tuition

The language of tuition is English.

7. Guaranteed admission

Students who follow the study programme at the prescribed pace are guaranteed admission to all compulsory and elective courses stated in the programme syllabus, provided that the student

in question is eligible for the course/courses provided that specific entry requirements are fulfilled and the student applies to the course within the study programme within the prescribed application period.

For elective courses outside the study programme local admission regulations are valid and there is no guaranteed admission.

8. Other information

Credit transfer of former education

In some cases, the student has the right to be given credit for former higher education according to the legislative regulations of the Higher Education Ordinance.

Evaluation

The courses of the study programme are evaluated according to each course syllabus. The result will be used for planning and implementation of upcoming courses. A summary is given to students at the start of the courses.

The study programme will be followed up and evaluated in accordance with the applicable *Policy för kvalitetssäkring och kvalitetsutveckling av utbildning vid Göteborgs universitet* (Policy for the Quality assurance and Quality Development of Education at the University of Gothenburg).

Revision of the syllabus

This syllabus is a revision of the syllabus confirmed by the IT Faculty Board, University of Gothenburg, on 07-03-2007 (reg. no. G 25 50/07) and revised on 17-03-2011 (reg. no. G 2011/52).