Mälardalen University

Syllabus - Master's Programme in Software Engineering

Scope	120.0 credits
Programme code	ZCS24
Valid from	Autumn semester 2021

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Decision instance	The Faculty Board
School	IDT
Registration number	2020/1234
Ratified	2012-09-27
Revised	2020-05-20
Specific requirements	A completed Bachelor's degree from an institution of higher education of three years or more, equivalent to 180 credits, of which at least 60 credits are within Computer Science or Computer Engineering including programming corresponding to 15 credits, and at least 22.5 credits in Mathematics/Applied Mathematics. A TOEFL test result, with a minimum score of 575 with a TWE score of at least 4.5 (PBT) or 90 with a TWE score of at least 20 (iBT) or an IELTS test result with an overall band score of at least 6.5 and no band score below 5.5 or equivalent is required.

About programme syllabus

The programme syllabus applies to the entire education period, starting with the academic year and the semester you started your education. The programme syllabus contains goals for the programme, contents and arrangement, but also requirements for special qualifications, etc.

Outcomes

Software affects us to an ever-increasing extent, both within industry and in our daily lives. Software Engineering deals with the design and development of high-quality software systems and is thus an increasingly important area of computer science. Students completing this programme are very attractive on the labour market nationally as well as internationally, both as experts in industry and in academia as doctoral students and future researchers.

After finishing the programme, students will be able to pursue careers in software development within different industrial sectors (e.g. home electronics, the automotive industry), information and service sectors (financial institutes, geographical information systems, transport services), consultancy, the public sector, the education sector and within academic research. After their studies, the students will be able to pursue careers as, for example engineers, project managers, system architects, programmers or researchers within the area.

Knowledge and Understanding

On completion of the degree programme the student shall:

For a Degree of Master (60 credits)

- demonstrade knowledge and understanding in the main field of study Computer Science, including both an overview of the field and specialised knowledge in the specialisation of Software Engineering as well as insight into current research and development work, and
- demonstrate specialised methodological knowledge in the main field of study Computer Science

For a Degree of Master (120 credits)

- demonstrate knowledge and understanding in the main field of study Computer Science including both knowledge of the field and a considerable degree of specialised knowledge in Software Engineering, as well as insight into current research and development, and
- demonstrate specialised methodological knowledge in the main field of study Computer Science

Aptitudes and Accomplishments

On completion of the degree programme the student shall:

For a Degree of Master (60 credits)

- demonstrate the ability to integrate knowledge and analyses, asses and deal with complex phenomena, issues and situatioins even with limited information,
- demonstrate the ability to identify and formulate issues autonomously as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames,
- demonstrate the ability in speech and writing to report clearly 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 employment in some ither qualified capacity

For a Degree of Master (120 credits)

- 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 adcanced tasks within predetermined time frames and so contibute 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 och her conlusions and the knowledge and arguments on which they are based i dialogue with different audiences, snd
- demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

Ability to Evaluate and Assess

On completion of the degree programme the student shall:

For a Degree of Master (60 and 120 credits)

- demonstrate the ability to make assassments in the main field of study Computer Science informed by relevant diciplinary, 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 ongong learning.

Language of instruction

The language of instruction is English, which includes all teaching, examination and literature, etc.

Contents

The programme includes 120 credits, including an independant project (degree project) in Computer Science, with specialisation in software engineering, at second-cycle level, comprising 30 credits. It is possible to finish the programme after one year, and students can, upon completion of courses and a passed 15 credits degree project, apply for a one-year master's degree if the degree requirements are fullfilled.

The programme consists of the following courses:

Year 1

For Degree of Master of Science (60 credits) in Computer Science with specialization in Software Engineering:

Computer science:
Software Engineering 1: Basic Course, 7.5 credits
Research Methods in Computer Science, 7,5 credits
Software Verification and Validation, 7.5 credits*
Safety Critical Systems, 7,5 hp*
Model-driven Engineering, 7,5 credits*
Thesis for the Degree of Master of Science (60 credits) in Computer Science with Specialization in Software Engineering, 15 credits*

Mathematics/applied mathematics:
Mathematics of Internet, 7.5 credits

For Degree of Master of Science (120 credits) in Computer Science with Specialization in Software Engineering:

Computer science:
Software Engineering 1: Basic Course, 7.5 credits
Research Methods in Computer Science, 7,5 credits
Software Engineering 2: Project teamwork, 7.5 credits
Software Verification and Validation, 7.5 credits*
Software Architecture, 7.5 credits*
Model-driven Engineering, 7.5 credits*
Software Development for Real-Time Systems, 7.5 credits*

Mathematics/applied mathematics:
Mathematics of Internet, 7.5 credits

Year 2
Computer science:
Industrial Systems in Cloud Computing, 7,5 credits*
Distributed Software Development, 7.5 credits*
Web Security, 7.5 credits*
Safety Critical Systems Engineering, 7.5 credits*
Thesis for the Degree of Master of Science (120 credits) in Computer Science with Specialization in Software Engineering, 30 credits*

*The course contributes to fulfill the degree requirements of courses at advanced level within the main field of study Computer Science with specialisation in Software Engineering for students who wish to apply for a Master of Science (60 or 120 credits) in Computer Science with Specialisation in Software Engineering.

Minor changes in the course list may occur due to continuous quality work.

Choices within the program

Students who have already taken similar courses are offered the possibility to choose among courses outside the recommended study plan. All courses are selected in consultation with the programme coordinator to ensure the fulfilment of requirements for a degree.

University degree

The degree programme is so designed that the studies will lead towards fulfilment of the requirements for the following degree(s):

- Degree of Master of Science (120 credits) in Computer Science with Spezialisation in Software Engineering
- Degree of Master of Science (60 credits) in Computer Science with Spezialisation in Software Engineering