



Programme syllabus

[An accessible version of the syllabus can be found in the Course and programme directory.](#)

Master's Programme, Software Engineering of Distributed Systems 120 credits

Masterprogram, programvaruteknik för distribuerade system

Valid for students admitted to the education from autumn 19 (HT - Autumn term; VT - Spring term).

This is a translation of the Swedish, legally binding, programme syllabus.

Programme objectives

Development of computer networks and communication technology provides a new technological foundation for designing software systems. The systems become distributed, reconfigurable and adaptive and their components employ a high degree of autonomy. The set of devices where distributed software applications may operate ranges from workstations to Personal Digital Assistants (PDA). Distributed computer environments also assume that information sources and control can be decentralized over the network. All this makes the process of developing distributed software systems significantly more complex than for centralized systems.

New technological developments create a great demand from industry in engineers who are able to design software systems utilizing these developments. Our Master program is intended to be an educational response to such industrial demand.

The program emphasizes combination of fundamental principles of distributed computing with modern methods of software systems design.

The program gives the students state-of-the-art knowledge of the field and develops their practical skills in order to meet current industrial requirements as well as ability to adapt to new developments of tomorrow technology.

Knowledge and understanding

Upon successful completion of the program the students shall:

- know basic methods of modern software development and data analysis
- understand a variety of approaches to software development and discuss their applicability boundaries, benefits, restriction and complementarities
- know basic Distributed AI methods for solving problems with decentralized control
- know basic concepts and principles of distributed systems
- understand distributed algorithms and have orientation about distributed architectures and middleware
- identify and describe examples of sustainability aspects related to distributed software systems
- have in-depth knowledge in the chosen area of specialization
- explain social, ethical and environmental aspects of sustainable development in the area of distributed software systems.

Skills and abilities

Upon successful completion of the program the students are able to

- use modern software development and data analysis methods and techniques in practical system development
- apply distributed AI methods in providing solutions to inherently distributed problems and to problems where expertise is distributed
- design, implement and maintain distributed software systems for a wide range of applications including, systems for peer-to-peer and cloud computing, systems with services oriented architecture, big data systems and internet-based systems
- based on various definitions of sustainable development illustrate and point out perspectives where progress within distributed software systems can be relevant for sustainable development in society.

Ability to make judgements and adopt a standpoint

The student shall

- show ability to make assessments taking into account relevant scientific, societal and ethic aspects as well as show awareness of ethical aspects of research and development work
- show insight into the possibilities and limitations of science, its role in society and the responsibility of humans for its use also from a sustainability perspective
- show ability to identify her/his need for additional knowledge and take responsibility for the development of his/her own knowledge
- show ability to compare and evaluate possibilities and limitations of distributed software systems in the society and how they are used from a sustainability perspective.

Extent and content of the programme

The programme comprises two years and 120 credits. Education level is second-cycle. The instruction language is English.

Eligibility and selection

General admission requirements and the following special admission requirements must be fulfilled in order to be admitted: Bachelor's degree in computer science or equivalent degree. Courses with mathematics, information technology or computer science equivalent to at least 90 credits.

The specific requirements may be assessed as not fulfilled if:

- The degree awarding institution is not considered to meet acceptable quality standards by the authorities of the country in which the institution is located.
- The degree does not qualify for admission to equivalent master level in the country where the degree is awarded.

The selection process is based on the following selection criteria: university, previous studies (for instance GPA, grades in specific subjects and English), motivation for the studies (for instance letter of motivation, references, thesis proposal and relevant work experience). The evaluation scale is 1-75.

Implementation of the education

Structure of the education

Each academic year consists of two semesters which are 20 weeks each, and each semester is further divided into two study periods. Each course in the program is offered in a specific period. During the first year mostly compulsory courses are taught. Elective courses are mostly taught in second year followed by master degree project.

Courses

The programme is course-based. Lists of courses are included in appendix 1.

60 credits must be obtained from the set of compulsory courses (this includes degree project), 30 credits must be obtained from the set of conditionally elective courses and 30 credits can be taken from elective courses.

The programme offers two specialization tracks: software track and data science track.

Grading system

Courses in the first and the second cycle are graded on a scale from A to F. A-E are passing grades, A is the highest grade. The grades pass (P) and fail (F) are used for courses under certain circumstances.

Grading scale is found in the course syllabus.

Conditions for participation in the programme

Participation requires admission to courses within the programme and course registration.

For further studies, special admission requirements for the course are to be fulfilled. Special admission requirements are listed in the respective course syllabus.

Degree project

The degree project is the final part of the education. The project work may begin when special admission requirements for the course are fulfilled.

Degree

Degree is entitled “Teknologie masterexamen” - Master of Science. The main field of study is stated in the text on the degree certificate. The text on the degree certificate states the educational programme, Software engineering of Distributed Systems, completed by the student.

Appendix 1 - Course list

Appendix 2 - Programme syllabus descriptions



Appendix 1: Course list

Master's Programme, Software Engineering of Distributed Systems (TSEDM)

General courses

Year 1

Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
ID2201	Distributed Systems, Basic Course	7.5 hp	Second cycle
ID2207	Modern Methods in Software Engineering	7.5 hp	Second cycle
ID2209	Distributed Artificial Intelligence and Intelligent Agents	7.5 hp	Second cycle

Optional courses

Code	Name	Credits	Edu. level
ID2010	Programming of Interactive Systems	7.5 hp	Second cycle
ID2012	Ubiquitous Computing	7.5 hp	Second cycle
ID2204	Constraint Programming	7.5 hp	Second cycle
ID2210	Distributed Computing, Peer-to-Peer and GRIDS	7.5 hp	Second cycle
IK2206	Internet Security and Privacy	7.5 hp	Second cycle

Year 2

Mandatory courses (37.5 Credits)

Code	Name	Credits	Edu. level
DA240X	Degree Project in Computer Science and Engineering, specializing in Software Engineering for Distributed Systems, Second Cycle	30.0 hp	Second cycle
II2202	Research Methodology and Scientific Writing	7.5 hp	Second cycle

Optional courses

Code	Name	Credits	Edu. level
ID2221	Data-Intensive Computing	7.5 hp	Second cycle
ID2222	Data Mining	7.5 hp	Second cycle
ID2223	Scalable Machine Learning and Deep Learning	7.5 hp	Second cycle
II2300	Product Realization Processes I	7.5 hp	Second cycle
IK2206	Internet Security and Privacy	7.5 hp	Second cycle

Track, Data Science (DASC)

Year 1

Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
ID2201	Distributed Systems, Basic Course	7.5 hp	Second cycle
ID2207	Modern Methods in Software Engineering	7.5 hp	Second cycle
ID2209	Distributed Artificial Intelligence and Intelligent Agents	7.5 hp	Second cycle

Optional courses

Code	Name	Credits	Edu. level
ID2010	Programming of Interactive Systems	7.5 hp	Second cycle
ID2012	Ubiquitous Computing	7.5 hp	Second cycle
ID2204	Constraint Programming	7.5 hp	Second cycle
ID2210	Distributed Computing, Peer-to-Peer and GRIDS	7.5 hp	Second cycle
IK2206	Internet Security and Privacy	7.5 hp	Second cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
ID2203	Distributed Systems, Advanced Course	7.5 hp	Second cycle

Supplementary information

At least 30 ECTS must be taken from the conditionally elective courses from corresponding track.

Year 2

Mandatory courses (37.5 Credits)

Code	Name	Credits	Edu. level
DA240X	Degree Project in Computer Science and Engineering, specializing in Software Engineering for Distributed Systems, Second Cycle	30.0 hp	Second cycle
II2202	Research Methodology and Scientific Writing	7.5 hp	Second cycle

Optional courses

Code	Name	Credits	Edu. level
II2300	Product Realization Processes I	7.5 hp	Second cycle
IK2206	Internet Security and Privacy	7.5 hp	Second cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
ID2221	Data-Intensive Computing	7.5 hp	Second cycle
ID2222	Data Mining	7.5 hp	Second cycle
ID2223	Scalable Machine Learning and Deep Learning	7.5 hp	Second cycle

Supplementary information

At least 30 ECTS must be taken from the conditionally elective courses from corresponding track.

Track, Software (PVT)

Year 1

Mandatory courses (22.5 Credits)

Code	Name	Credits	Edu. level
ID2201	Distributed Systems, Basic Course	7.5 hp	Second cycle
ID2207	Modern Methods in Software Engineering	7.5 hp	Second cycle
ID2209	Distributed Artificial Intelligence and Intelligent Agents	7.5 hp	Second cycle

Optional courses

Code	Name	Credits	Edu. level
ID2010	Programming of Interactive Systems	7.5 hp	Second cycle
ID2012	Ubiquitous Computing	7.5 hp	Second cycle
IK2206	Internet Security and Privacy	7.5 hp	Second cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
ID1212	Network Programming	7.5 hp	First cycle
ID2203	Distributed Systems, Advanced Course	7.5 hp	Second cycle
ID2204	Constraint Programming	7.5 hp	Second cycle
ID2210	Distributed Computing, Peer-to-Peer and GRIDS	7.5 hp	Second cycle

Supplementary information

At least 30 ECTS must be taken from the conditionally elective courses from corresponding track.

Year 2

Mandatory courses (37.5 Credits)

Code	Name	Credits	Edu. level
DA240X	Degree Project in Computer Science and Engineering, specializing in Software Engineering for Distributed Systems, Second Cycle	30.0 hp	Second cycle
II2202	Research Methodology and Scientific Writing	7.5 hp	Second cycle

Optional courses

Code	Name	Credits	Edu. level
ID2221	Data-Intensive Computing	7.5 hp	Second cycle
ID2222	Data Mining	7.5 hp	Second cycle
ID2223	Scalable Machine Learning and Deep Learning	7.5 hp	Second cycle
II2300	Product Realization Processes I	7.5 hp	Second cycle
IK2206	Internet Security and Privacy	7.5 hp	Second cycle

Conditionally elective courses

Code	Name	Credits	Edu. level
ID2213	Logic Programming	7.5 hp	Second cycle

Supplementary information

At least 30 ECTS must be taken from the conditionally elective courses from corresponding track.



Appendix 2: Specialisations

Master's Programme, Software Engineering of
Distributed Systems (TSEDM)

Track, Data Science (DASC)

No information entered.

Track, Software (PVT)

No information entered.