Programme syllabus
Faculty of Technology

Programvaruteknik, masterprogram, 120 högskolepoäng
Software Technology, Master Programme, 120 credits

Level
Second Level

Date of Ratification
Approved 2009-09-15
Revised 2014-01-24 by the Faculty Board within the Faculty of Technology
The programme syllabus is valid from autumn semester 2014

Prerequisites
General entry requirements for second-cycle studies and specific entry requirements:

- Bachelor Degree in Computer Science or the equivalent, and a solid practical experience of object-oriented programming.
- English B/6 or the equivalent.

Description of Programme
The degree programme will prepare students for work in the domain of software technology with a focus on the efficient development of complex software systems. The programme will also prepare students for postgraduate studies in Computer Science.

Computers used in all sectors of society today. There is therefore a need for trained professionals to develop the software that controls both current systems and the systems of tomorrow. Both large and small companies / organisations will have a need for software developers and operators of their systems.

Objectives
Knowledge and understanding

For a Degree of Master (Two Years) students must
- demonstrate knowledge and understanding in their main field of study, including both broad knowledge in the field and substantially deeper knowledge of certain parts of the field, together with deeper insight into current research and development work; and
- demonstrate deeper methodological knowledge in their main field of study.

Skills and abilities
For a Degree of Master (Two Years) students must
- demonstrate an ability to critically and systematically integrate knowledge and to
  analyse, assess and deal with complex phenomena, issues and situations, even when
  limited information is available;
- demonstrate an ability to critically, independently and creatively identify and formulate
  issues and to plan and, using appropriate methods, carry out advanced tasks within
  specified time limits, so as to contribute to the development of knowledge and to
  evaluate this work;
- demonstrate an ability to clearly present and discuss their conclusions and the
  knowledge and arguments behind them, in dialogue with different groups, orally and in
  writing, in national and international contexts; and
- demonstrate the skill required to participate in research and development work or to
  work independently in other advanced contexts.

Judgement and approach

For a Degree of Master (Two Years) students must
- demonstrate an ability to make assessments in their main field of study, taking into
  account relevant scientific, social and ethical aspects, and demonstrate an awareness of
  ethical aspects of research and development work;
- demonstrate insight into the potential and limitations of science, its role in society and
  people’s responsibility for how it is used; and
- demonstrate an ability to identify their need of further knowledge and to take
  responsibility for developing their knowledge.

Program Specific Objectives:

Knowledge and Understanding

For a Degree of Master (Two Years) students must demonstrate:
- knowledge of different programming language paradigms and their specific
  properties,
- good knowledge of different programming language constructs and structure, and
- good knowledge relating to the vocabulary, concepts, and tool support used within the
  domains of Software Engineering and Software Technology.

Skills and Abilities

For a Degree of Master (Two Years) students must be able to:
- gather, summarize, and present advanced technical material,
- specify, design, implement, evaluate, and document complex software systems, and
- carry out and document software development projects (on an individual basis or in
  groups) and
- show knowledge of a number of different scientific methods used in Software
  Technology.

Judgement and Approach

For the Degree of Master (Two Years) students must be able to:
- consider different advanced solutions to a given programming problem, and to
- select an appropriate approach for the given problem.

Content

Organization
A programme director is responsible for overseeing the programme. A programme council is established and is responsible for the quality of the programme, its development and relationship with the outside world. The programme with 120 higher education credits corresponds to 2 years of full-time study.

Programme Overview

The first year provides a solid foundation in software technology and contains a number of general courses within computer science at advanced level. We also present general methods and techniques to handle common problems within software development. The second year is an extension of the depth of these studies and provides an insight into several application domains in Software Technology where theoretical knowledge can be applied. The programme is completed with a degree dissertation project.

This is supplemented by studies of mathematics and research methodology which are relevant for the subject in question. The programme prepares students for a future academic career by presenting and applying established research methods and practice in several courses.

We continuously monitor the students' progression in terms of both individual courses as well as the programme as a whole throughout the degree programme.

Programme Courses

Year 1

Foundations of Software Technology, 7,5 hp, G2N*: The course covers the following topics: object-oriented programming in Java, software testing, data structures, formal languages, algorithm theory

Scientific Methods in Computer Science, 7,5hp, A1N*: The course aims at giving the student basic knowledge on theory of science and scientific methodology in the field of Computer Science and Software Engineering.

Compiler Construction I, 7,5hp, A1N*: Theory related to formal languages and compiler construction.

Agile Product Development, 7,5hp, A1N*: This is a practical programming course. The goal is to design software using modern, agile, development models.

Advanced Software Design, 7,5hp, A1N*: The course provides a theoretical and practical introduction to advanced software design techniques.

Software Quality, 7,5hp, A1N*: The course gives an overview about software quality, quality management, and metrics for software and software-development.

Elective courses within FTK corresponding to 15hp at G2N-level (or higher)

Year 2

Applied Program Analysis, 7,5hp, A1F*: The course gives an introduction to general program analysis techniques: metrics, pattern detection, clustering, and information visualization.
Bachelor Degree in Computer Science or the equivalent, and a solid practical

Programme

Faculty of Technology
Programvaruteknik, masterprogram, 120 högskolepoäng
Software Technology, Master's Degree in...

Open to students who have completed
courses corresponding to at least 45 higher education credits.

Main Field of study: Computer Science

The third term of the programme is only open to students who have completed

Huvudområde: Datavetenskap
Filosofie Masterexamen med inriktning mot programvaruteknik

After completing programme studies, corresponding to the requirements expressed in

consultation at the University.

Course evaluations are carried out for all courses in the programme. Every year there is

participation in course and programme evaluations.

Students are represented on
course evaluations.

quality and further development of the degree programme. Students are represented on

course and programme evaluations.

Work Experience

The programme's students will at regular intervals during the programme meet

representatives from working life. Several courses involve invited speakers as guest

lecturers. In a couple of courses, projects are carried out in conjunction with companies

or other organizations. Degree dissertation project work can

be carried out in cooperation with a company.

Studies Abroad

During the second term of studies, study abroad at a foreign university is

possible. Course selection is made in consultation with the programme director to

ensure the validation of courses chosen within the degree programme.

Scope of the Programme

Computer science, the main subject in this degree programme, is largely about
developing and adapting new technologies for everyday use. The target audience for this
is increasingly international. Ethical and legal questions around IT security are present in
many of the programme's courses. Concepts like usefulness, user experience, target
group adaption, availability, etc. are important in all courses. Concepts such as
sustainable development, gender and equal opportunities, diversity and
internationalization are a natural part of the degree programme.

Quality Development

Course evaluations are carried out for all courses in the programme. Every year there is
also a programme evaluation. It is primarily the programme council that monitors the
quality and further development of the degree programme. Students are represented on
all these bodies and participate in course and programme evaluations.

Selected Topics in Compiler Construction, 7.5hp, A1F*: The course gives an in-depth
background in selected topics of compiling and optimizing programs.

Architectures for Service Based Systems, 7.5hp, A1F*: The course gives a short
overview of conventional middleware and motivates the need
for service as a design abstraction.

Adaptive Software Systems, 7.5hp, A1F*: The course gives an overview of adaptive
software systems and explains the central
role of software architecture for adaptive systems.

Degree project at Master level, 30 hp, A2E*: The main purpose of the course is the
improvement of the student’s ability to apply his
knowledge and skills to a research project within the area of Computer Science.

* Courses in the Main field of study Computer Science.

All courses specified above are obligatory and within the main area. The sequence of
courses in the programme may vary from one year to another. A number of courses
have parts related to various aspects of scientific methods.

The Agile Product Development course during the first year involves a major software
development project where topics such as team building, project management, project
planning are studied together with the different phases that are a part of the software
development process.

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all these bodies and participate in course and programme evaluations.
Both the programme evaluations and course evaluations are filed and are available for consultation at the University.

Degree Certificate
After completing programme studies, corresponding to the requirements expressed in the Higher Education Ordinance degree order as well as Linnaeus University degree order, the student may apply for a degree. Those who have completed Master Programme in Software Technology, 120 higher education credits may obtain the following degree

Filosofie Masterexamen med inriktning mot programvaruteknik
Huvudområde: Datavetenskap

*M aster of Science (120 credits) with specialisation in Software Technology.
Main Field of study: Computer Science

The degree certificate is bilingual (Swedish/English). This certificate is also complemented with a Diploma Supplement (in English).

Other Information
The third term of the programme is only open to students who have completed courses corresponding to at least 45 higher education credits.