Utbildningsplan för Masterprogram i Software Engineering (120 högskolepoäng)
Master of Science Programme in Software Engineering (120 ECTS credits)

1. Decision
The degree programme is established by the Board of Education at Blekinge Institute of Technology 2018-03-01.
The programme syllabus was adopted jointly by the Deputy Vice-Chancellor and the Deans on 2018-10-29.
The document applies to all students admitted to the autumn semester of 2019.
Programme code: PAAPS

2. Entry requirements
The entry requirements are:
A Bachelor's degree - three years (180 ECTS) of study of Software Engineering, or a Bachelor’s degree in Computer Science. Completed studies corresponding to 90 ECTS credits classified within the subject of Software Engineering or Computer Science. The Bachelor's degree must include at least 30 credits in one or more of the following areas: Programming, Object-oriented Systems, Software Design, Data Structures and Algorithms, Database Technology, Data Communications, Real Time Systems, Operating Systems. In addition, a completed course of at least 7.5 credits in Software Engineering or a Team Software Engineering Project is required. The Bachelor's degree must also include at least 15 credits in Mathematics. English 6.

3. Conditions for participation in programme courses
To participate in programme courses, the student must meet the course entry requirements by the start of the course at the latest. The student’s prior knowledge will be checked before the start of each course. The entry requirements are stated in the respective course syllabi.

To participate in programme courses, the student must be admitted and registered to each course. Admission to compulsory courses within a programme takes place in connection with the start of the semester during which the course will be given, provided that the student meets the entry requirements for the course. Elective courses within a programme must first be selected by the student, on specific occasions, before admission can take place. Course entry requirements also apply to elective courses.

Students have the opportunity to discuss their study situation with the programme director or a study advisor.

4. Degree
The programme leads up to the following second-cycle degree:
Degree of Master of Science (120 credits)
Main field of study: Software Engineering

4.1. Specific requirements for BTH
A Degree of Master (120 credits) requires at least 60 second cycle credits in the main field of study, of which the independent project (degree project) is to comprise at least 30 credits (level A2E). A maximum of 30 first cycle credits can be included in the degree.
5. Goals

The following goals apply to the study programme.

5.1. Knowledge and understanding

Upon completion of the programme the student shall:

- demonstrate a broad knowledge of the main field of study of software engineering regarding methods, tools and languages applied for large-scale software development
- demonstrate substantially deepened knowledge in one of the sub areas of requirements management, project management or quality management
- demonstrate deepened insight into current research- and development work within the main field of study of software engineering
- demonstrate deepened knowledge of methods within the main field of study of software engineering

5.2. Skills and Abilities

Upon completion of the programme the student shall:

- demonstrate the ability to critically and systematically integrate knowledge in the main field of software engineering for research and development work or other qualified activities,
- demonstrate the ability to critically and systematically analyze, assess and handle complex phenomena, issues and situations within the main field of software engineering even with limited information,
- demonstrate ability to critically, autonomously and creatively identify and formulate relevant issues in the main field Software Engineering,
- demonstrate ability to critically, independently and creatively plan and implement qualified tasks with adequate methods within given time frames, thereby contributing to the development of knowledge as well as evaluating this work,
- demonstrate the ability to explain and discuss in both national and international contexts orally and in writing their conclusions and the knowledge and arguments underlying them in dialogue with different groups,
- show the skills required to participate in research and development work or to work independently in another qualified activities.

5.3. Judgement and approach

Upon completion of the programme the student shall:

- demonstrate the ability to make assessments in the main field of software engineering with regard to relevant scientific, social and ethical aspects as well as raise awareness of ethical aspects of research and development work,
- demonstrate insight into technology and science in the field of software engineering's possibilities and limitations, its role in society and people's responsibility for how it is used,
- have the ability to identify their need for further knowledge and to take responsibility for their knowledge development.

6. Content

Software has become an increasingly important element in many products developed today. This increases the need for developing software with the right functionality, the right quality, in time and within budget. The Master of Science Programme in Software Engineering is designed to meet these challenges by training software developers in advanced concepts within software engineering covering the whole development chain from the perspective of the company management to the perspective of technology and development.

The education is a two-year degree programme that consists of compulsory and elective courses. The compulsory courses give a broad basis and cover several advanced subjects which the software engineering industry is in need of. The elective courses give the students the possibility to have an influence on the content of their degrees and contributes to increasing their attractiveness to future employers in a way chosen by the students themselves. The courses offer a mix of well-tried methods and the latest development and the latest research results. This is further strengthened by the fact that the University has active research in all subjects that form part of the compulsory courses.
6.1. Structure and courses of the degree programme

The courses are studied in the order presented below.

Semester 1

- Compulsory: PA2550, Seminar Series in Software Engineering, 7.5 credits, Software Engineering, Advanced level, A1N
- Compulsory: PA2555, Agile and Lean Software Development, 7.5 credits, Software Engineering, Advanced level, A1N
- Compulsory: PA2551, Requirements Engineering and Product Management, 7.5 credits, Software Engineering, Advanced level, A1N
- Compulsory: PA1453, Software Architectures and Quality, 7.5 credits, Software Engineering, Basic level, G1F

Semester 2

- Compulsory: PA2552, Software Testing, 7.5 credits, Software Engineering, Advanced level, A1N
- Compulsory: PA2554, Research Methodology in Software Engineering and Computer Science, 7.5 credits, Computer Science and Software Engineering, Advanced level, A1N
- Compulsory: PA2559, Software Metrics, 7.5 credits, Software Engineering, Advanced level, A1N
- Elective: DV2544, Multiprocessor Systems, 7.5 credits, Computer Science and Software Engineering, Advanced level, A1N
- Elective: DV2573, Decision Support Systems, 7.5 credits, Computer Science and Software Engineering, Advanced level, A1N
- Elective: MS1411, Mathematical Statistics, 7.5 credits, Basic level, G1F

Semester 3

- Compulsory: PA2558, Software Evolution and Maintenance Project, 7.5 credits, Software Engineering, Advanced level, A1N
- Elective: DV1457, Programming in UNIX Environment, 7.5 credits, Computer Science and Software Engineering, Basic level, G2F
- Elective: DV2557, Applied Artificial Intelligence, 7.5 credits, Computer Science, Advanced level, A1N
- Elective: DV1567, Performance Optimization, 7.5 credits, Computer Science, Basic level, G2F
- Elective: DV2578, Machine Learning, 7.5 credits, Computer Science, Advanced level, A1N
- Elective, DV2546, Software Security, 7.5 credits, Computer Science, Advanced level, A1N
- Compulsory: PA2557, Software Quality Management, 7.5 credits, Software Engineering, Advanced level, A1N
- Elective: PA2560, Advanced Topic in Software Engineering, 7.5 credits, Software Engineering, Advanced level, A1F

Semester 4

- Compulsory: PA2534, Master’s Thesis (120 credits) in Software Engineering, 30 credits, Software Engineering, Advanced level, A2E

6.2. Learning and teaching

Software Engineering is a broad subject extending from management to engineering. The programme reflects this breadth through elective courses that cover a number of different specialisations. The teaching is often problem-based, and centered around teamwork, and the students are expected to take responsibility for their own learning.

The foundation in the subject is offered in compulsory courses. In addition, students can choose elective courses

The programme is offered in English
7. Quality assurance
The education program is followed up annually regarding content, design, implementation and results. This is done through two follow-up meetings, spring and autumn, where program managers, faculty programme director, deans and deputy vice-chancellor discuss aspects and statistics of the program.

The program is continuously evaluated through the course evaluations of the separate courses conducted after completion of the course, and partly by program evaluation performed every two years. Course evaluations are reported and discussed by course managers and head of department, followed by head of department, deputy vice-chancellor and deans, and feedback gives to the students. Program evaluation is reported and discussed by program manager, faculty programme director, deans and deputy vice-chancellor, and is returned to students. The result of course and program evaluations leads to the development of the program.

The programme is connected to a Programme Board that deals with quality and development issues. The Programme Board and the different committees of the Board, have external members, student representatives and alumni, who discuss the program’s development, quality and relevance to the labor market.

8. Student participation
The students are represented in the Board of Education and committees, the Programme Board of the degree programme, and they are also represented in connection with the decisions taken by the departments regarding the course syllabi. There is a programme manager for the programme who is the students’ primary contact person for overall matters regarding the programme.

9. Research foundation
The degree program rests on scientific grounds and proven experience. The courses in the programme are linked to relevant research areas. Also, specific courses in the programme such as Research Methodology in Software Engineering and Computer Science, Advanced Course in Computer Science and Communication, and the Master’s Thesis in Software Engineering build on both the latest research results and recognized approaches in research methodology.

The content and design of the courses are developed by active researchers; in the case of this programme researchers come from, to a large extent, SERL Sweden (Software Engineering Research Lab). The same applies to supervisors of master's theses as also from SERL Sweden.

10. Third stream activities and labor market links
BTH actively works to make its programmes lead to applicability and employability. The students have good possibilities to collaborate with the industry through projects and the Master’s thesis. The Programme Board includes representatives from commerce and industry and also alumni, who usually also have experience from commerce and industry. It is common for the Master’s theses to include a connection to commerce and industry based on the students’ initiatives or the supervisors’ contacts.

Several teachers on the programme are also researchers at BTH, in several cases these persons have connections to the industry through different research projects. Through this link, the connection to commerce and industry is woven into the courses through concrete examples and problems.

11. Internationalization
The degree program is carried out in accordance with the BTH internationalization policy. Students at the programme are encouraged to study one semester abroad. The studies abroad can either be carried out at one of our partner universities or at other suitable universities.

As the programme attracts quite a large number of international students, the study environment is international with a mixing of several cultures and traditions. The programme coordinator works actively with the faculty to maintain a good mix of international students.
12. Social and gender equality in education

BTH promotes equal opportunities for both women and men to shape society and their own lives.

A good learning environment at BTH means a stimulating, respectful and inclusive environment in which all forms of harassment, discrimination or offensive behaviour are unacceptable. Through our quality enhancement system, we work to improve and develop the learning environment of our study programmes. We have adopted a four-step systematic approach: investigate; analyse; take measures; follow up and evaluate. The work is organised within five different areas: 1) Recruitment and admission, 2) Forms of teaching and programme structure, 3) Examinations and assessments, 4) Study environment and 5) Studies and parenting. The work involves the direct encounters with our students as well as surrounding structures, systems and functions. Our procedures for creating a learning environment free from discrimination, harassment and offensive victimisation cover three aspects: promotion of equal opportunities, prevention of harassment and discrimination, and management of cases that arise.