

Programme description

Master of Applied Computer Science - Software Integration

120 credits

2020-2022

Full time and part time

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1. Introduction

This study programme Software Integration is the specialization within the Master's degree Master of Applied Computer Science (MACS) and is an advanced programme for students who aim for a career in applied computer science. MACS Software Integration is the solicitation of classic and leading-edge computing concepts and technologies, applied at different levels from system development to project analysis, project management and consulting.

Applied computing is both a professional discipline and an academic field, aiming to bridge the technical capabilities of IT with organizations' needs. Applied Computing is the application of classic and leading-edge computing concepts and technologies to different current problem areas. These concepts and technologies can be applied at the different levels of system development from project analysis and implementation to project management and maintenance. MACS Software Integration aims at educating the next generation of technical leaders, architects, developers, innovators, and entrepreneurs as they learn how to turn research findings into practical applications. Candidates will achieve an advanced knowledge in the areas of architecture, integration and modern software systems, in terms of theories, knowledge claims, research methods and professional standards. They will be able to apply this knowledge, and to reflect on how applied computing systems contribute to bridge the gap between business and societal aims.

Candidates will take responsibility for solving complex tasks and conducting a research project at a high standard in an organisation/company. This includes the ability to choose the appropriate research approach, to choose or develop a solution, to handle relationships ethically and professionally, and to evaluate and communicate the results in a systematic

A successful solution requires competence in tools, technology and business. With a Master's degree in Applied Computer Science, Software Integration, you can work in many roles such as:

- Chief Technology Officer (CTO)
- Project Manager
- Architect
- Consultant
- System Developer
- IT Expert

After completing the Master's programme, the candidate is also formally qualified for a PhD study in a related area of research.

1.1 Prerequisites

A bachelor's degree with an average grade C or better. In addition, you must have a bachelor's degree in information technology or a related field and submit a motivation letter in English. Relevant practices, or other special considerations, may in some cases weigh up for non-compliant grade requirements.

2. Objective

Knowledge

The candidate will have

- advanced knowledge of applied computing as a research field, in terms of theories, knowledge claims, research methods, processes, tools, technologies and professional standards.
- advanced knowledge of how to apply and reflect over how applied computing contributes to increase interaction.
- knowledge of how to utilize research findings for the benefit of individual- and organisational needs, and societal aims.

Skills:

The candidates

- will acquire practical skills in analysing complex individual- and organizational problems, research issues and technology innovation opportunities.
- will be able to analyse, design, develop and evaluate solutions through independent and team-based projects.
- will gain strong skills in applying research approaches and methods.
- will be able to describe, construct and discuss key technologies and software artefacts.
- will critically evaluate how to solve individual-, organisational- and societal problems.

Competence:

The candidate

- will take responsibility for solving complex tasks and conducting a research-based information technology project at a high standard.
- will gain the ability to critically assess and select the appropriate research approach to choose and/or develop a solution.
- will be able to act professionally and ethically.
- will be able to evaluate research results in a systematic way.
- will critically assess and communicate outcomes of the research project to professionals and to the general public with the goal of contributing to innovation.
- are able to present the results from extensive independent work, mastering the terminology of the field.

3. Structure

The programme is run over two years (full-time) or three years (part-time). For full-time students the first year offers five specialisation courses, in addition to two courses shared with existing master programmes at the faculty, and one electable course. For part time students these eight courses are taken over two years. The last year focus on the Master Thesis, as well as one elective course.

Master of Applied Computer Science - Software Integration				
Full-time				
1. semester	Systems Development 7,5 ects	Big Data 7,5 ects	Visual Analytics 7,5 ects	Integration Oriented Architecture 7,5 ects
2. semester	Mobile Computing and Internet of Things 7,5 ects	Agile Project Management 7,5 ects	Interactive Technologies 7,5 ects	Research Methods in Computer Science 7,5 ects
3. semester	Master Thesis 52,5 ects			Elective 7,5 ects
4. semester				

*The courses are thought as modules, meaning that the students usually will complete one module before starting the next.

Master of Applied Computer Science - Software Integration			
Part-time			
1. semester	Systems Development 7,5 ects	Visual Analytics 7,5 ects	
2. semester	Mobile Computing and Internet of Things 7,5 ects	Interactive Technologies 7,5 ects	
3. semester	Big Data (7,5 ects)	Integration Oriented Architecture 7,5 ects	
4. semester	Agile Project Management 7,5 ects	Research Methods in Computer Science 7,5 ects	
5. semester	Master Thesis 52,5 ects		Elective 7,5 ects
6. semester			

*The courses are thought as modules, meaning that the students usually will complete one module before starting the next.

3.1 Academic progression

The first year (first and second year for part-time students) provides the students with knowledge and skills in Applied Computer Science, including design research, project management, big data, emerging technologies, innovation, architecture, mobile computing and interactive / intelligent systems.

The last year has a stronger focus on competence, aiming at synthesising knowledge and skills into the ability to conduct projects. The shared courses of the second year prepare the student for the Thesis. During the Thesis the student will be able to draw on and integrate all these resources. During the third semester an internship in industry is recommended.

3.2 Courses

Course name	Credits	Description
Systems Development	7,5	Students will gain knowledge of models, theories, and frameworks for information systems development from the research traditions of Action Research, Design Science, Scandinavian Participatory Design, and Engaged Scholarship. Students will obtain an overview of the technologies, tools, and platforms central to the upcoming courses Master programme. Students will also gain knowledge of software documentation, data collection, data analysis, and technical writing.
Big Data	7,5	Students will gain advanced knowledge of key theories and concepts of big data and machine learning. They will acquire specialised problem-solving skills, being able to bring together several key technologies used in manipulating, storing, and analysing big data. They shall take responsibility to conduct the planning and implementation of activities and evaluate the organisations value of big data. Students will learn how to extract and identify useful features that best represent the data, learn about the most important machine learning algorithms as well as evaluating the performance of the chosen machine learning algorithm.
Visual Analytics	7,5	Students will gain knowledge about theoretical principles of and computational techniques for visual analytics. The course will enable students to design, develop, and evaluate information dashboards for organizations. The students shall be able to reflect upon the different models, theories, and frameworks for technology integration from a visual analytics perspective.
Integration Oriented Architecture	7,5	This course introduces interaction-oriented software architectures, to provide the students with analytical skills, development methodologies and technological skills that are necessary to analyse, plan and implement architectures for integration projects. The course will be taught in the context of enterprise systems and

		distributed systems, which means that issues of network protocols, scalability and security will be emphasized.
Mobile Computing and Internet of Things	7,5	Students will gain in depth knowledge of mobile computing and introduce the Internet of Things (IoT). Students will further acquire knowledge of theories/models of mobile and pervasive computing applications, technologies and common research paradigms in mobile and pervasive computing such as context awareness, computing in an environment with limited resources, sensor-based interaction, and smart-device management. They will acquire skills in application design, architecture and implementation. Students will be expected to be able to analyse, discuss and critically reflect upon theories and research issues in mobile computing and internet of things.
Agile Project Management	7,5	Organizations need to develop project managers who can complete projects on time and within budget and this course addresses challenges such as the ability to manage projects and stakeholders, risk assessment and agile planning. Students will gain advanced knowledge of the key theories of project management and agile development. They will acquire specialised problem-solving skills, being able to plan and run a time-boxed iteration, and to use a project management tool. They shall take responsibility to conduct plan, organise and control an agile IS project.
Interactive Technologies	7,5	The aim of the course is to design, develop and evaluate interactive technologies with a focus on the enterprise context of use. Students will be immersed in a pedagogical experience that covers the full spectrum of design, development, use and evaluation of innovative and interactive enterprise technologies using smartphones, tablets, motion controllers, touch tables, and touch walls. Natural User Interfaces (NUI) will be a special focus of the course. Students will use state-of-the-art mobile eye-tracking solutions to evaluate the applications/products designed and developed.
Research Methods in Computer Science	7,5	<p>Research is a cyclical process where new and carefully planned investigations build and extend on established work. The aim is to provide students with a fundamental understanding of research as a conceptual, empirical and practical approach to gathering new insight and knowledge within Applied Computer Science. Teaching centres on applied research from the field of computer science and presents students with relevant methods from this domain, along with their possibilities and limitations.</p> <p>Emphasising the importance of background work with a solid understanding of past research, an important outcome of this course is a structured literature review that forms the foundation for a project plan. Furthermore, students will learn a systematic approach to empirical investigation, including research design and methodology, qualitative and quantitative analyses, design research and the presentation and evaluation of results.</p> <p>At completion of the course, students will be prepared to begin work on their own research project.</p>

3.3 Electable Subject

Within the students' 3rd semester (5th semester for part-time students) they will have to choose one electable course in the program, which give the students the opportunity to further engage in in-depth knowledge of a topic of interest, or to broaden their scope and area of knowledge by selecting a related module that expands their horizon.

What topics that can be chosen may vary from year to year. The concrete topics are presented and published therefore early in the spring, in the students' 2rd semester, together with the deadline for enrolment in individual electable subjects.

3.4 Master Thesis (52,5 credits)

The aim of this course is to provide the student with an opportunity to develop systematic understanding and critical awareness on the solution of a relevant problem in the student's focal area. Students will gain advanced knowledge of the research process at Master level, including a deep knowledge of selected theories. They will acquire specialized problem-solving skills, be able to plan and conduct the steps in the research or development process at a high standard. They shall take responsibility to conduct a well planned and executed project at Master level.

On a more detailed level, the student will, based on observations of the industry and the existing body of knowledge, develop a research project. The student can also do the Master Thesis in relation to an ongoing research project at School of Economics, Innovation and Technology (SEIT). As part of the thesis the student will conduct a literature review and establish a research question. Independently, or in a group of two, the student will plan, execute and evaluate the research project according to established research methods in applied computer science.

4. Internationalization and student exchange

With reference to *Studietilsynsforordningen* of February 2017 (§2-2, sections 7 and 8), the study has arrangements for internationalization and international student exchange.

4.1 Internationalization

Internationalization means the collective efforts regarding international activities. The internationalisation efforts at SEIT includes research collaborations, staff- and student exchange, participation in international conferences, publications, competitions, displays, etc. The students are actively involved in our international network and its activities at Kristiania University College enabling them to gain valuable insights and experiences. Scientific staff is given options for participating in their international networks to keep their knowledge up to date, gain valuable experiences and share and learn new pedagogical techniques. Our membership in networks such as Erasmus+ and Nordplus, give students and academic staff rich opportunities.

For the specific courses in the programme, they are all taught in English, thereby facilitating for incoming exchange students. Historically, approximately one third of the class size are international students which encourages an international student environment. Further, in a number of courses there are guest lectures delivered by international visiting staff. Some of the courses are also delivered by international staff in adjunct positions from our partner institutions such as Copenhagen Business School, Denmark and Brunel University, UK. Through coursework and assignments, the students will work on cases from international actors and companies, relating their reflections, discussions and hand ins to a global IT industry and its professional community.

For specific internationalization schemes, see the subject description of the study.

4.2 International student exchange

As regards to arrangements for international student exchange, Kristiania University College has the following mobility program;

- Nordplus in the Nordic region or the Baltic States
- ERASMUS + in Europe
- "Study Abroad", for students in and outside Europe

Kristiania University College has agreements on student exchanges and academic relevance secured by the academic field of study. Exchange courses from partners are approved by academic supervisors, for admission to the program, with an equivalent of 30 credits.

For nominations for student exchange, requirements are set for grades and motivation applications. For some study programs there are requirements for documentation of creative work/portfolios.

For students at Master of Applied Computer Science student exchange is possible during the third semester. While on exchange the student will be able to start their master thesis with an advisor from Kristiania University College. For outgoing students, Kristiania University College, has established student exchange agreements with the following institutions:

- Kingston University, UK: Master Programme
- Seoul, South Korea: Seoul National University of Science and Technology
- England: University of Hertfordshire, UK
- New Zealand: Otago Polytechnic New Zealand (1 student only)

Changes to approved universities may occur. Information about possible exchange stays for the relevant year is therefore published online and on the learning platform.

5. Teaching methods

The programme uses a number of varied forms of teaching in order to encourage learning.

- Lectures, to introduce theoretical issues and domain knowledge
- Seminars and group work, to give the students the opportunity to discuss different perspectives, integrate with previous knowledge, and practice analytical assessment with case materials.
- Practical assignments and lab work, to develop hands-on technical skills
- Directed and student-selected readings, to develop a solid knowledge base
- Technical demonstrations, to present and convey the technical workings and user interaction aspects of an IT artefact
- Oral presentations, to develop personal communication skills
- Essay and thesis writing, in order to synthesise knowledge and present analyses and results
- Supervision, to provide detailed feedback and discussion of student projects in close interaction with Kristiania University Collage researchers.

5.1 Forms of assessment

Regarding assessment forms, the students will write essays, technical reports, articles, reflection documents, poster, and similar written hand-ins. In addition, oral presentations, poster demonstrations, product demonstrations, prototyping, and lab work are examples of other assessment forms. There are usually one or two assessments in each module and it will alternate between individual assignments and group-based assignments. For the Master Thesis in the last year, there will be both a written thesis document and an oral presentation.