Programme Syllabus

Master's Programme in Computer Science

Programme code:	TAMIS
Programme title:	Master's Programme in Intelligent Software Systems
	Masterprogram i intelligenta mjukvarusystem
Credits:	120
Programme approval:	The programme syllabus was approved by the Faculty Board of Health, Science and Technology on 11 November 2024, effective from the autumn semester of 2024.
Language of instruction:	English
Education cycle:	Second (Master's)
Degree type:	General
Degree title:	Degree of Master of Science (120 credits) Main field of study: Computer Science Specialisation: Intelligent Software Systems
Entry requirements:	General entry requirements. Upper-secondary school English 6 or equivalent, Degree of Bachelor 180 credits and 90 credits in computer science, including the following courses:
	Programming techniques, 7.5 credits Software development methodology, 7.5 credits Operating systems, 5 credits Computer networking I, 7.5 credits and Mathematical statistics, 7.5 credits (or equivalent courses)

Introduction
Computer science is a rapidly developing field. In line with this, the programme at Karlstad University is designed to equip students with the ability to continuously acquire and apply new knowledge. The aim of the programme is also for students to acquire specialised competence in the field of computer science with a focus on intelligent software systems.

Programme outcomes
In accordance with the national objectives of a Degree of Master, the following programme outcomes apply.

Knowledge and understanding
For a Degree of Master (120 credits) the student shall
- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in computer networking, computer security and software development as well as in-depth insight into current research and development work in computer networking, cybersecurity and software development.

Competence and skills
For a Degree of Master (120 credits) the student shall
- 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 advanced tasks within predetermined time frames and so contribute 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 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 other qualified capacity.

Judgement and approach
For a Degree of Master (120 credits) the student shall
- demonstrate the ability to make assessments in computer networking, computer security and software development informed by relevant disciplinary, 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 ongoing learning.

Programme structure
The programme comprises four semesters. The first two semesters consist of courses in the profile areas of computer science: computer networking, cybersecurity and software design. These courses are usually held by researchers from the respective research groups. The third semester focuses on specialised studies in intelligent software systems. It is recommended

that the final degree project is carried out in collaboration with companies, authorities or the research group in computer science.

Internationalisation
Karlstad University wants to promote collaboration and exchange with other universities. Karlstad University has partnerships with many other universities in Sweden and abroad, and has an organisation in place to support students who want to make use of this opportunity. Students are therefore encouraged to complete part of the programme at a university abroad.

Programme curriculum
The education comprises 120 credits including a degree project, of which at least 90 credits in the main field of study at Master's level.

Year 1
The first year of the programme consists of obligatory courses in both the profile areas of computer science profile as well as basic courses in advanced computer science. The first semester includes the following courses:

Mandatory courses (30 credits):
Advanced communication networks, 5 credits
Internet architectures and protocols, 5 credits
System modeling and simulation, 5 credits
Methods in computer science, 7.5 credits
Internet security and privacy, 7.5 credits

The second semester includes the following courses:

Distributed systems and cloud computing, 7.5 credits
Ethical hacking, 7.5 credits
Software architectures of distributed applications, 5 credits
Wireless systems, 5 credits
Distributed applications: development projects, 5 credits

Year 2
The second year of the programme focuses on the profile area of intelligent software systems. The third semester includes the following courses:

Mandatory courses (30 credits):
Foundations of AI and optimisation methods, 7.5 credits
Quality in data driven systems, 7.5 credits
AI engineering, 7.5 credits
Current research in networked systems, 7.5 credits

The fourth semester is dedicated to a degree project of 30 credits.

Credit transfer
Students have the right to transfer credits from previously completed university courses in Sweden or abroad. Credit transfer is subject to approval according to the current regulations.

Additional information
The local regulations for first and second cycle education at Karlstad University stipulate the obligations and rights of students and staff.