Roskilde University

MSc. / cand.scient.

Computer Science

Master's Programme

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Computer Science

Even before you get up in the morning, you have been in contact with many IT systems, so it almost goes without saying that the world - both now and in the future - needs people who can develop complex IT systems that are both reliable, user-friendly and resilient.

The computer science programme is practice-oriented and focuses on providing the graduate with competences to the development of complex IT systems that are reliable, user-friendly, and long-lasting.

We aim to anchor software development in realistic settings and with actual and current technologies, state-of-the-art methods and techniques to analyse and construct complex IT systems. This is where we differ from other similar studies - we focus on applied Computer Science, and as a student you'll obtain the ability to create entire IT systems from scratch.

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Computer Science – continued

IT systems are and will be a necessary part of our everyday lives and influence people in all areas. Understanding their context and their issues problems define the success criteria for the solution, hence interdisciplinarity is a basic prerequisite for being able to work with applied computer science.

As a student, you will gain skills in the application of software architecture and design principles for the development of complex IT systems. Learn how to document solutions and critically reflect both system structure and the context in which solutions must operate. Obtain insight into the complexity of algorithms for efficient and scalable solutions and usage of agile development methods for the development of complex IT systems, from idea to systems in production.

The programme provides opportunities for specialisation in a range of areas including algorithms, programming frameworks, complex IT systems, data science, artificial intelligence, business intelligence, internet of things, robotics, and virtual technologies.

Content

Note, that this is an example of a recommended course of study. Individual students' coruses, projects, interships and accredited study abroad may vary in relation to the above. You can see the range of courses currently offered by Roskilde University at study.ruc.dk.

<table>
<tr><th colspan="2">1. year</th><th colspan="2">2. year</th></tr>
<tr><th>1. SEMESTER</th><th>2. SEMESTER</th><th>3. SEMESTER</th><th>4. SEMESTER</th></tr>
<tr><td rowspan="2">Complex IT Systems
[Course]
15 ECTS</td><td rowspan="3">Data & Things
[Course]
10 ECTS</td><td>Elective courses

2 courses of
5 ECTS

or

1 course of
10 ECTS</td><td rowspan="3">Master thesis
30 ECTS</td></tr>
<tr><td rowspan="2">Project
Specialisation project
in Computer Science
20 ECTS</td><td>Research seminar
5 ECTS</td></tr>
<tr><td>Complex IT Systems Practice
[Course]
15 ECTS</td><td>Project

or

Project-oriented internship
15 ECTS</td></tr>
</table>

Through your education, you get the opportunity to specialise your profile and get in-depth knowledge in one or more areas of your own choice. The study starts with knowledge and skills needed to construct complex IT-systems in the first semester and advanced data solutions and complex device systems in beginning of the second. The remaining part of the study focusing on specialisation with elective courses and projects.

1. SEMESTER

The first semester focuses on construction of complex IT systems and management of complex IT projects and systems that are distributed and require focus on security and authentication. You will gain in-depth knowledge and understanding within the analysis, design, and construction of complex IT systems and skills to design, implement and evaluate these. Furthermore, we will focus on project management and agile development to manage and design useful solutions for complex systems.

2. SEMESTER

The second semester focuses on advanced data solutions and complex device systems. You get the opportunity to specialise in a selected area of computer science, such as complex IT systems, artificial intelligence, data science or pervasive computing, and will achieve in-depth knowledge of research within the area and possibilities to apply this knowledge to real problems in your project.

3. SEMESTER

The third semester offers further specialisation in selected state-of-the-art areas of computer science by elective courses and a semester project. The semester includes preparation for the thesis by offering a research seminar. Internship is possible this semester instead of the project.

4. SEMESTER

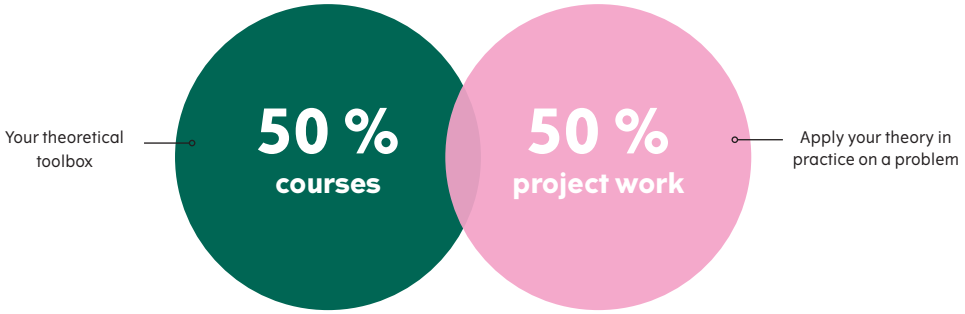
The fourth and final semester consists of the master's thesis where you combine the theoretical and practical knowledge and skills you have acquired in the previous semesters by writing a thesis and academically conclude your education. You get the whole semester for immersion in your specialisation. This can be in collaboration with companies or organisations to find solutions to their complex IT-problems, or by diving into theoretical solutions.

Form of Study

Through your education, you get the opportunity to create your own individual education profile and your own independent specialisation in accordance with the idea of the problem-oriented, interdisciplinary and project-oriented teaching method at Roskilde University.

THE STUDY FORM IS A COMBINATION OF

- Problem-oriented project group work
- Courses that are organised as teaching in small groups, where the focus is on theories, methods, and problems in an interaction between teacher and student



The project work and guidance are prioritised at Roskilde University. We also prioritise that you gain experience with the production and processing of empirical data as well as the practical application of theories and methods.

All master's programmes offer project-oriented internships and / or studies at other universities at home and abroad with credit transfer.

Project Examples

The problem-oriented project work gives you unique opportunities to shape your academic profile and investigate problems of your specific interest. Through the project work you acquire practical experience of applying theories and constructing complex IT-systems in realistic settings. You practice your methodological skills as well as analytical capacities and become versed in communicating your results.

Here are examples of problems you could study in the project work:

Optimisation:

- Supermarket Navigation
- Traffic in city
- Truck route tracking
- Telemetry for Peak-Shaving in Virtual Power Plants

Machine Learning:

- Deep Reinforcement Learning
- Classification of CT-scans with Deep Learning
- Word-Sense Disambiguation problem in Machine Reading Comprehension
- Integration of deep Learning Network in Danish Healthcare

Gaming:

- A.I. Chess
- Chess Engine
- Game design
- Repayable Videogames

Complex Systems:

- Independent Musicians Management
- Visualising and simplifying and modular synthesis
- Web scraping of news pages to measure and display diversity
- Serverless computing and FaaS as back-end

Security:

- IT-security
- Daily IT Security Technologies
- Evaluate and improve an existing security related tool

Competences

Candidates will be qualified to:

- Construct complex IT solutions individually and in software development teams
- Acquire new knowledge about new technologies and their application possibilities
- Organise, manage and implement complex IT projects
- Initiate and complete IT solutions that require interdisciplinary collaboration and take on professional areas of responsibility

Career examples

Examples of job titles for candidates in Computer Science are:

- software developer
- technical consultant
- project manager
- software engineer
- software architect
- software designer

Further information

You can find admission requirements, application deadlines and other information about Computer Science at Roskilde University here:

ruc.dk/kandidat/computer-science

Contact us if you have questions about Computer Science:

RUC Study & Career Guidance
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Kandidatgrad: Cand.scient. i Datalogi
Degree: Master of Science in Computer Science