

## Specialization Course in Computer Science - Complex IT

Title	Specialization Course in Computer Science - Complex IT
Semester	F2023
Master programme in	Computer Science
Type of activity	Course
Teaching language	English
Study regulation	Read about the Master Programme and find the Study Regulations at <a href="http://ruc.dk">ruc.dk</a>

### REGISTRATION AND STUDY ADMINISTRATIVE

Registration	Sign up for study activities at <a href="#">STADS Online Student Service</a> within the announced registration period, as you can see on the <a href="#">Study administration homepage</a> . When signing up for study activities, please be aware of potential conflicts between study activities or exam dates. The planning of activities at Roskilde University is based on the recommended study programs which do not overlap. However, if you choose optional courses and/or study plans that goes beyond the recommended study programs, an overlap of lectures or exam dates may occur depending on which courses you choose.
Number of participants	
ECTS	5
Responsible for the activity	Sune Thomas Bernth Nielsen ( <a href="mailto:stbn@ruc.dk">stbn@ruc.dk</a> )
Head of study	Henrik Bulskov ( <a href="mailto:bulskov@ruc.dk">bulskov@ruc.dk</a> )
Teachers	
Study administration	IMT Registration & Exams ( <a href="mailto:imt-exams@ruc.dk">imt-exams@ruc.dk</a> )
Exam code(s)	U60059

### ACADEMIC CONTENT

Overall objective	<p>Specialization within one of the core specialization areas of the program. The student must acquire knowledge, skills and competences in order to translate theories, methods and solutions ideas into their own practice in relation to software development.</p> <p>1) Specialization course with a focus area towards algorithms, programming frameworks and complex IT systems. 2) Specialization</p>
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	course with a focus area towards data science, artificial intelligence and business intelligence. 3) Specialization course with a focus area within e.g. internet of things, robotics and virtual technologies.
Detailed description of content	The Complex IT systems specialization course is for students who want skills in and knowledge of large, distributed or specialized systems beyond the first semester courses. With a focus on the systems dimension, the course lets the students explore both theoretical and practical sides of working with complex IT systems. Students work on a portfolio assignment based on developing and integrating their acquired knowledge and skills in a new dedicated project, an existing project or their specialization semester project.
Course material and Reading list	Foundational texts and newer papers about theory and practice. Documentation for relevant tools, frameworks, protocols etc. is in part chosen by the students.
Overall plan and expected work effort	The course will have a total workload of 135 hours.  40 hours of lectures and exercises/individual work, 70 hours of preparation and 25 hours for the exam
Format	
Evaluation and feedback	Evaluation form to be filled out (anonymously) plus open discussion on the last course day
Programme	<p>The students design, implement and describe advanced features of a complex distributed system. Advanced features covered in lectures, workshops and self-study are:</p> <p>Mandatory topics: - Security - System- and network architecture - Testing, automization of build and continuous integration and deployment/delivery (DevOps) - Non-browser clients such as mobile devices, terminal, IoT devices, embedded computers and physical nodes.</p> <p>Beyond the mandatory topics, the system must include at least 3 of the following features/dimensions: - Monitoring and operation or analytics/crash reporting - Containerization - Modern frontend frameworks and state management - Parallel programming - Advanced security (beyond the mandatory) - Advanced testing and/or DevOps (beyond the mandatory) - Alternative topic*</p> <p>*Alternative topics may include: Virtualization, APIs/protocols, history, analysis and other topics approved by the teacher.</p>
<b>ASSESSMENT</b>	
Overall learning outcomes	<p>After completing this course, students will be able to:</p> <ul style="list-style-type: none"> <li>• demonstrate knowledge and understanding of one or more of the specialization areas and the area's techniques for designing and constructing complex software systems.</li> <li>• know and understand the general principles behind the specialization area's theory, methods, and technological solutions.</li> </ul>

	<ul style="list-style-type: none"> <li>• elect and apply appropriate methods and techniques from the specialization area to analyse, design and construct reliable and user-friendly systems.</li> <li>• become proficient in new approaches to the specialization area.</li> </ul>
Form of examination	<p>Individual oral exam based on a written product..</p> <p>The character limit of the written product is maximum 48.000 characters, including spaces. The character limits include the cover, table of contents, bibliography, figures and other illustrations, but exclude any appendices.</p> <p>Time allowed for exam including time used for assessment: 20 minutes. The assessment is an overall assessment of the written product(s) and the subsequent oral examination.</p> <p>Permitted support and preparation materials for the oral exam: All.</p> <p>Assessment: 7-point grading scale. Moderation: Internal co-assessor.</p>
Form of Re-examination	Samme som ordinær eksamen / same form as ordinary exam
Type of examination in special cases	
Examination and assessment criteria	<p>The students design, implement and describe advanced features of a complex distributed system.</p> <p>The goal is that students gain in-depth knowledge and skills about a relevant set of modern, advanced or complex topics in designing, developing, managing, testing, securing complex IT systems.</p>
Exam code(s)	Exam code(s) : U60059

Course days:

Hold: 1

## Complex IT (COMP)

time 06-03-2023 08:15 til  
06-03-2023 12:00

location 07.1-021 - undervisningslokale (30)

Teacher Sune Thomas Bernth Nielsen ( stbn@ruc.dk )

## Complex IT (COMP)

time 08-03-2023 08:15 til  
08-03-2023 16:00

location 07.1-061 - undervisningslokale (30)

Teacher Sune Thomas Bernth Nielsen ( stbn@ruc.dk )

## Complex IT (COMP)

time 10-03-2023 08:15 til  
10-03-2023 12:00

location 07.1-021 - undervisningslokale (30)

Teacher Sune Thomas Bernth Nielsen ( stbn@ruc.dk )

## Complex IT (COMP)

time 13-03-2023 08:15 til  
13-03-2023 12:00

location 07.1-021 - undervisningslokale (30)

Teacher Sune Thomas Bernth Nielsen ( stbn@ruc.dk )

## Complex IT (COMP)

time 15-03-2023 08:15 til  
15-03-2023 16:00

location 07.1-021 - undervisningslokale (30)

Teacher Sune Thomas Bernth Nielsen ( stbn@ruc.dk )

## Complex IT (COMP)

time 17-03-2023 08:15 til  
17-03-2023 12:00

location 07.1-021 - undervisningslokale (30)

Teacher Sune Thomas Bernth Nielsen ( stbn@ruc.dk )

## Complex IT (COMP)

time 20-03-2023 08:15 til  
20-03-2023 12:00

location 07.1-021 - undervisningslokale (30)

Teacher Sune Thomas Bernth Nielsen ( stbn@ruc.dk )

## Complex IT - Hand-in (COMP)

time 26-03-2023 20:00 til  
26-03-2023 20:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

## Complex IT - Oral examination (COMP)

time 31-03-2023 08:15 til  
31-03-2023 18:00

location 10.1-025 - teorirum (32)

Teacher Sune Thomas Bernth Nielsen ( stbn@ruc.dk )

## Complex IT - Reexam - Hand-in (COMP)

time 14-08-2023 10:00 til  
14-08-2023 10:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

## Complex IT - Oral reexamination (COMP)

time 18-08-2023 08:15 til  
18-08-2023 18:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

location 10.1-025 - teorirum (32)