

## Specialization Course in Computer Science - Physical Computing

Title	Specialization Course in Computer Science - Physical Computing
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="https://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	Maja Hanne Kirkeby ( <a href="mailto:majaht@ruc.dk">majaht@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)	U60480

### 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	<p>This course has an emphasis on technical aspects and development that relate to Physical Computing, Visualization and Interactive Experiences. The focus will be on acquiring knowledge about principles for designing systems that are highly interactive in that they can sense and respond to their environment. The course will include a theoretical as well as a practical part. The theoretical part will introduce core concepts and cover relevant literature, while the practical part will place this into contexts aiming at building prototypes of Physical Computing systems. Prototypes are developed by means of construction and programming using creative frameworks, selected libraries, physical devices and tools. The prototypes can for instance have input such as sensors measuring distance, motion, temperature or heart rate and output via visual effects, sound, light and motion. The Prototypes and Physical Computing systems in general provide the basis for developing interactive experiences for purposes such as story-telling, entertainment, learning, gaming or art.</p>
Course material and Reading list	Will be announced on Moodle.
Overall plan and expected work effort	<p>The course will have a total workload of 135 hours.</p> <p>40 hours of lectures and exercises/individual work, 70 hours of preparation and 25 hours for the exam</p>
Format	
Evaluation and feedback	Evaluation form to be filled out (anonymously) plus open discussion on the last course day
Programme	<p>The course will have the form of seminars with an active learning style, i.e., introduction to theory in combination with hands-on in-class exercises, together with assignments and peer-reviewing. The assignments will be subject to review and peer-review.</p> <p>The assignments will be a mix of individual and group assignments.</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> <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 assessment will be based on the extent to which the student:</p> <ul style="list-style-type: none"> <li>• Demonstrates familiarity with typical hardware, sensor, software, and communications infrastructure used in Physical Computing.</li> <li>• Demonstrates knowledge of current research trends in physical computing</li> <li>• Demonstrates understanding of models of unit control ranging from fully autonomous to centralised control.</li> <li>• Demonstrates understanding of the potential for application of physical computing and visualization in diverse fields, including performances, games, and industrial settings.</li> <li>• Demonstrates the ability to apply algorithms for handling and arbitration among continuous sensor inputs.</li> <li>• Demonstrates the ability to construct programs for physical devices using current software architectures.</li> </ul>
Exam code(s)	Exam code(s) : U60480

Course days:

Hold: 1

## Physical Computing (COMP)

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

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby ( [majaht@ruc.dk](mailto:majaht@ruc.dk) )

## Physical Computing (COMP)

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

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby ( [majaht@ruc.dk](mailto:majaht@ruc.dk) )

## Physical Computing (COMP)

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

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby ( [majaht@ruc.dk](mailto:majaht@ruc.dk) )

## Physical Computing (COMP)

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

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby ( [majaht@ruc.dk](mailto:majaht@ruc.dk) )

## Physical Computing (COMP)

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

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby ( [majaht@ruc.dk](mailto:majaht@ruc.dk) )

## Physical Computing (COMP)

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

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby ( [majaht@ruc.dk](mailto:majaht@ruc.dk) )

## Physical Computing (COMP)

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

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby ( [majaht@ruc.dk](mailto:majaht@ruc.dk) )

## Physical Computing - Hand-in (COMP)

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

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

## Physical Computing - Oral examination (COMP)

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

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

location 02.1-123 - mospus-mødelokale (20)

Teacher Maja Hanne Kirkeby ( [majaht@ruc.dk](mailto:majaht@ruc.dk) )

## Physical Computing - Reexam - Hand-in (COMP)

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

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

## Physical Computing - Oral reexamination (COMP)

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

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

location 02.1-123 - mospus-mødelokale (20)

