

Elective Course: Energy consumption

Title	Elective Course: Energy consumption
Semester	E2023
Master programme in	Computer Science / Digital Transformation
Type of activity	Course
Teaching language	English
Study regulation	Read about the Master Programme and find the Study Regulations at ruc.dk

REGISTRATION AND STUDY ADMINISTRATIVE

Registration	You register for activities through stads selvbetjening during the announced registration period, which you can see on the Study administration homepage. When registering for courses, please be aware of the potential conflicts and overlaps between course and exam time and dates. The planning of course activities at Roskilde University is based on the recommended study programmes, which should not overlap. However, if you choose optional courses and/or study plans that goes beyond the recommended study programmes, 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 (majaht@ruc.dk)
Head of study	Henrik Bulskov (bulskov@ruc.dk)
Teachers	
Study administration	IMT Registration & Exams (imt-exams@ruc.dk)
Exam code(s)	U60593

ACADEMIC CONTENT

Overall objective	The purpose of elective courses is to give the student opportunities to specialize within a specific subject area, where the student acquires knowledge, skills and competences in order to translate theories, methods and solutions ideas into their own practice.
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Detailed description of content	This course gives a practical introduction to evaluating energy efficiency and energy consumption of software in IT systems. Internet Communication Technologies (ICT), i.e., web-based software, is currently estimated to consume 6-7% of electricity worldwide and it is predicted to increase in the future. In this course, you will become familiar with the factors affecting the energy consumption of software and tools and methods for comparing and evaluating the energy consumption of IT solutions. During the course, you will work on how to reduce the energy consumption of software. Based on your expertise you can approach this from several angles. For example, one way to reduce the energy consumption of software is to optimize the interaction with the software, for instance, by optimizing the user flow or affecting user's behaviours, and another way is to optimize the implementation of the software, e.g., by using better algorithms, data structures, or libraries. During the course, you can work with the focus that suits your educational profile and expertise. By finalizing the course, you will gain competencies in analyzing energy-related issues in IT systems.
Course material and Reading list	The course material will mainly include research papers and white papers. Relevant texts and resources will be recommended via Moodle.
Overall plan and expected work effort	The course will have the form of in-person 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/or peer review. The assignments will be a mix of individual and group assignments. The course will have a total workload of 135 hours: 30 hours of lectures, 70 hours of preparation and exercises/individual work, and 35 hours for the exam and preparation hereof.
Format	
Evaluation and feedback	Evaluation form to be filled out (anonymously) plus open discussion during the course. Written and verbal feedback from students is collected throughout the course. During the course students will receive feedback via oral and written reviewing and peer-reviewing. The type of feedback can be oral or written and will depend on the type of activity.
Programme	
ASSESSMENT	
Overall learning outcomes	After completing this course, students will be able to: • demonstrate knowledge within a defined subject area. • demonstrate an overall overview and understanding of the general principles behind the field's theory, methods and technological solutions. • choose and apply appropriate methods and techniques relevant to the field to analyse, design and implement solutions • work with it-related problems within their field, both individually and in groups. • be proficient in new approaches within the subject area in a critical and systematic way and thereby independently take responsibility for their own professional development.

Form of examination	Individual oral exam based on a written product 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. 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. Permitted support and preparation materials for the oral exam: All. Assessment: 7-point grading scale. Moderation: Internal co-assessor.
Form of Re-examination	Samme som ordinær eksamen / same form as ordinary exam
Type of examination in special cases	
Examination and assessment criteria	The assessment will be based on the extent to which the student: 1. know about current research trends related energy consumption across various relevant fields and disciplines 2. know about the parameters affecting the energy consumption of software, 3. demonstrates knowledge about the data analysis of energy estimations/measurements, 4. demonstrates knowledge about methods for evaluating energy efficiency and energy consumption of IT systems, 5. has skills in using tools for evaluating energy efficiency and energy consumption of IT systems, and 6. has competencies in analyzing energy-related issues in IT system
Exam code(s)	Exam code(s) : U60593

Course days:

Hold: 1

Energy consumption (COMP)

time 15-09-2023 12:15 til
15-09-2023 16:00

location 02.1-005 - lille teorirum (30)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption (COMP)

time 22-09-2023 12:15 til
22-09-2023 16:00

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption (COMP)

time 29-09-2023 12:15 til
29-09-2023 16:00

location 07.2-033 - undervisningslokale (30)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption (COMP)

time 06-10-2023 12:15 til
06-10-2023 16:00

location 04.0-031 - undervisningslokale (30)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption (COMP)

time 13-10-2023 12:15 til
13-10-2023 16:00

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption (COMP)

time 20-10-2023 12:15 til
20-10-2023 16:00

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption (COMP)

time 27-10-2023 12:15 til
27-10-2023 16:00

location 28b.0-01 - store teorirum (30)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption (COMP)

time 03-11-2023 12:15 til
03-11-2023 16:00

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption (COMP)

time 10-11-2023 12:15 til
10-11-2023 16:00

location 02.1-005 - lille teorirum (30)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption (COMP)

time 17-11-2023 12:15 til
17-11-2023 16:00

location 10.1-025 - teorirum (32)

Teacher Maja Hanne Kirkeby (majaht@ruc.dk)

Energy consumption - Hand-in (COMP)

time 27-11-2023 10:00 til
27-11-2023 10:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt

Energy consumption - Oral examination (COMP)

time	11-01-2024 08:15 til 12-01-2024 18:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt

Energy consumption - Reexam hand-in (COMP)

time	16-02-2024 10:00 til 16-02-2024 10:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt

Energy consumption - Oral reexamination (COMP)

time	23-02-2024 08:15 til 23-02-2024 18:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt