Data & Things

Title	Data & Things
Semester	F2024
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 [ruc.dk](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	10
Responsible for the activity	Jens Ulrik Hansen (jensuh@ruc.dk) Hua Lu (luhua@ruc.dk)
Head of study	Henrik Bulskov (bulskov@ruc.dk)
Teachers	
Study administration	IMT Registration & Exams (imt-exams@ruc.dk)
Exam code(s)	U60058

ACADEMIC CONTENT

Overall objective	Advanced data solutions and complex device systems.

Detailed description of content	This course focuses on building data centric applications that utilize data to create new insights or features. In doing this, we need to understand how to analyze data and create statistical and machine learning models, as well as learning how to process, transform, and manage data. In managing data, we will go beyond the classical relational databases and cover topics such as parallel and distributed data systems, partial and graph databases, and data from IoT devices. Moreover, we will cover how to put data products, such as machine learning models, into production and monitor their performance (ML Ops). Thus, this course cover both hands-on introductions to data science, machine learning, data engineering, ML Ops, as well as building complex data centric systems that may utilize IoT devices and external data sources as input to statistical and machine learning models that may result in visualizations, features, or effects into the environment.
Course material and Reading list	Course materials will consist of part of books, papers, etc. The specific materials will be announced on Moodle for each lecture.
Overall plan and expected work effort	During the run of the course the students may hand in a number of short topical assignments (hand-ins). Hand-in info: ● The hand-in will consists of answers to selected exercises - these will be selected among those that have already been done in class. Only some of the exam topics will have hand-in exercises. ● The list of selected hand-in exercises will be made public on the last day of class. ● The hand-in should be in the format of a Jupyter Notebook. A template Jupyter notebook will be provided on Moodle. ● The students may hand in in groups, which Eksamen.ruc.dk should be set up for. In that case, the students can only hand in one joint Jupyter Notebook per group. The course will have a total workload of 270 hours consisting of approximately: ● 76 hours of lectures and exercises, ● 140 hours of preparation over an 8 week course period and ● 54 hours for the exam and preparation before the course.
Format	
Evaluation and feedback	Evaluation form to be filled out (anonymously) plus open discussion on the last course day
Programme	

ASSESSMENT

Overall learning outcomes	After completing this activity, students will be able to: ● analyse, implement, and verify complex data solutions to solve problems within complex IT systems. ● demonstrate knowledge of modern data storages, and data engineering and science. ● understand and implement solutions that integrate computation into the environment and use serval devises and systems.

	• design and implement coordination for systems with many software and hardware components and interfaces suitable for ubiquitous computing.
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	At the beginning of the exam, the student draw a random number. Each number will correspond to an exam topic. (The list of exam topics roughly corresponds to the different classes and will be announced at the beginning of the course). The student will then present on the topic (3-5 min), followed by questions about it from the examiners (5-10 min). At the end, the examiners might relate their questions to the full curriculum (i.e., some of the other exam topics). For each of the possible exam topics (curriculum), the student is expected to know the central concepts, methods, theories, and problems discuss in class and be able to explain and exemplify them. Moreover, for those exam topics where there are hand-in exercises, the student will be expected to be able to explain how they would solve (or solved) the exercise (and details of what code would be needed (or that they used)).
Exam code(s)	Exam code(s) : U60058

Course days:

Hold: 1

Data & Things (COMP)

time	30-01-2024 08:15 til 30-01-2024 12:00
location	44.2-40 - theory room (50)
Teacher	Jens Ulrik Hansen (jensuh@ruc.dk) Hua Lu (luhua@ruc.dk)

Data & Things (COMP)

time	05-02-2024 08:15 til 05-02-2024 12:00
location	15.0-003 - auditorie 15 (68)
Teacher	Hua Lu (luhua@ruc.dk) Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time	07-02-2024 08:15 til 07-02-2024 16:00
location	44.2-40 - theory room (50)
Teacher	Hua Lu (luhua@ruc.dk) Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time	09-02-2024 08:15 til 09-02-2024 12:00
location	44.2-40 - theory room (50)
Teacher	Jens Ulrik Hansen (jensuh@ruc.dk) Hua Lu (luhua@ruc.dk)

Data & Things (COMP)

time	12-02-2024 08:15 til 12-02-2024 12:00
location	44.2-40 - theory room (50)

Teacher   Hua Lu (luhua@ruc.dk)
           Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time   14-02-2024 08:15 til
           14-02-2024 16:00

location   44.2-40 - theory room (50)

Teacher   Hua Lu (luhua@ruc.dk)
           Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time   16-02-2024 08:15 til
           16-02-2024 12:00

location   44.2-40 - theory room (50)

Teacher   Hua Lu (luhua@ruc.dk)
           Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time   19-02-2024 08:15 til
           19-02-2024 12:00

location   44.2-40 - theory room (50)

Teacher   Jens Ulrik Hansen (jensuh@ruc.dk)
           Hua Lu (luhua@ruc.dk)

Data & Things (COMP)

time   21-02-2024 08:15 til
           21-02-2024 12:00

location   44.2-40 - theory room (50)

Teacher   Hua Lu (luhua@ruc.dk)
           Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time   23-02-2024 08:15 til
           23-02-2024 12:00

location	44.2-40 - theory room (50)
Teacher	Jens Ulrik Hansen (jensuh@ruc.dk) Hua Lu (luhua@ruc.dk)

Data & Things (COMP)

time	26-02-2024 08:15 til 26-02-2024 12:00
location	44.2-40 - theory room (50)
Teacher	Hua Lu (luhua@ruc.dk) Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time	28-02-2024 08:15 til 28-02-2024 12:00
location	44.2-40 - theory room (50)
Teacher	Hua Lu (luhua@ruc.dk) Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time	01-03-2024 08:15 til 01-03-2024 12:00
location	44.2-40 - theory room (50)
Teacher	Hua Lu (luhua@ruc.dk) Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time	04-03-2024 08:15 til 04-03-2024 12:00
location	44.2-40 - theory room (50)
Teacher	Hua Lu (luhua@ruc.dk) Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time	06-03-2024 08:15 til 06-03-2024 12:00
location	44.2-40 - theory room (50)
Teacher	Hua Lu (luhua@ruc.dk) Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things (COMP)

time	08-03-2024 08:15 til 08-03-2024 12:00
location	44.2-40 - theory room (50)
Teacher	Jens Ulrik Hansen (jensuh@ruc.dk) Hua Lu (luhua@ruc.dk)

Data & Things - Questions (COMP)

time	13-03-2024 08:15 til 13-03-2024 12:00
location	44.2-40 - theory room (50)
Teacher	Jens Ulrik Hansen (jensuh@ruc.dk) Hua Lu (luhua@ruc.dk)

Data & Things - Hand-in (COMP)

time	15-03-2024 10:00 til 15-03-2024 10:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt

Data & Things - Oral examination (COMP)

time	21-03-2024 08:15 til 21-03-2024 18:00
Teacher	Hua Lu (luhua@ruc.dk) Jens Ulrik Hansen (jensuh@ruc.dk)

Data & Things - Oral examination (COMP)

time	22-03-2024 08:15 til 22-03-2024 18:00
Teacher	Jens Ulrik Hansen (jensuh@ruc.dk) Hua Lu (luhua@ruc.dk)

Data & Things - Reexam - Hand-in (COMP)

time	08-08-2024 10:00 til 08-08-2024 10:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt

Data & Things - Oral reexamination (COMP)

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