

SYLLABUS

Mobile and distributed computing systems 7.5 credits D7024E

Mobila och distribuerade datorsystem

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2022-02-11**

Mobile and distributed computing systems 7.5 credits D7024E

Mobila och distribuerade datorsystem

Second cycle, D7024E

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Mobila system	Computer Technology

Main field of study

Computer Science and Engineering

Entry requirements

Courses of at least 60 hp at 1st cycle level, whereof the following courses (or corresponding knowledge) are required: object-oriented programming 7.5 hp (e.g., D0010E), algorithms and data structures 7.5 hp (e.g., D0012E), real-time systems 7.5 hp (e.g., D0003E), database technology (e.g., D0018E), computer communication (e.g., D0002E)

Good knowledge in English equivalent to English 6.

Alternative:

Alternative to completed courses can be corresponding knowledge acquired through work within the IT-sector.

Selection

The selection is based on 30-285 credits

Course Aim

You should be able to show knowledge and abilities as follows:

- Knowledge on architectures of some different classes of distributed systems, both decentralized and partly centralized.
- Ability to creatively and critically model, formulate and implement a decentralized distributed system using research paper(s), various methods and tools for distributed system development.
- Ability to evaluate and analyze trade-offs (pros and cons) of different types of architectures.
- Ability to carry out agile development of a distributed system.
- Ability to judge societal and ethical aspects related to distributed systems.

Contents

The course covers:

- Architectures of mobile & distributed computing systems, peer-to-peer and cloud systems.
- Distributed communication models (e.g., remote procedure calls, message queues, pubsub). NAT/FW traversal
- Marshaling/serialization, models and tools for direct and indirect communication.
- Global consensus and distributed state synchronization.
- Cloud platforms, virtual machines and containers.
- SOA and Microservices distributed models.
- Mobility and security
- Ad-hoc networking and Information centric networks (ICN)
- Network infrastructure and security for mobile and distributed computing systems
- Distributed file systems and storage.
- Distributed digital currency, ledgers, blockchains.
- Gaming platforms
- Distributed data analytics and MapReduce

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

- lectures and assignments discussed in class.
- quizzes.
- seminars by students where scientific publications are presented.
- lab assignment.

Recorded lectures will be provided to registered participants. During scheduled labs, supervisors will be available (e.g., online). At other times correspondence is in the course room or by email.

One large lab assignment is carried out in small groups of students. It is problem oriented and defined at a high level by a research paper in order to practice agile development (SCRUM) in a small project, according to CDIO (Conceive-Design-Implement-Operate). It is your task to conceive the solution by specifying objectives and requirements. You must design your solution, plan the implementation and demonstrate how it is operated at sprint reviews. You will maintain a backlog of identified and prioritized tasks. At the sprint review, your lab supervisor will provide feed-back and feed-forward. Your final result should be part of your portfolio.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Assessment is carried out by lab reporting, seminar, home exam and quizzes. Each part has a weight in the online course room. To pass the course, it is necessary to pass the lab, the seminar and the home exam (while the results on quizzes are only weighted into the final grade). The course grade on the scale U 3 4 5 is given by the weighted results of the parts as shown in the online course room. Note therefore that the grade on the exam may differ from the total course grade.

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term “unauthorized aids” refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Laboratory work	U G#	3	Mandatory	A09	
0003	Seminar	U G#	1.5	Mandatory	A09	
0004	Take-home examination	G U 3 4 5	3	Mandatory	A11	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Jonny Johansson, HUL SRT 2022-02-11

Syllabus established

by the Department of Computer Science and Electrical Engineering 2008-12-15