

Course

LCSS - Large and Cloud-based Software-Systems

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General information

Long name	Large and Cloud-based Software-Systems
Approving CModule	LCSS MaTIN
Responsible	Prof. Dr. René Wörzberger Professor Fakultät IME
Organisation and materials	Ilu course
Level	Master
Semester in the year	summer semester
Duration	Semester
Hours in self-study	78
ECTS	5
Professors	Prof. Dr. René Wörzberger Professor Fakultät IME
Requirements	<ul style="list-style-type: none">advanced programming skillsbasic knowledge of web technologiesbasic knowledge of databasesbasic knowledge in software architecturesbasic knowledge of Unified Modeling Language (UML)
Language	English

Overview video



Final exam

Details

The final examination is either written or oral. Students must demonstrate that they can apply the knowledge and skills of the course.

Minimum standard

50% of all achievable points

Exam Type

The final examination is either written or oral. Students must demonstrate that they can apply the knowledge and skills of the course.

^ Lecture / Exercises

Learning goals

Knowledge

Basic concepts of large distributed systems

Quality attributes and their interdependencies

Formulate and analyze requirements for response times, throughput and utilization of a system
Analyze and formulate requirements for the reliability of a system
Basic concepts of maintainability of a system
Basic concepts of the security of a system
System design goals, requirements, principles and patterns
Decomposition patterns
Trading the advantages and disadvantages of monolithic architectures against architectures of distributed systems (microservices)
Patterns for scaling systems
Communication patterns in distributed systems
Modeling of large systems from different viewpoints with the Unified Modeling Language (UML)
Common infrastructure and middleware components in large systems
Principles and terms of cloud computing
Virtualization and container technologies
Application layer protocol, especially HTTP and related technologies and standards such as REST, OpenAPI, GraphQL, gRPC, WebSockets, Server-sent events.
Web security protocols such as TLS, OAuth, OpenID Connect
Messaging and streaming
Database systems, their data models, scaling and consistency models
Distributed database transaction programming

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Exercises (whole course)	1

Separate exam

^ Practical training

Learning goals

Skills

Be able to formulate and present a research question in the topic area of the course.

Design an application prototype that serves to investigate the research question.

Develop the application prototype and run it in the cloud

Design and conduct test scenarios and experiments with the application prototype to answer the research question.

Consolidate results into one report according to an IEEE template

Work collaboratively in a team of about four people

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	1

Separate exam

Exam Type

working on projects assignment with your team e.g. in a lab)

Details

The lab consists of several milestones and attendance dates, in which the research question, the design of the prototype, a mutual review, the presentation and documentation of the final results must be submitted or presented.

The performance in the lab will be 50% of the final grade.

Minimum standard

A qualitatively and quantitatively sufficient contribution of each team member must be evident in the presentations and deliveries.