Course guide
270636 - DS - Decentralized Systems

Last modified: 04/02/2025

Unit in charge: Barcelona School of Informatics
Teaching unit: 701 - DAC - Department of Computer Architecture.

Degree: MASTER'S DEGREE IN INNOVATION AND RESEARCH IN INFORMATICS (Syllabus 2012). (Optional subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: FELIX FREITAG

Others: Segon quadrimestre:
ROGER BAIG VIÑAS - 10
FELIX FREITAG - 10

PRIOR SKILLS

Computer networks.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEC3. Ability to apply innovative solutions and make progress in the knowledge that exploit the new paradigms of Informatics, particularly in distributed environments.
CEE2.1. Capability to understand models, problems and algorithms related to distributed systems, and to design and evaluate algorithms and systems that process the distribution problems and provide distributed services.
CEE2.2. Capability to understand models, problems and algorithms related to computer networks and to design and evaluate algorithms, protocols and systems that process the complexity of computer communications networks.

Generical:
CG5. Capability to apply innovative solutions and make progress in the knowledge to exploit the new paradigms of computing, particularly in distributed environments.

Transversal:
CTR6. REASONING: Capacity for critical, logical and mathematical reasoning. Capability to solve problems in their area of study. Capacity for abstraction: the capability to create and use models that reflect real situations. Capability to design and implement simple experiments, and analyze and interpret their results. Capacity for analysis, synthesis and evaluation.

TEACHING METHODOLOGY

Theory and participatory classes, readings of research papers, presentation of topics by students, development of a course work.

LEARNING OBJECTIVES OF THE SUBJECT

1.Review papers

STUDY LOAD

Type	Hours	Percentage
Hours large group	27,0	18.00
Hours small group	27,0	18.00
Self study	96,0	64.00

Total learning time: 150 h

CONTENTS

Fundamental concepts

Description:
Peer-to-peer and overlay networks

Routing in overlay networks

Description:
Routing in unstructured and structured overlay networks

Techniques and models

Description:
Publish/subscribe, group communication, self-properties, incentives, management, resource allocation, security and anonymity, characterization and evaluation.

Applications

Description:
Content and media distribution, storage, file sharing, communication, computing, social networks

ACTIVITIES

Course presentation

Full-or-part-time: 3h
Self study: 1h
Theory classes: 2h

Fundamental concepts in peer-to-peer and overlay networks

Specific objectives:
1

Related competencies :
CEE2.2. Capability to understand models, problems and algorithms related to computer networks and to design and evaluate algorithms, protocols and systems that process the complexity of computer communications networks.
CEC3. Ability to apply innovative solutions and make progress in the knowledge that exploit the new paradigms of Informatics, particularly in distributed environments.
CEE2.1. Capability to understand models, problems and algorithms related to distributed systems, and to design and evaluate algorithms and systems that process the distribution problems and provide distributed services.
CG5. Capability to apply innovative solutions and make progress in the knowledge to exploit the new paradigms of computing, particularly in distributed environments.
CTR6. REASONING: Capacity for critical, logical and mathematical reasoning. Capability to solve problems in their area of study. Capacity for abstraction: the capability to create and use models that reflect real situations. Capability to design and implement simple experiments, and analyze and interpret their results. Capacity for analysis, synthesis and evaluation.

Full-or-part-time: 20h
Self study: 10h
Theory classes: 10h

Routing in unstructured and structured overlay networks

Full-or-part-time: 12h
Self study: 6h
Theory classes: 6h

Techniques and models

Full-or-part-time: 20h
Self study: 10h
Theory classes: 10h

Applications

Full-or-part-time: 18h
Self study: 10h
Theory classes: 8h

Course work proposal

Full-or-part-time: 6h
Self study: 6h

Discussion leader

Full-or-part-time: 8h
Self study: 8h

Paper review work

Full-or-part-time: 20h
Self study: 20h

Q&A research

Presentation of course work

Full-or-part-time: 34h
Self study: 34h

Proposal course work

Full-or-part-time: 1h
Theory classes: 1h

Discussion leader

Full-or-part-time: 2h
Theory classes: 2h

Paper review work

Full-or-part-time: 2h
Theory classes: 2h

Q&A research

Full-or-part-time: 2h
Theory classes: 2h

Presentation final course work

Full-or-part-time: 2h
Theory classes: 2h

GRADING SYSTEM

The evaluation of the course is based on the participation of students in class activities, the students' review and assessment of reports/papers and the development of a course work on specific topics.

NF = 0,3 * PR + 0,2 * PAR + 0,5 * DT
where:

NF = Final mark of the course
PR = Paper reviews and assessment
PAR = Participation in activities
DT = Work on specific topic

BIBLIOGRAPHY

Basic:
- The course will not rely on any basic bibliography, but on a set of research papers that address topics of the different sections of the program of the course..