Course guides
270636 - DS - Decentralized Systems

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: 2021 ECTS Credits: 6.0 Languages: English

LECTURER

Coordinating lecturer: FELIX FREITAG - LEANDRO NAVARRO MOLDES

Others: Segon quadrimestre:
FELIX FREITAG - 10
LEANDRO NAVARRO MOLDES - 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory classes</td>
<td>27,0</td>
<td>18.00</td>
</tr>
<tr>
<td>Theory classes</td>
<td>27,0</td>
<td>18.00</td>
</tr>
<tr>
<td>Self study</td>
<td>96,0</td>
<td>64.00</td>
</tr>
</tbody>
</table>

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
  Theory classes: 2h
  Self study: 1h
### Fundamental concepts in peer-to-peer and overlay networks

**Specific objectives:**

1. 

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

### Routing in unstructured and structured overlay networks

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

### Techniques and models

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

### Applications

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

### 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
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.

\[ NF = 0.3 \times PR + 0.2 \times PAR + 0.5 \times DT \]

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.