

## Course guide

### 270637 - FINE - Future Internet Networks

Last modified: 13/07/2022

**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:** 2022    **ECTS Credits:** 6.0    **Languages:** English

#### LECTURER

---

**Coordinating lecturer:** JOSEP SOLE PARETA

**Others:** Primer quadrimestre:  
SERGI ABADAL CAVALLÉ - 10  
ROGER BAIG VIÑAS - 10  
PERE BARLET ROS - 10  
JORDI PERELLO MUNTAN - 10  
JOSEP SOLE PARETA - 10

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

---

**Specific:**

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.

**Transversal:**

CTR3. TEAMWORK: Capacity of being able to work as a team member, either as a regular member or performing directive activities, in order to help the development of projects in a pragmatic manner and with sense of responsibility; capability to take into account the available resources.

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.

**Basic:**

CB6. Ability to apply the acquired knowledge and capacity for solving problems in new or unknown environments within broader (or multidisciplinary) contexts related to their area of study.

CB7. Ability to integrate knowledges and handle the complexity of making judgments based on information which, being incomplete or limited, includes considerations on social and ethical responsibilities linked to the application of their knowledge and judgments.

CB8. Capability to communicate their conclusions, and the knowledge and rationale underpinning these, to both skilled and unskilled public in a clear and unambiguous way.

CB9. Possession of the learning skills that enable the students to continue studying in a way that will be mainly self-directed or autonomous.

#### TEACHING METHODOLOGY

---

The methodology of this course will follow the criteria established by the Superior European Education Space (SEES), which objective is that the students "learn to learning". Besides of the attendance and participation in the lectures, the course will rely in two main tasks, namely one consisting of preparing questions and answers based on the specific content taught in class, and the other on the realisation of a Technical Report (done in groups of 2 or 3 students) that will be presented to the class at the end of the course. The students will be also requested to read some research papers related with subjects of the course, that later on will be discussed in specific panel sessions.



## LEARNING OBJECTIVES OF THE SUBJECT

- 1.Objective of the discussion sessions based on selected readings: Fosters autonomous learning and team work skills.
- 2.Objective of preparing a set of question for feeding the midterm exams: Comprehensive learning, ability to summarise and of abstracting concepts.
- 3.Objective of the technical report: Enhance the cooperative learning and the capacity of synthesising and transmit concepts.
- 4.Objective of the lectures: 1) The impact that the tremendous explosion of the use of Internet is having in the in the networking technology evolution. 2) The contribution of Internet in the global energy consumption and the mechanisms to counteract this fact. 3) The new networking paradigms and its consistence with the existing ones.

## STUDY LOAD

Type	Hours	Percentage
Hours large group	54,0	36.00
Self study	96,0	64.00

**Total learning time:** 150 h

## CONTENTS

### Next Generation Internet

**Description:**

- Internet trends
- Evolution of the IP network architecture
- IP Traffic Monitoring and Analysis
- The Internet of things

### Backbone Network Technologies

**Description:**

- SDH and Optical networks
- Control Plane
- Traffic engineering and routing schemes
- Multilayer resilience networks

### Energy Oriented Internet

**Description:**

- Energy consumption in Internet: The problem
- Optimising the energy consumption in the network
- Datacenters and Clouds

### New Networking Paradigms

**Description:**

- Nano-communications and Networks of nano-devices
- Introducing graphene and its impact in miniaturised wireless communications
- Applications of miniaturised wireless communications

## GRADING SYSTEM

---

The evaluation and marking of the students of this course will be done according with the following percentages:

- Attendance to the lectures: 10%
- Panel Sessions on research papers (chairing the panel and participating in the debate): 10%
- Preparation of exam-like Questions\*: 10%
- Preparation and presentation of a Technical Report (in groups of 2 or 3 students): 20%
- Midterm exams (x 2): 50%

(\*) During the course the students will have to prepare three sets (one per each of the main subjects of the course) of 2 or 3 questions (and their answers) that can be included in the midterm exams of the course (i.e., they have to be not too easy or extremely difficult questions, but fitting with the level taught in the course).

## BIBLIOGRAPHY

---

### Basic:

- The course will not rely in any basic bibliography which will be yearly updated but in a set of research papers addressing topics of the different Sections of the programe of the course.