# Course guide
# 270638 - IAS - Internet Applications and Security

**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:** JAIME M. DELGADO MERCE

**Others:** Primer quadrimestre:
JAIME M. DELGADO MERCE - 10

## PRIOR SKILLS

Basic knowledge of programming, communication networks and coding of audiovisual content.

## DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

**Specific:**
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.

**Generical:**
CG1. Capability to apply the scientific method to study and analyse of phenomena and systems in any area of Computer Science, and in the conception, design and implementation of innovative and original solutions.
CG4. Capacity for general and technical management of research, development and innovation projects, in companies and technology centers in the field of Informatics Engineering.
CG5. Capability to apply innovative solutions and make progress in the knowledge to exploit the new paradigms of computing, particularly in distributed environments.

**Transversal:**
CTR4. INFORMATION LITERACY: Capability to manage the acquisition, structuring, analysis and visualization of data and information in the area of informatics engineering, and critically assess the results of this effort.
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:**
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.

## TEACHING METHODOLOGY

The course is very interactive with some introductory topics from the Professor and a few assignments in which students present papers and discuss conclusions.

In particular, students prepare one assignment for analysis and discussion on specific advanced topics or standards, and another one more on research.

In the first assignment, students present the results of their analysis and lead a discussion on this with rest of students.

In the second one, students make a small research project led by the Professor (on a specific topic: what is done? what is not solved? ideas to solve it). They write a short paper and make a presentation where they answer questions and criticisms from the Professor and the other students.

## LEARNING OBJECTIVES OF THE SUBJECT

1.Standards
2.Internet multimedia applications
3.Internet security

## STUDY LOAD

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

**Total learning time:** 150 h

## CONTENTS

### Introduction

**Description:**
Subject introduction.
Application layer.
Web: HTTP.
XML (eXtensible Markup Language).
Standardization.

### Security in applications

**Description:**
Threats and mechanisms.
Cryptography.
PKI (Public Key Infrastructure).
Security and Privacy by Design.
Security in application layer protocols.
Security in formats (XML, JSON): Encryption, Signature.
Specific security protocols: SAML, OAuth, JWT.
Internet applications privacy, access control
Example in eHealth.
Security in multimedia content (DRM).

### Multimedia content

**Description:**
Life cycle.
Content architectures.
Content types: Characters, Audio, Images, Video.
Containers.
Metadata.

### Multimedia content transmission

**Description:**
HTML5 support to multimedia transmission.
Streaming protocols.
Streaming with HTTP.
DASH.

## ACTIVITIES

### Development of topic 1

**Specific objectives:**
1, 2

**Related competencies :**
CG1. Capability to apply the scientific method to study and analyse of phenomena and systems in any area of Computer Science, and in the conception, design and implementation of innovative and original solutions.
CG5. Capability to apply innovative solutions and make progress in the knowledge to exploit the new paradigms of computing, 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.
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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.

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

### Development of topic 2

**Specific objectives:**
1, 3

**Related competencies :**
CG4. Capacity for general and technical management of research, development and innovation projects, in companies and technology centers in the field of Informatics Engineering.
CG1. Capability to apply the scientific method to study and analyse of phenomena and systems in any area of Computer Science, and in the conception, design and implementation of innovative and original solutions.
CG5. Capability to apply innovative solutions and make progress in the knowledge to exploit the new paradigms of computing, 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.
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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.

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

### Development of topic 3

**Specific objectives:**
1, 2

**Related competencies :**
CG1. Capability to apply the scientific method to study and analyse of phenomena and systems in any area of Computer Science, and in the conception, design and implementation of innovative and original solutions.
CG5. Capability to apply innovative solutions and make progress in the knowledge to exploit the new paradigms of computing, 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.
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.
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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.

**Full-or-part-time:** 8h
Theory classes: 4h
Self study: 4h

**Development of topic 4**

**Specific objectives:**
1, 2

**Related competencies :**
CG1. Capability to apply the scientific method to study and analyse of phenomena and systems in any area of Computer Science, and in the conception, design and implementation of innovative and original solutions.
CG5. Capability to apply innovative solutions and make progress in the knowledge to exploit the new paradigms of computing, 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.
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CTR4. INFORMATION LITERACY: Capability to manage the acquisition, structuring, analysis and visualization of data and information in the area of informatics engineering, and critically assess the results of this effort.
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.

**Full-or-part-time:** 8h
Theory classes: 4h
Self study: 4h

**Presentations and discussion students' assignments**

**Specific objectives:**
1, 2, 3

**Related competencies :**
CG4. Capacity for general and technical management of research, development and innovation projects, in companies and technology centers in the field of Informatics Engineering.
CG1. Capability to apply the scientific method to study and analyse of phenomena and systems in any area of Computer Science, and in the conception, design and implementation of innovative and original solutions.
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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.

**Full-or-part-time:** 102h
Theory classes: 24h 36m
Self study: 77h 24m

## GRADING SYSTEM

Tests on the topics developed by the Professor (T1 and T2).
An assignment on analysis and discussion (A) and an assignment on research (R).
(A) Analysis & Discussion of a document or topic. Students provide documentation + short presentation and lead class discussion. Students not presenting should make questions showing their understanding of the topic.
(R) Research work. Students provide documentation + "long" presentation + interview (if needed).
Final mark: (T1 * 0,2) + (A * 0,3) + (R * 0,3) + (T2 * 0,2)
Assessment of A includes:
Content (35%), Presentation (30%), Lead discussion (20%), Others' discussion (15%).
Assessment of R includes:
Content (35%), Presentation (25%), Questions (15%), Report (25%).
T1 and T2 marks could be increased (factor F) with the evaluation of n (number to define) "dairy short tests" (mark D for every dairy test):
Increase factor (F) = 0,25 * ( Σn Di )/ n
The increased Ti mark would be: Ti * (1+F). 0

## BIBLIOGRAPHY

**Basic:**
- Stallings, W.; Brown, L. Computer security: principles and practice. 4th ed. Pearson Education, 2018. ISBN 9781292220611.
- Delgado, Jaime. Slides. 2021.