

**Seguretat de Xarxes i Aplicacions Distribuïdes****2012/2013**

Code: 42241

ECTS Credits: 6

Degree	Syllabus	Type	Year	Semester
4313133 Còmput d'Altes Prestacions, Teoria de la Informació i Seguretat / High Performance Computing, Information Theory and Security	1094 Còmput d'Altes Prestacions, Teoria de la Informació i Seguretat / High Performance Computing, Information Theory and Security	P	1	0

**Contact**

Name: Joan Borrell Viader

Email: Joan.Borrell@uab.cat

**Use of languages**

Principal working language: anglès (eng)

**Prerequisites**

There are no requirements.

**Objectives and Contextualisation**

The objective of this module consists of providing an introduction to information processing, emphasizing the mathematical theory of information and its treatment, the data compression and/or images coding, the encoding for error correction, techniques and cryptographic encoding for the security of the information, applications to communications networks, and the design of applications.

After completeness of the module, the student will be able of:

1. To understand the attacks and prevention techniques for computer networks.
2. To gain some basic knowledge on cryptography.
3. To analyze and to evaluate the implementation requirements of security algorithms.
4. To understand the main characteristics of advanced networks and their associated security risks.

**Skills**

- Analyse, synthesise, organise and plan projects related to information theory, security and high performance computing.
- Apply the functions and operations of Internet, new generation network technologies and protocols, component models, intermediate software and services to systems design.
- Apply the methodology of research, techniques and specific resources for investigating and producing innovative results in a certain specialised field.
- Design solutions for complex information theory problems, analysing different technical and technological solutions and backing up these decisions with efficient criteria.
- Direct innovation and research projects and work teams in the area of information theory, security and high performance computing.
- Innovate in the search for new spaces / areas in one's field of work.
- Possess and comprehend knowledge that offers the basis and opportunity to be original in the development and/or application of ideas, frequently in a research context.
- Recognise the human, economic, legal and ethical dimensions of professional exercise.
- Show responsibility in the handling of information and knowledge, and in the management of

multidisciplinary groups and/or projects.

- Students must possess learning abilities to enable them to continue studying in a way that will to a large extent have to be self-managed and autonomous.

## Learning outcomes

1. Analyse and evaluate the requirements for the implementation of network security algorithms
2. Analyse, synthesise, organise and plan projects related with information theory, security and high performance computing
3. Apply the methodology of specific research, techniques and resources for investigating and producing innovative results in a certain specialised field
4. Formulate methods for incorporating security into different aspects related to new generation networks.
5. Innovate in the search for new spaces / areas in one's field of work
6. Plan and develop research projects with content related to the security of new generation networks
7. Possess and comprehend knowledge that offers the basis and opportunity to be original in the development and/or application of ideas, frequently in a research context
8. Recognise attacks and prevention techniques for them on the different levels of conventional and new generation computer networks.
9. Recognise the human, economic, legal and ethical dimensions of professional exercise
10. Show responsibility in the handling of information and knowledge, and in the management of multidisciplinary groups and/or projects
11. Students must possess learning abilities to enable them to continue studying in a way that will to a large extent have to be self-managed and autonomous

## Content

1. Introduction to Internet security
2. Attacks and prevention mechanisms at network layer
3. Attacks and prevention mechanisms at transport layer
4. Attacks and prevention mechanisms at application layer
5. Intrusion detection systems
6. Introduction to advanced networks security
7. Mobile IP
8. Ad-hoc Networks and pervasive computing
9. Distributed hash tables and Service Discovery
10. Wireless sensor networks and RFID
11. Distributed applications
12. Delay- and Disruption-Tolerant Networks (DTNs)
13. Mobile agents and their applications
14. Authorization schemes in distributed applications
15. Trust Management in distributed applications

## Methodology

The methodology applied to the student work will combine the attended lectures, the laboratories, the independent work of the student, the presentation of working papers throughout the course, and the oral and public dissertation about a specific subject previously approved.

Distribution of the tasks:

- Attended activities: 30%
- Guided learning activities (outside classroom): 30%
- Learning self-activities (outside classroom): 40%

## Activities

Title	Hours	ECTS	Learning outcomes
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<b>Type: Directed</b>			
Homework	44	1.76	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
<b>Type: Supervised</b>			
Master classes	45	1.8	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
<b>Type: Autonomous</b>			
Learning	60	2.4	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

## Evaluation

The final evaluation will take into account the portfolio delivered by the students, the attendance and participation in class, and the oral presentation.

1. Attendance and active participation are compulsory. At least an 80% of the lectures shall be attended. Absences might be compensated with a home-work after agreement with the teacher. Mark: 20%.
2. Class activities will be proposed. Some home-works will be compulsory, others will be optional. Mark: 40%.
3. Oral presentation of a particular subject. Presentation in English is strongly advised. Mark: 40%.

## Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Attendance and active participation	20%	0	0	1, 4, 6, 7, 8, 11
Class activities	40%	0	0	1, 4, 6, 7, 8, 11
Oral presentation	40%	1	0.04	1, 4, 6, 7, 8, 11

## Bibliography

Selected journal papers.