Course guide
300310 - SCCBD-OT - Smart Cities: Cybersecurity and Big Data

Last modified: 08/06/2023

Unit in charge: Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: 701 - DAC - Department of Computer Architecture.
744 - ENTEL - Department of Network Engineering.

Degree: BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish, English

LECTURER

Coordinating lecturer: Definit a la infoweb de l'assignatura.

Others: Definit a la infoweb de l'assignatura.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. CE 21 SIS. Capacidad para construir, explotar y gestionar las redes, servicios, procesos y aplicaciones de telecomunicaciones, entendidas éstas como sistemas de captación, transporte, representación, procesado, almacenamiento, gestión y presentación de información multimedia, desde el punto de vista de los sistemas de transmisión.(CIN/352/2009, BOE 20.2.2009.)
2. CE 24 TEL. Capacidad de describir, programar, validar y optimizar protocolos e interfaces de comunicación en los diferentes niveles de una arquitectura de redes. (CIN/352/2009, BOE 20.2.2009.)
3. CE 27 TEL. Capacidad de programación de servicios y aplicaciones telemáticas, en red y distribuidas.(CIN/352/2009, BOE 20.2.2009.)

Generical:
8. EFFICIENT USE OF EQUIPMENT AND INSTRUMENTATION - Level 3: Design experiments, measurements, subsystems and systems, equipment and tools most appropriate laboratory. Knowing not only benefits but also the limitations of the equipment and resources. Conduct assessments and evaluations critically, making decisions according to the overall system specifications or service.

Transversal:
4. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
5. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
6. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
7. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
9. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

After completing the course, students should be able to:
- Describe the problem of managing large amounts of data (distributed, performance, parallelization and scalability)
- Describe architectural models for managing large amounts of data
- Implement applications that manipulate large amounts of data distribution using current tools.
- List and describe the usefulness of different types of algorithms for predictive analysis in smart cities.
- Analyze the behavior of the network, users and content in smart cities using tools of data analysis and recommendation.
- Analyze the modernization of electronic electoral processes and help increase citizens' trust in e-democracy
- Describe the different data formats used in smart cities and problems related
- In the world of augmented reality, identify the sensors used, their features and map formats that can be used
- Identify the problems associated with security on smart grids
- Describe the basic aspects of an eHealth environment

STUDY LOAD

Type	Hours	Percentage
Hours small group	32,5	21.67
Self study	84,0	56.00
Guided activities	1,0	0.67
Hours large group	32,5	21.67

Total learning time: 150 h

CONTENTS

(ENG) - GESTIÓ DE DADES DISTRIBUIDES

Description:
The problem of managing large volumes of data
Cost, parallelization and scalability of data manipulation
Architectural model of data manipulation: Map & Reduce
Examples of existing tools: Apache Hadoop

Full-or-part-time: 25h
Theory classes: 5h 30m
Laboratory classes: 5h 30m
Self study : 14h

(ENG) - ALGOTISMES PER SMART CITIES

Description:
Techniques and types of algorithms to add "intelligence" to applications.
Examples of use of predictions and recommendations
- Decision support systems
- Detection of patterns
Examples of current tools: Mahout

Full-or-part-time: 50h
Theory classes: 11h
Laboratory classes: 11h
Self study : 28h

(ENG) ADVANCED SERVICES FOR SMART CITIES

Description:
The student should understand the operation / management services such as smart grids, eVoting, eHealth, fleet management, augmented reality and all kinds of services related to life in a smart city; as well as all issues of common and particular all safety. In any case the details of the contents adapted to AD project mainly chosen by the students / teachers.

Full-or-part-time: 75h
Theory classes: 16h 30m
Laboratory classes: 16h 30m
Self study : 42h

ACTIVITIES

(ENG) PRÀCTICA GUIADA D'UTILITZACIÓ DE HADOOP

Full-or-part-time: 2h
Self study: 2h

(ENG) EXERCICI AUTÒNOM D'UTILITZACIÓ DE HADOOP

Full-or-part-time: 5h 30m
Laboratory classes: 2h 45m
Self study: 2h 45m

(ENG) PRÀCTICA GUIADA D'UTILITZACIÓ DE MAHOUT

Full-or-part-time: 2h
Self study: 2h

(ENG) EXERCICI AUTÒNOM D'UTILITZACIÓ DE MAHOUT

Full-or-part-time: 11h
Laboratory classes: 5h 30m
Self study: 5h 30m

(ENG) IMPLEMENTATION OF AN ADVANCED SERVICE FOR SMART CITIES

Full-or-part-time: 15h
Laboratory classes: 10h
Self study: 5h

GRADING SYSTEM

BIBLIOGRAPHY

Basic:
- Torres, Jordi; Valero Cortés, Mateo. La Intel·ligència artificial explicada als humans. Primera edició en aquesta col·lecció. Barcelona: Plataforma Editorial, setembre de 2023. ISBN 9788419655585.
- Torres, Jordi; Valero Cortés, Mateo. La inteligencia artificial explicada a los humanos. Primera edición en esta colección. Barcelona: Plataforma Editorial, septiembre de 2023. ISBN 9788419655561.