

60922 - Heterogeneous networks

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	533 - Master's Degree in Telecommunications Engineering
ECTS	5.0
Course	1
Period	First semester
Subject Type	Compulsory
Module	---

1. Basic info

1.1. Recommendations to take this course

1.2. Activities and key dates for the course

2. Initiation

2.1. Learning outcomes that define the subject

2.2. Introduction

3. Context and competences

3.1. Goals

3.2. Context and meaning of the subject in the degree

3.3. Competences

3.4. Importance of learning outcomes

4. Evaluation

5. Activities and resources

5.1. General methodological presentation

The subject program is developed through the following methodologies:

Classroom and laboratory methodology: lectures (M1), resolution of practical problems in the classroom (M8), lab practices (M9) and evaluation (M11). Additionally, students will be personally attended through tutoring sessions (M10)

Autonomous learning: In addition to the lectures and labs, the learning activities will require autonomous learning: practical work (M13), theoretical (M14) and practical (M13) study.

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5.2.Learning activities

The designed learning process is based on the following learning activities:

A01: Lectures (32 hours): classroom activity for instructors to present the theoretical contents.

A02: Resolution of practical problems (8 hours). This activity will take place in the classroom and may require previous work from the students (A07).

A03: Practical sessions in the laboratory (10 hours). Students will do five 2-hour practical sessions in the lab. This activity will take place in the Lab 2.03 (Telematics Lab) in Ada Byron building. This work will be done in small groups and may require previous work from the students (A07).

A05: Practical assignments to develop in groups, led by instructors (20 self-learning hours).

A06: Tutoring sessions . Customized student support during office hours with the objective of revising and discussing materials and concepts presented in both lectures and labs . (6 hours).

A07: Autonomous self-learning: preparation of practical sessions and lectures, problem-solving exercises, personal study (46 self-learning hours)

A08: Examination (3 hours). Set of written tests (theoretical and practical) and presentation of reports to evaluate the student progress.

5.3.Program

The main theoretical and practical contents of the subject are organized as follows:

- General concepts and architecture paradigms .
 - o Heterogeneity in current wireless systems.
 - o Interconnection of heterogeneous networks: IEEE 802.1, vertical handover.
 - o Architecture of wireless networks.
 - o Multi-hop wireless networks: routing.
 - o Wireless sensor, mesh and vehicular networks. Applications and services.
 - Use case: wireless sensor networks.
 - o Hardware considerations.
 - o Routing.
 - o Medium Access control: IEEE 802.15.4 standard.
 - o Zigbee and 6LowPAN
 - o COAP
 - Planning and optimization in heterogeneous networks.
 - o Optimization: linear, integer linear and non-linear programming (LP, ILP, NLP). Uses cases.
 - o Game theory: applications in Wireless networks, non-cooperative games.

5.4.Planning and scheduling

The scheduling of the course is defined by the School every academic year.

5.5. Bibliography and recommended resources**Basic bibliography:**

BB Bertsimas, D. Introduction to Linear Optimization / Bertsimas D., Tsitsiklis J.N.. Athena Scientific, 1997

BB Dargie, W.. Fundamentals of Wireless Sensor Networks. Theory and Practice / - W. Dargie, C. Pellabauer Wiley, 2010.

BB Fudenberg, Drew. Game theory / Drew Fudenberg, Jean Tirole . - 4th ed. Cambridge, Mass ; London : The MIT Press, 1995

BB IEEE Xplore [Recurso electrónico] / Institute of Electrical and Electronics Engineers [New York, etc.] : Institute of Electrical and Electronics Engineers, 2002- [Publicación periódica]

BB Osborne, Martin J.. A course in game theory / Martin J. Osborne, Ariel Rubinstein. Cambridge : Massachusetts Institute of Technology Press, cop. 1994.

BB Vanderbei, Robert J.. Linear programming : foundations and extensions / Robert J. Vanderbei . - 4th ed. New York : Springer, cop. 2014

Further reading:

BC Hou, Y.T, Sherali, H.D. Applied Optimization Methods for Wireless Networks / Y. T. Hou, H. D. Sherali Cambridge : University Press, 2014

BC Pavon Mariño, Pablo. Optimization of Computer Networks : modeling and Algorithms : A Hands-On Approach Chichester : Wiley, 2016

URLs:

-IETF Request For Comments (RFC) - [<http://www.ietf.org/>]