60947 - Mission Critical Communication Systems

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	2
Period	Second semester
Subject Type	Optional
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 teaching-learning methodologies to be undertaken to achieve the proposed learning results are as follows:

Participatory lecture (35 hours). Presentation by the teacher of the main contents of the subject, combined with the active participation of students. This activity will take place in the classroom in person. This methodology, supported with the individual student's study is designed to provide students with the theoretical foundations of the subject content

Problem-based learning sessions in the classroom (9 hours). Problem solving and practical cases proposed by the

teacher, with the possibility of exposing them by students individually or in groups authorized by the teacher. This activity will take place in the classroom in person, and may require preparatory work by students.

Lab sessions (6 hours) This activity will take place in the laboratory. It is mandatory, and may require preparatory work by students.

Tutored practical works (30 hours). This activity will advance all proposed learning outcomes. Follow-up sessions will be conducted by the teacher in which each student will present their work.

Personalized attention to students through tutorials.

Assessment tests.

Personal work of the student .

5.2.Learning activities

1.- Theoretical/practical sessions in the classroom practices, whose main contents are organized as described in detail in the next section.

2.- Tutored practical work aimed at solving practical cases analysis, design, dimensioning and planning of mobile networks by applying techniques and procedures seen in theoretical and problem sessions. The evolution of the work will be presented periodically to the teacher and an explanatory final report of solving methodology followed by the student and justification of the proposed solution will be delivered.

3.- Laboratory session. Main objectives include mathematical modeling, simulation and measurements of physical blocks described in the course.

5.3.Program

Block 0. Introduction .

- *Course presentation* .

- *Overview of radio communications technologies and networks for mission critical systems*

Block 1 Radio communications systems and networks for safety-mission critical systems.

- *Use case escenarios.*
- *Functional operational and technical requirements.*
- *Technologies TETRA, APCO P25, TETRAPOL*
- *Evolution: LTE-Advanced- Rel12, TETRA Rel 2.*

Block 2. Advanced physical layer technologies for safety-mission critical systems.

- *Introduction to digital signal processing for linearization techniques: digital predistortion, cartesian loop systems with digital processing,..*
- *Reconfigurable mobile systems and evolution towards Software Defined Radio (SDN). Linearity problems and specific solutions.*
- *Advanced architectures for signal processing for mission critical services.*

5.4.Planning and scheduling

The schedule of the course will be defined by the EINA in the academic calendar of the corresponding course.

5.5.Bibliography and recomended resources

- Dunlop, John. Digital mobile communications and the TETRA system / John Dunlop, Demessie Girma, James Irvine . - [1st ed.], repr. with corr. Chichester (England) : John Wiley & Sons, 2000.
- Stavroulakis, Peter. TErrestrial Trunked RAdio TETRA A Global Security Tool / Peter Stavroulakis Springer-Verlag Berlin Heidelberg 2007.
- Mohammadi, A.. RF Transceiver Design for MIMO Wireless Communications / A. Mohammadi, F. M. Ghannouchi Springer-Verlag Berlin Heidelberg 2012.
- Kenington, P.B. High linearity RF amplifier design / P. B. Kenington Artech House.
- Kenington, P.B. RF and Baseband Techniques for Software Defined Radio / P. B. Kenington Artech House.
- Vuolevi, J.. Distortion in RF power amplifiers / J. Vuolevi, T. Rahkonen Artech House Cripps, Steve C.. RF Power amplifiers for wireless communications / Steve C. Cripps Norwood, MA : Artech House, cop. 1999
- http://www.3gpp.org/