60947 - Mission Critical Communication Systems

Información del Plan Docente

Academic Year	2017/18
Subject	60947 - Mission Critical Communication Systems
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	533 - Master's Degree in Telecommunications Engineering
ECTS	5.0
Year	2
Semester	Second semester
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, practice sessions, problem-solving, laboratory sessions, assignments, tutorials, autonomous work and study.

Students are expected to participate actively in the class throughout the semester.

5.2.Learning tasks

The course includes the following learning tasks:

- **Lectures** (35 hours). Presentation of the main course contents combined with the active participation of students. This activity will take place in the classroom. This methodology, supported by the the student's autonomous work is designed to provide the students with the necessary theoretical aspects of the course.
- **Practice sessions** (9 hours). Sessions of problem-solving and practical cases proposed by the teacher, related to the lectures. Students may present individually or in groups their results under the teacher's supervision. This activity will take place in the classroom and may require previous work.
- **Lab sessions** (6 hours). This activity will take place in the laboratory. It is mandatory, and may require preparatory work by students. Its main objectives include mathematical modeling, simulation and measurements of physical blocks described in the course.
- **Guided assignment** (30 hours). It is aimed at solving practical cases, analysis, design, dimensioning and planning of mobile networks by applying techniques and procedures seen in lectures and practice sessions. Its progress will be presented periodically to the teacher, and students will submit a final report, which will include the methodology followed and the justification of the proposed solution.
- **Tutorials**.
- **Autonomous work**.
- **Assessment tests**.

5.3.Syllabus

The course will address the following topics:

Section 0. Introduction.

- Course presentation
- Overview of radio communication technologies and networks for mission critical systems

Section 1. Radio communication systems and networks for safety-mission critical systems.

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

Section 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 architecture for signal processing for mission critical services

5.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

5.5.Bibliography and recommended 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/