

60930 - Radar, radionavegation and satellite systems

Información del Plan Docente

Academic Year	2017/18
Subject	60930 - Radar, radionavegation and satellite systems
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	533 - Master's Degree in Telecommunications Engineering
ECTS	5.0
Year	1
Semester	Second semester
Subject Type	Compulsory
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, problem-solving, laboratory sessions, group work, assignments, tutorials, and assessment.

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5.2.Learning tasks

The course includes the following learning tasks:

- **Lectures** (38 hours). Teacher's presentation of the course contents.
- **Practice sessions** (8 hours). Problem-solving is done individually or in groups.
- **Laboratory sessions**. 2 sessions of 2 hours each will be held in laboratory facilities.
- **Group assignments**. Each group of students, under the supervision of a teacher, will be assigned a case study related to radar systems.
- **Tutorials**.
- **Assessment**. A set of a final test, laboratory sessions and the group assignment.

5.3.Syllabus

The course will address the following topics:

- Topic 1. Introduction and required background
- Topic 2. Satellite communication systems
 - Basics of Orbital Mechanics and Geodesic
 - Satellite subsystems and spatial environment
 - Channel and Link Calculation
 - Communication techniques in satellite communication systems: physical layer and multiple access
- Topic 3. Radio Localization Systems
 - Coordinate and projection systems in radio localization systems. Mathematical methods for positioning estimation
 - Directional and hyperbolic Radionavigation systems: terrestrial systems
 - GNSS systems
- Topic 4. Radar Systems
 - Introduction to Radar systems.
 - Basics of Radar: pulsed and continuous wave radar
 - Environmental interference. CFAR systems
 - Advanced techniques

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

The students will have access to the lecture notes prepared by the teachers, which will cover all the contents of this course.

- Skolnik, Merrill I.. Introduction to radar systems / Merrill I. Skolnik . - 2nd ed., international ed. Aukland [etc.] : McGraw-Hill, 1981
- Levanon, Nadav. Radar principles / Nadav Levanon New York [etc.] : John Wiley & Sons, cop. 1988
- Edde, Byron. Radar : Principles, technology, applications / Byron Edde Englewood Cliffs : Prentice-Hall, cop. 1993
- Principles of modern radar / edited by Jerry L. Eaves and Edward K. Reedy New York : Van Nostrand Reinhold, cop. 1987
- Maral, Gérard. Satellite communications systems : systems, techniques and technology / Gérard Maral, Michel Bousquet . 4th ed., repr. with corr. Chichester (England) : John Wiley & Sons, 2007
- Gordon, G.D.. Principles of communications satellites / G.D. Gordon, W.L. Morgan New York: Wiley, 1993
- Roddy, J.D. Satellite Communications / J D. Roddy. . - 4th ed. Editorial McGraw Hill, 2006
- Evans, B.G.. Satellite Communications systems / B.G. Evans. - 3rd ed. The Institution of Engineering and Technology (IET), London, United Kingdom.

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- Ippolito, Louis J.. Satellite Communications Systems Engineering / Louis J. Ippolito, Jr. JohnWiley & Sons Ltd, 2008
- Forsell, J. Borje. Radionavigation systems /] Börje Forsell Artech House, 2008
- Understanding GPS : principles and applications / Elliot D. Kaplan, editor Boston [etc.] : Artech House, cop. 1996
- Gleason, S.. GNSS Applications and Methods / S. Gleason, D. Gebre-Eqziabher Artech House, 2009
- Hofmann-Wellenhof, B.. GNSS - Global Navigation Satellite Systems: GPS, GLONASS, Galileo, and more / B. Hofmann-Wellenhof, H. Lichtenegger Springer Verlag, 2007
- Grewal, M.S.. Global Navigation Satellite Systems, Inertial Navigation, and Integration / M. S Grewal, A. P. Andrews, C. G. Bartone. - 3rd ed. Wiley-Interscience, 2013