

Program	09TT- Engineering in Telecommunication Technologies and Services
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Course number and name	
Number	95000045
Name	Radiodetermination Systems Sistemas de Radiodeterminación
Semester	2

Credits and contact hours	
ECTS Credits	4.5
Contact hours	45

Coordinator's name	Javier Gismero Menoyo
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Specific course information

Description of course content

This course presents the conceptual basis and a panoramic of typical systems used in radiogoniometry (determination of the direction of a radioelectric source), radionavigation (obtaining the own position through radioelectric techniques) and radar (obtaining the position of a target through radioelectric techniques).

The operative parameters of the different systems are analyzed as well as the influence on these parameters of, among others, the used bandwidth, noise to signal ratio, waveform type, etc.

List of topics to be covered

1. Introduction
 - 1.1. Course presentation
 - 1.2. Basic definitions
 - 1.3. Positioning systems
2. Radiogoniometry
 - 2.1. Classification
 - 2.2. Systems based on amplitude comparison
 - 2.3. Interferometry
 - 2.4. Doppler effect radiogoniometry
3. Radionavigation systems
 - 3.1. Introduction. Radio beacons
 - 3.2. VOR-DME-TACAN
 - 3.3. Approach and landing systems. ILS, MLS
 - 3.4. Hyperbolic systems. Loran-C
 - 3.5. Satellital systems (GNSS)
4. Radar Systems
 - 4.1. Introduction. Classification
 - 4.2. Continuous wave radar

4.3. Pulsed radar 4.4. Radar equation		
Prerequisites or co-requisites		
None		
Course category in the program		
__ R (required)	__ E (elective)	X SE (selective elective)

Specific goals for the course
Specific outcomes of instruction
RA1: Knowledge for the selection of circuits, subsystems and systems with application in radiofrequency, microwave, radiobroadcasting, radiolinks and radiodetermination. RA2: Ability to apply the classic techniques of radiogoniometry to locate radioelectric sources. RA3: Ability to select and dimensioning the right radionavigation system for a given application RA4: Ability to select and dimensioning the right radar system (CW or pulsed, without intrapulse modulation) for a given application
Student outcomes addressed by the course
CE-ST4 CG5

Bibliography and supplemental materials
Borje Forssell. "Radionavigation Systems". Artech House, 2008. Paul Fombonne. "Radionavigation, Radiolocalization". Masson, 1983. F. Pérez. "Sistemas de Radiogoniometría". ETSIT Servicio de Publicaciones, 2000. F. Pérez. "Radiofaros y Sistemas Hiperbólicos". ETSIT Servicio de Publicaciones, 2000 Kaplan, Elliott D. "Understanding GPS : principles and applications" 2006 Artech House. F. Pérez. "Sistemas de navegación por satellite". ETSIT Servicio de Publicaciones, 2000. M.A. Richards, J.A. Scheer, W.A. Holm. "Principles of modern radar (basic principles)". Scitech, 2010. Merril I. Skolnik. "Introduction to radar systems". McGraw-Hill 2980. Moodle of the course. UPM Moodle server. http://moodle.upm.es/titulaciones/oficiales/course/

Teaching methodology			
X lectures	X problem solving sessions	__ collaborative actions	__ laboratory sessions
Other:			