Universidad Zaragoza

Year : 2020/21

60956 - Radar, radionavegation and satellite systems

Syllabus Information

Academic Year: 2020/21
Subject: 60956 - Radar, radionavegation and satellite systems
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 623 - Master's Degree in Telecommunications Engineering
ECTS: 6.0
Year: 1
Semester: First semester
Subject Type: Compulsory
Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

Methodology:

1. Lectures (43 hours) laying the theoretical foundations of the course. This task will be classroom-based and will rely on material previously delivered to the student (or available online).
2. Problems and case studies (9 hours). Problems and cases appointed by the instructor, to be solved by the students or the teacher himself, based on the programmed lectures. This activity will be classroom-based.
3. Lab Sessions (8 hours). Small groups of students will carry out simulations and experimental measurements using test equipment in order to support the knowledge acquired during the lectures. This activity will require presence at the laboratory.
4. Group assignment (25 hours). A course project, under instructor supervision, will be assigned to each group. The course project should deal some application focused on the Telecommunication field and during the supervision sessions, every student will present the advance of the required task within the work.
5. Personal attention through academic tutoring.

4.2.Learning tasks

Classroom-based learning (52 hours):

Lectures and cases according to the detailed syllabus on section 4.3 will be preliminary focused on the following topics:

Laboratory (8 hours):

Mathematical modelling, computing and simulation of Radiolocation and Satellite systems.

Seminars (25 hours)

Analysis Radar subsystem simulation, theoretical and simulation comparison.

4.3.Syllabus

Unit 0. Introduction.

- Course objetives
- Required previous knowledge.

Unit 1. Satellite Communication systems.

- Orbital Mechanics and Geodesy foundations
- Satellite Subsystems and space environment.
- Space Channel and Link budget.
- Physical Layer in Satellite Communication Systems.

Unit 2. Radionavigation systems.

- Navigation frames. Mathematical methods of positioning.
- Earth Radionavigation systems.
- GNSS systems.

Unit 3. Radar systems

- Radar introduction.
- Basic radar technologies: Pulse and CW radar.
- Clutter and Clutter Mitigation methods.
- Advanced radar techniques.

4.4.Course planning and calendar

Distribution of activities:

- Lectures and problems: four hours a week during the semester
- laboratory sessions in reduced groups
- Seminars dedicated to the radar course project and Radiolocation.

Lecture and laboratory session schedules together with evaluation dates will be provided by the university before the beginning of the semester.

4.5.Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=60930&Identificador=4879