AEROSPACE ENGINEERING (LM52)

(Brindisi - Università degli Studi)

Teaching RADAR SYSTEMS

GenCod A006600

Owner professor Giuseppe RICCI

Teaching in italian RADAR SYSTEMS

Teaching RADAR SYSTEMS

SSD code ING-INF/03

Reference course AEROSPACE ENGINEERING

Course type Laurea Magistrale

Credits 6.0

Teaching hours Front activity hours: 54.0

For enrolled in 2021/2022

Taught in 2021/2022

Course year 1

Language ENGLISH

Curriculum CURRICULUM AEROSPACE SYSTEMS

Location Brindisi

Semester First Semester

Exam type Oral

Assessment Final grade

Course timetable https://easyroom.unisalento.it/Orario

BRIEF COURSE DESCRIPTION

A review of basic concepts from signal and systems.
Generalities on radar signal processing.
The radar equation.
Electromagnetic propagation in real atmosphere.
Transmitting and receiving antennas.
Radar cross section of a target.
Clutter characteristics.
A review from probability theory.
Detection theory and CFAR techniques.
Ambiguity function of basic signals.
Accuracy of radar measurements.
Moving target indicator.

REQUIREMENTS

Knowledge (at an undergraduate level) of Signal and Systems and Probability Theory is highly desirable

COURSE AIMS	**Overview.** An introduction to the main concepts of radar systems with emphasis on radar signal processing. **Learning Outcomes**. ***Knowledge and understanding*** After the course the student should be able to describe the main blocks of a radar systems, signal and interference models, link budget analysis, application of detection theory to the design of a radar receiver, CFAR techniques, ambiguity function and measurement accuracy, the concept of moving target indicator. ***Applying knowledge and understanding*** After the course the student should be able to evaluate the performance parameters of a radar system for simplified scenarios. ***Making judgements*** Students should acquire the ability to compare pros and cons of different approaches to the solution of a specific problem through examples and problems. ***Communication*** The ability to communicate should be acquired by discussing a specific topic with a good balance of mathematical rigor and physical insights. ***Learning skills*** Selected problems will be proposed that require elaborating on introduced concepts and methods, also with the help of selected readings suggested by the instructor (from the list of references). Identifying solutions to non trivial problems will be important to be ready for autonomous lifelong learning.
TEACHING METHODOLOGY	Lectures, assigned homeworks, solution to proposed problems, and computer projects.
ASSESSMENT TYPE	Oral exam
REFERENCE TEXT BOOKS	Radar Principles by Nadav Levanon, John Wiley & Sons, 1988. Handouts (in progress).