Course guide
230632 - ARRAYS - Array Processing and Smart Antennas

Last modified: 17/06/2023

Unit in charge:	Barcelona School of Telecommunications Engineering
Teaching unit:	739 - TSC - Department of Signal Theory and Communications.

Degree:	MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Optional subject). MASTER'S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019). (Optional subject).

Academic year: 2023   **ECTS Credits:** 5.0   **Languages:** Spanish, English

LECTURER

Coordinating lecturer:	Consultar aquí / See here: https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/responsables-assignatura
Others:	Consultar aquí / See here: https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/professorat-assignat-idioma

PRIOR SKILLS

Signal Processing, Communications II.

TEACHING METHODOLOGY

master classes

LEARNING OBJECTIVES OF THE SUBJECT

The objective of the subject is to extend the traditional methods
signal processing that use temporal and/or frequency diversity,
to the cases of sensor openings with spatial diversity. The
procedures, developed in its beginnings in sonar and geophysics,
they became common in radar systems. They will later be
implemented in telecommunications via satellite and, finally, today
represent the only alternative to an increase in capacity and quality
of service, simultaneously and without an increase in bandwidth, in the
successive generations of radio communications. In this last
application, array processing techniques are referred to by
generic with the term of smart antennas. The course is structured in
topics that successively address the techniques of forming by
temporal reference, by address and by code. are finally exposed
specific techniques for diversity MIMO communication systems
both transmitting and receiving.

STUDY LOAD

Type	Hours	Percentage
Self study	86,0	68.80
Hours large group	39,0	31.20

Total learning time: 125 h

CONTENTS

1. Introduction to spatial diversity systems (6 hours)

Description:
Introduction

Full-or-part-time: 6h
Theory classes: 6h

2. Beamforming (14 hours)

3. Detection and estimation of arrival angle (8 hours)

4. Adaptive beamforming (7 hours)

5. Tx-Rx Array processing (10 hours)

GRADING SYSTEM

- Final Examen: 60%

- Participation and class assistance: 40%

RESOURCES

Other resources: