

# ADVANCED ANTENNA ENGINEERING

## 1. KEY INDICATORS

CFU/ECTS: 6

Professor: Paolo Baccarelli - Paolo Burghignoli

Contact Professor: Tel. +39 0644585452 - [paolo.baccarelli@diet.uniroma1.it](mailto:paolo.baccarelli@diet.uniroma1.it); Tel. + 39 0644585404 – [burghignoli@die.uniroma1.it](mailto:burghignoli@die.uniroma1.it)

Website Professor: <http://151.100.120.244/personale/burghignoli/index.htm>

## 2. OBJECTIVES OF THE COURSE

Antennas are fundamental components of modern wireless communication systems for smart environments such as pervasive systems for distributed information and computing, advanced space systems, intelligent transportation systems. This course aims at providing a selection of advanced topics in antenna engineering, including analytical, numerical, and experimental techniques: smart and MIMO antenna arrays; theory and applications of periodic structures; resonant and traveling-wave antennas for terrestrial and space communication systems; numerical methods and CAD tools for antennas.

## 3. ACQUIRED ABILITIES

Students who passed successfully the exam will be able to: know the principles of the main classes of array smart and MIMO; know the theory of periodic structures and the relevant main applications; know the characteristics and features of the main classes of resonant and traveling-wave antennas for terrestrial and space communication systems; use the principal commercial general-purpose electromagnetic CAD.

## 4. PROGRAM OF THE COURSE

1. Review of antenna parameters, theorems, and other fundamentals
2. Arrays and MIMO systems
3. Periodic structures and applications
4. Resonant integrated antennas
5. Planar traveling-wave antennas
6. Numerical methods and CAD

## 5. REFERENCES

C. A. Balanis, Antenna theory, analysis and design. New York, NY: Wiley Interscience, 2005, 3a ed.

R. E. Collin and F. J. Zucker, Antenna theory. New York, NY: McGraw-Hill, 1969.

R. C. Booton, Computational methods for electromagnetics and microwaves. New York, NY: Wiley, 1992, 2a ed.

Materiale integrativo (lucidi/diapositive del corso, articoli) disponibile sul sito web

## 6. COURSE WEBSITE

<http://dip-diet.unisapienza.cineca.it/node/5618#overlay-context=node/5617>

<http://151.100.120.244/personale/burghignoli/index.htm>