

Program of the course (master degree, in English), 5 credits

This course aims to provide the student with the basis of radiation theory and the most useful concepts for antenna engineering applications. After examining the radiation theory, some of the most common antennas are presented together with their application fields, ranging from telemetry to telecommunications and remote sensing. Some specific topics are finally addressed, such as noise and measurements of antenna parameters.

- The antenna as a transducer. Main parameters (directivity, gain, effective area, effective electrical and magnetical length, efficiency, matching, equivalent circuit). Characteristic polarization
- Radiation theory. Maxwell equations in differential form. Poynting vector. Retarded potentials.
- Radiation from electric hertzian dipole; near field, induction field and radiation field. Magnetic dipole. Duality. Huygens source.
- Wire antennas (short dipole, half wavelength dipole, full wavelength dipole)
- Aperture antennas (horns and parabolas)
- Antenna arrays (array factor, coupling). Broadside arrays, end-fire arrays, collinear and log-periodic arrays

Suggested text: Electromagnetic waves and antennas, J. Orphanidis