

Microwave Measurements

Lecturer: Luca Perregrini

Course name: Microwave Measurements

Course code: 505006

Degree course: Electronic Engineering

Disciplinary field of science: ING-INF/02

University credits: CFU 6

Course website: http://microwave.unipv.it/pages/microwave_measurements/

Specific course objectives

The course aim to present the techniques for measurement and characterization of circuits and antennas for applications in the microwave frequency band. The student will basically learn how to select the most appropriate instruments and components to organize a measurement setup for a given circuit. Moreover, he will be able to conduct autonomously some standard measures.

Course programme

The course will address the following topics:

- Component and devices for microwave measurements: directional couplers, circulators, attenuators, matching circuits, matched loads, filters, wavemeters, slotted lines.
- Characteristics of connectors, cables, waveguides and transitions.
- Frequency and signal generators.
- Power measurement: bolometers, detectors, and mixers.
- Impedance measurement by a reflectometer.
- Vector Network Analyzer: block diagram and calibration techniques.
- Spectrum analyzer.
- Basics of nonlinear and active circuits measurement.
- Measurement of cavity resonators.
- Antenna measurement: comparison between open space and anechoic chamber measurements; far field measurement, near field measurement (planar, cylindrical, spherical scan), compact range systems.
- Basics of electromagnetic interference measurements.
- SAR measurement.

Course entry requirements

Knowledge of electromagnetic field theory and microwave circuits, basic knowledge of antennas.

Course structure and teaching

Lectures (hours/year in lecture theatre): 30

Practical class (hours/year in lecture theatre): 20

Practicals / Workshops (hours/year in lecture theatre): 15

Suggested reading materials

Provided by the teacher.

Testing and exams

Oral examination.