UNIVERSITÀ DI PAVIA

Anno Accademico 2020/2021

MICROWAVE MEASUREMENTS

Anno immatricolazione	2019/2020
Anno offerta	2020/2021
Normativa	DM270
SSD	ING-INF/02 (CAMPI ELETTROMAGNETICI)
Dipartimento	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
Corso di studio	ELECTRONIC ENGINEERING
Curriculum	Microelectronics
Anno di corso	2°
Periodo didattico	Primo Semestre (28/09/2020 - 22/01/2021)
Crediti	6
Ore	60 ore di attività frontale
Lingua insegnamento	English
Tipo esame	ORALE
Docente	SILVESTRI LORENZO (titolare) - 6 CFU
Prerequisiti	Knowledge of electromagnetic field theory and microwave circuits, basic knowledge of antennas.
Obiettivi formativi	The course is taught in English. The course aim to present the techniques for the 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/she will be able to conduct autonomously some standard measures.
Programma e contenuti	The course will address the following topics: - Component and devices for microwave measurements: directional couplers, circulators, attenuators, matching circuits, matched loads, filters and waveguides. In the course the main characteristics of

	connectors, cables, waveguides and transitions/connectors are presented. - Frequency and signal generators. - Power measurement: bolometers, thermistors and diode detectors. - Fundamentals of the Spectrum analyzer: working principles and block diagram and technical specifications. Some practical and specific examples of usage of the instrument are analyzed. - VNA (Vector Network Analyzer): working principle, block diagram and calibration techniques (SOLT, TRL). - Antenna measurement: the topic is subdivided in two main parts; indoor (anechoic chamber) and outdoor measurements. Both the far field and near field measurement (planar, cylindrical, spherical scan) are analyzed. - Material Characterization at microwave: several approaches aim at characterizing dielectric materials at microwave are presented as: coaxial probe, trasmission/reflection method, antenna method, cavity resonators. - Basics of dosimetry: The basics of microwave dosimetry are introduced with some highlights on the SAR measurements and ICNIRP specifications.
Metodi didattici	Lectures (hours/year in lecture theatre): 30 Practical class (hours/year in lecture theatre): 20 Practicals / Workshops (hours/year in lecture theatre): 15
Testi di riferimento	Provided by the teacher. The slides are complemented with various connections to text books and Internet links.
Modalità verifica apprendimento	Oral examination. The student can decide to prepare a short presentation about his/her favorite topic of the course. In any case, the second part of the exam comprises some questions about the overall course. The minimum score to pass the exam is 18/30, the maximum score is 30/30 cum laude.
Altre informazioni	=
Obiettivi Agenda 2030 per lo sviluppo sostenibile	$lbl_legenda_sviluppo_sostenibile