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Academic Year 2010/11 (first time established in A.Y.2007/08)

02MBQJA

**Electromagnetic waves II**

1st degree and Bachelor-level of the Bologna process in Electronic And Computer Engineering - Vercelli (III FACOLTA' DI INGEGNERIA)

Teacher	Status	SSD	Les	Ex	Lab	Years Stability
Orefice Mario	PO	ING-INF/02	4	1	0	2

SSD	CFU	Activities	Area context
ING-INF/02	5	B - Caratterizzanti	Ingegneria elettronica

**Esclusioni:**[Computer networks \(02KSI\)](#)[Introduction to telecommunication networks \(01MPU\)](#)**Objectives of the course**

This course deals with the radiation of electromagnetic wave, and gives the bases to understand and analyze the phenomena of free propagation and radiation of electromagnetic waves. After having solved the radiation problem, the most simple antenna systems and components of microwave communication systems are analyzed.

**Expected skills**

After completion of the course, the student will be able to analyze plane electromagnetic waves, simple radiation problems and radiating structures described in the course.

**Prerequisites**

Electromagnetic Fields and Waves I, and all courses of Mathematics, Physics, Fundamentals of Electric Circuits, and relevant prerequisites.

**Syllabus**

Wave propagation and radiation. Plane wave propagation, polarization of electromagnetic fields. Stratified dielectric structures, planar waveguide, general concepts of optical fibers and dielectric waveguides. Solution of non homogeneous Maxwell equations: transfer function in spectral domain. Green's function as pulse response of the electromagnetic system. Solution in space domain with convolution integral. Equivalence theorem. Reciprocity theorem, Antennas and definition of their characteristic parameters: gain, directivity, effective area, EIRP, radiation impedance. Friis transmission equation. Radar equation. Wire antennas, aperture antennas, reflectors. Arrays.

**Laboratories and/or exercises**

Lectures and exercises on the content of the lectures; laboratory exercises (measurements of radiation characteristics and antennas). Computational electromagnetics exercises at LAIB.

**Bibliography**

Lecture notes (texts and slides copies) prepared by the instructor.

Moreover, as auxiliary texts ' R. E. Collin: 'Foundations for microwave engineering', McGraw-Hill, 1992. ' D.M. Pozar, 'Microwave engineering', Addison Wesley, 1990. ' D.M. Pozar, 'Microwave engineering', Addison Wesley, 1990.

**Revisions / Exam**

Written (with textbook but without personal notes) and oral examination.

Programma definitivo per l'A.A.2010/11

