UNIVERSITÀ DEGLI STUDI DELL'AQUILA
CORSI DI INGEGNERIA

A.A. 2023/2024
RF design for Internet of Things(Progettazione elettromagnetica per IoT) (I4T)
- Tognolatti Piero -

(Aggiornato il 1-12-2023)

Contenuti del corso (abstract del programma):

The course deals with the electromagnetic design of structures of interest in telecommunications and in other applications of electromagnetism. In the first part, the tools for designing microwave junctions with assigned frequency behavior are learned. In the second part we study methods for the synthesis of high performance antennas and open antennas. At the end of the course the student will be able to: - design filters and microwave impedance transformers, both by analytical and numerical techniques; - design special microwave junctions (transitions, discontinuities, couplers, etc.); - synthesize radiation pattern for antenna array ; - use software packages for the analysis and optimization of electromagnetic structures.

Programma esteso:

Multi-section impedance transformers, with binomial and Chebyshev synthesis. Equalizing networks and their limits. Lumped element matching networks. Wideband hybrid junctions. Periodic structures, microwave filters. Synthesis of filters by the method of image parameters and the method of insertion loss. Numerical methods for analysis and optimization of microwave junctions (MoM, FDTD, FEM). Techniques for array factor synthesis, Shelkunoff circle, Dolph-Chebyshev, Woodward, and Elliott synthesis.

Modalità d'esame:

Oral

Risultati d'apprendimento previsti:

Design capabilities in microwave filters, broadband impedance adaptation techniques, and, more generally, microwave passive devices. Ability to design array antennas and their power supply networks. Ability to use the most common CAD for electromagnetism.

Testi di riferimento:

David M. Pozar, Microwave Engineering (4th ed.), Wiley, 2011

Robert E. Collin, Foundation for Microwave Engineering, second edition, McGraw-Hill, 1992

Robert E. Collin, Antennas and Radiowave Propagation, McGraw-Hill, 1985

Robert S. Elliott An Introduction to Guided Waves and Microwave Circuits, Prentice-Hall,1993

E. H. Fooks, R. A. Zakarevicius, Microwave Engineering using Microstrip Circuits, Prentice-Hall, 1990