UE Microwave Circuits

Niveau d'étude
Bac +5

ECTS
6 crédits

Composante
UFR PhITEM (physique, ingénierie, terre, environnement, mécanique)

Période de l'année
Automne (sept. à dec./janv.)

- **Langue(s) d'enseignement:** Anglais
- **Forme d'enseignement :** Cours magistral
- **Ouvert aux étudiants en échange:** Oui
- **Code d'export Apogée:** PAX9ICAC

Présentation

Description

The goal of this course is to explore the theory, design and characterization techniques of the main passive circuits appearing in wireless communication systems: power dividers, matching networks, couplers, baluns, filters, …
Only passive circuits based on distributed approach (transmission lines) will be addressed, in PCB, CMOS/BiCMOS and alternative technologies, from RF to mm-wave circuits. The circuits are based on classical transmission lines like microstrip, coplanar or SIW (Substrate Integrated Waveguide), but a large focus will be done on new transmission lines based on slow-wave concepts, including slow-wave CPW, slow-wave microstrip and slow-wave SIW.
The design of tunable passive circuits will also be discussed.
The characterization techniques will be explored in theory and in practical labs.

Content: S parameters, ABCD, Y & Z matrices. Smith chart, matching networks. Signal-flow diagram. Classical low-profile transmission lines: microstrip, coplanar (CPW & CPS). Substrate integrated waveguides (SIW). Slow-wave structures. Design of power dividers, matching networks, couplers, baluns, filters, phase shifters. Characterization and de-embedding techniques.

This teaching module will be divided into 2 parts

- Microwave passive circuits (course) – 24 hours – 3 ECTS

- Lab work: Design and characterization of microwave passive circuits – 24 hours – 3 ECTS

Heures d'enseignement

UE Microwave Circuits - CMTD	Cours magistral - Travaux dirigés	24h
TP	TP	38h

Période : Semestre 9

Bibliographie

- D. M. Pozar, “Microwave Engineering”.

- Peter A. Rizzi, “Microwave Engineering: Passive Circuits”.

- Robert E. Collin, “Foundations for Microwave Engineering”.

- R. N. Simons, “Coplanar Waveguide Circuits, Components, and Systems”.

- I Wolff, “Coplanar Microwave Integrated Circuits”.

- B. Razavi“RF Microelectronics: United States Edition”.

Infos pratiques

Lieu(x) ville

Grenoble

Campus

Grenoble - Polygone scientifique