

UE Microwave Circuits



Niveau d'étude
Bac +5



ECTS
6 crédits



Composante
UFR Physique,
Ingénierie,
Terre,
Environnement,
Mécanique
(PhITEM)



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

Diplômes intégrant cet élément

- Master Electronique, énergie électrique, automatique

- › **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

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