Summary
This course is an introduction to microwaves and microwave passive circuits. A special attention is given to the introduction of the notion of distributed circuits and to the scattering matrix.

Content
Introduction: Definition of the basic notions, applications: radar, communications, satellites, space probes, microwave ovens, atomic clocks, biological effects
Microwave networks: S-parameters and scattering matrix
Microwave circuits: Description of devices with 1, 2, 3 and 4 ports. Ferrite devices: The gyromagnetic effect, isolators, circulators, switches, limiters, component insertion, filters
Device and signal measurements: Basic principles, reflectometry, vector network analyzer, attenuation and phase shift, TDR. Calibration for error compensation and deembedding. Measurement of frequency and power.

Keywords
microwaves, S-parameters, passive devices

Learning Prerequisites
Recommended courses
Electromagnetics

Learning Outcomes
By the end of the course, the student must be able to:
• Analyze Microwave circuits
• Create Microwave components
• Formalize S-parameter model

Transversal skills
• Use a work methodology appropriate to the task.

Teaching methods
Ex cathedra with demonstrations and exercises
Assessment methods
With mandatory continuous control

Resources
Bibliography
Handouts

Websites
• http://lema.epfl.ch/content/view/25/51/

Prerequisite for
Microwaves, practical work and projects