

Telecommunications systems



ECTS



Hourly volume
68h

Introducing

Description

Random signals: random process, stationarity, correlation, ergodicity, covariance, spectral density.

Digital filters: fast Fourier transform, discrete signals and systems, structure and properties of recursive and non-recursive filters, design methods.

Telecommunications systems: data rates, eye diagrams, transmission lines, baseband coding, analog and digital modulation, constellation diagrams, frames, multiplexing, channel access (FDMA, TDMA, CDMA), spread spectrum. There will also be an introduction to mobile networks, space communications and securing wireless communications. The tutorials will go into greater depth on the concepts seen in class, and will focus on well-known applications of telecommunications systems (e.g. USB, Bluetooth, FM radio, etc.). Lab classes will address the design of analog and digital modulations using Software Defined Radio (SDR) tools and an implementation on Universal Software Radio Peripherals (USRP) to develop a wireless telecommunication system. An introduction to the topic of communications security will also be illustrated.

Objectives

At the end of this module, the student should have understood and be able to explain (main concepts):

- o Definitions related to random signals
- o Basics of spectral analysis
- o Structures and design modes of digital filters
- o Operating principles of telecommunication systems

The student will be able to design a simple digital filter and the architecture of a telecommunication system: choice of the modulation, choice of the media accès type, etc.

Necessary prerequisites

Signal Process Course

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

Toulouse