Module IT.2405

Radio Communications

Person in charge: Sarah KAMEL
Prerequisite: Basic signal processing
Organization: 15 lectures of 3h de courses, 27h of project based learning.
Evaluation: Project Based Learning, exams
ECTS: 5 credits

Context

The transmitted signal over the wireless air interface is subject to different types of attenuations, transmission echoes and perturbations. The main objective of this course is to introduce all the components of a digital transmission chain that includes the compression, the channel coding and the different types of single carrier and multi-carriers modulation. The signal decoding at the receiver side will be also studied within this course.

Objectives

In terms of acquired skills, this course aims to

- Provide an efficient and uniquely decodable binary representation of the information (the text, the audio or image) in a compressed manner
- Understand the channel coding and decoding used to minimize the error occurrence during the wireless transmission
- Map the binary representation using different types of constellation
- Understand the use of a reshape filter and a matched filter
- Modulate and demodulate the signal.

Knowledge
Concepts

- Source coding methods for compressed binary data representation;
- Channel coding and decoding for information redundancy;
- Single and multi-carrier modulation.

Know How:

- Implementation of a digital transmission chain in MATLAB
- Error performance comparison of different transmission techniques

Pedagogical approach

The basics are taught as lecture courses and practical exercises. The rest of the module consists in a project-based learning that will be realized through teamwork.