COM-302 **Principles of digital communications**

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Cursus	Sem.	Type
Communication systems minor	E	Opt.
Communication systems	BA6	Obl.
Computer science	BA6	Opt.
HES -SC	E	Obl.

Language of teaching	English
Credits	6
Session	Summer
Semester	Spring
Exam	Written
Workload	180h
Weeks	14
Hours	**6 weekly**
Lecture	4 weekly
Exercises	2 weekly
Number of positions	

Summary

This course is on the foundations of digital communication. The focus is on the transmission problem (rather than being on source coding).

Content

Optimal receiver for vector channels
Optimal receiver for waveform (AWGN) channels
Various signaling schemes and their performance
Efficient signaling via finite-state machines
Efficient decoding via Viterbi algorithm
Communicating over bandlimited AWGN channels
Nyquist Criterion
Communicating over passband AWGN channels

Keywords

Detection, estimation, hypothesis testing, Nyquist, bandwidth, error probability, coding, decoding, baseband, passband, AM, QAM, PSK.

Learning Prerequisites

Required courses

Signal processing for communications and Modèles stochastiques pour les communications

Important concepts to start the course

Linear algebra, probability.

Learning Outcomes

By the end of the course, the student must be able to:

- Estimate the error probability of a communication link
- Design a "physical layer" communication link
- Implement a prototype of a "physical layer" transmitter/receiver via Matlab

Teaching methods

Ex cathedra + exercises + project. Lots of reading at home and exercises in class.

Assessment methods

With continuous control

Resources

Références suggérées par la bibliothèque

- Principles of digital communication : a top-down approach

Websites

- http://moodle.epfl.ch

Prerequisite for

Advanced Digital Communications
Software-Defined Radio: A Hands-On Course