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

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