

# Digital Communications



## Component

École Nationale  
Supérieure  
d'Électrotechnique  
d'Électronique  
d'Informatique  
d'Hydraulique  
et des  
Télécommunications

## In brief

- > **plugin.odf-inp:PLUGINS\_ODF\_COURSE\_NBHOURS\_TXT:** 9 lectures, 6 project sessions
- > **Code:** N9MS01B

# Presentation

## Objectives

- To be able to explain the role of the different elements in a communication channel allowing to transmit a digital information.
- To be able to analyze a basic digital transmission channel (modulation/demodulation on a Additive white Gaussian noise channel) in terms of spectral and power efficiencies.
- To be able to implement basic digital transmission channels, to compare and optimize them in terms of spectral and power efficiencies.

## Description

The following issues shall be addressed by this teaching unit:

- 1- Role of the different elements in a communication channel allowing to transmit a digital information.
- 2- Generation of a signal allowing to transmit a binary information (digital modulation) :
  - for a baseband transmission,

- for a transmission on a carrier frequency (ASK, PSK, QAM modulations),
- notion of spectral efficiency.
- 3- Basic modulation for the transmission channel.
- 4- Definition of an optimized digital demodulator :
  - power efficiency,
  - interference between symbols and Nyquist criterion,
  - matched filtering.
- 5- Bit error rate computation.
- 6- Notion of complex envelope and equivalent lowpass channel for transmissions on carrier frequencies.
- 7- Example of a basic digital transmission channel : DVB-S physical layer.

## Useful info

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### Place

- › Toulouse