Telecommunications, Learning and Information Technology

ECTS credits
4 credits

Semester
Spring

In brief

Course langage: French

Presentation

Prerequisites

Basic computer science, basic notions of signal processing and photonics

Learning objectives

The objective of this module is to present applications, advanced technologies of processing, analysis, transmission and display of digital data in the broadest sense and the general principles of statistical learning and neural networks. The aim is therefore to present in a transverse vision of the main technologies of components and systems, statistical learning techniques and concrete applications of information theory in the field of digital and telecommunications. The practical and conceptual consequences in other fields of science and in particular in physics will also be discussed (propagation, transmission,..).

Description of the programme

Digital Microelectronics (6H CM, 4H TD : C. Fossati)
In a context of continuous evolution of microelectronic technologies, the study of information processing architectures, whatever their origin, is an important aspect of engineering important aspect of engineering training.

Information Theory - Applications (14H CM : S. Bourennane)

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The goal of this course is to implement the main concepts of information theory by considering some applications such as data compression, data transmission, data storage and processing. A review of the various advanced applications of information theory in telecommunication will also be presented.

Telecommunications
- Fiber optic telecommunications (4H CM - J.C. Antonna). Network capacity and physical effects during propagation (distortion, noise).
- Telecommunications networks (8H CM : A. Khalighi). Wireless networks (mobile telephony; local, personal and wide area networks; wireless optics) and wired networks (ADSL, PLC); smart grids; Internet of Things for smart-city and smart-home.

Display systems (6H CM: L. Gallais)
Presentation of the essential notions on the science and technology of displays.

Learning and neural networks (2H CM, 6H TP. Th. Artières).
This module introduces the general principles of statistical learning and neural networks (multi-layer perceptron and convolutional models) for supervised classification and data generation.

Generic central skills and knowledge targeted in the discipline

Develop technical and scientific innovations (Ability to stimulate one's imagination, Ability to analyze the context, Ability to mobilize a scientific/technical culture, Ability to invent creative, ingenious and original solutions) Solve complex and transdisciplinary problems (Ability to recognize the specific elements of a problem, Ability to propose one or more resolution scenarios, Ability to identify the interactions between elements, Ability to take into account the uncertainty generated by complexity)

How knowledge is tested

Continuous Control (CC):
CC1 (part " Digital Microelectronics ") : an average of two written reports in class - Coefficient = 25% of the final grade
CC2 (part " Information Theory - Applications ") : an average of reports and written work in class - Coefficient = 25% of the final grade
CC3 (part " Telecommunications " and " Display system ") : an average of reports and written work in class - Coefficient = 25% of the final grade
CC4 (part " Learning and neural networks ") : 1 project report - Coefficient = 25% of the final grade

Teaching team

J.C. Antonna

Th.Artières

S.Bourennane

C. Fossati

Telecommunications, Learning and Information Technology

L. Gallais

A. Khalighi

Sustainable Development Goal



Responsible consumption and production



Reduced inequalities



Sustainable cities and communities



Quality education

Total des heures		**50h**
CM	Master class	40h
TD	Directed work	4h
TP	Practical work	6h

Useful info

Name responsible for EU

Lead Instructor

Salah Bourennane

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