Bio-Informatics and Image Processing

ECTS credits
4 credits

Semester
Spring

In brief

Course langage: English

Presentation

Prerequisites

First-year Common Core courses and first semester of 2nd year at École Centrale Méditerranée

Learning objectives

At the end of this Teaching Unit, students will have a good understanding of the fundamentals of data and image processing for bioengineering. They will also have acquired the basic notions of bioinformatics, including an introduction to deep learning methods (neural networks, deep learning). This foundation of skills will enable them to respond effectively to the growing needs of industry in the area of biomedical data management.

Description of the programme

This course is divided into three parts:

An introduction to bioinformatics: including the basics of bioinformatics in genomics and functional genomics, the modeling of complex systems & networks, and finally artificial intelligence and machine learning (neural networks, deep learning).
Digital image processing is a key step in diagnostic support and therapeutic control. In particular, it covers notions of image quality, data analysis, object tracking in sequences and decision support.
The acquisition and processing of biomedical signals is a particularly well-suited pedagogical tool for getting to grips with the challenges of connected medicine, data processing and instrument interfacing: through motivating hands-on work on teaching equipment for acquiring real physiological signals, students will be led through the entire acquisition/processing chain.

Detailed course content in the online documentation on the school's website (in French and English).

Generic central skills and knowledge targeted in the discipline

The elements of this teaching unit mobilize skills in mathematics and fundamental computing for bioinformatics, as well as in signal processing and instrumentation.

How knowledge is tested

The three parts will be evaluated in CC, with respective weights: 40%, 35%, 25%.

Bibliography

O. Papini, H. Prade, L'intelligence artificielle : frontières et applications, Cépaduès, 2014.

Teaching team

- Elisabeth REMY
- Marie-Galadriel BRIERE
- Thien VU MANH
- Salah BOURENNANE
- Caroline FOSSATI
- Thierry GAIDON
- Adrien SARRADE

Sustainable Development Goal

Quality education

Total des heures		**52h**
CM	Cours Magistral	36h
TP	Travaux Pratiques	16h