CENTRALE NANTES

ENGINEERING PROGRAMME

2025-2026

Year 2 / Year 3

Specialisation option

Digital Sciences for Life Sciences and Healthcare

OD BIOSTIC

PROGRAMME SUPERVISOR

Sophie LIMOU

Autumn Semester

Course unit	ECTS Credits	Track	Course code	Title
UE 73	12	Core course	BIOCEL BIOMOL SIMCHI STAPRE	Cellular Biology Molecular biology and genetics Computational Surgery Statistics and machine learning
UE 74	13	Core course	IMMUNO MOQUAN PHYSIO PIAF PROENC1	Immunology Systems Biology: Probablistic Modeling and Quantitative Analysis of Biological Networks Physiology Programming and computer framework for biological data analysis and visualization Tutorel project 1

Spring Semester

Course unit	ECTS Credits	Track	Course code	Title
UE 83	14	Core course	BIOGEN CONFER MODIAN PROENC2 SYSBAD	BioInformatics and Genomics Conferences Systems Biology: Discrete Modeling and Qualitative Analysis of Biological Networks Tutored project 2 Computer systems and Databases

Cellular Biology [BIOCEL]

LEAD PROFESSOR(S): Aurélien SERANDOUR

Requirements

No prerequisites

Objectives

Understanding the fundamental mechanisms in an eukaryotic cell

Course contents

Cell adhesion and extracellular matrix
Apoptosis
Cancer
Cell cycle
Cytoskeleton
Degradation of biomolecules
Genetic expression
Plasma membrane and membrane transport
Protein routing
Cellular signalling

Course material

Cell Biology 3rd Edition, Thomas D. Pollard , Elsevier

Skills developed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C3 : Think and act in an unpredictable and uncertain environments
    - Intermediate

Skills assessed through this course

No skill observed

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Life below water / Life on land

Sustainable Development and Social Responsibility Positioning

These courses are part of a sustainable development and social responsibility approach, addressing the ethical, health and societal issues related to cell biology, biomedical research and cancer.

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	20 hrs	6 hrs	4 hrs	0 hrs	2 hrs

Molecular biology and genetics [BIOMOL]

LEAD PROFESSOR(S): Aurélien SERANDOUR / Sophie LIMOU

Requirements

BIOCEL

Objectives

Introduction to major molecular biology concepts
Presentation of recent biotechnological challenges and opportunities

Course contents

The introduction to Molecular Biology will cover gametogenesis and the basis of sexual reproduction, the basis of heritability and diversity, embryonic development and cell differentiation.
Genetic analyses in biomedical research and clinical settings (linkage, next-generation sequencing, and genome-wide association analyses).
Biotechnological advances in genomics and functional genomics (gene expression regulation, gene editing, single-cell technologies).
Lab classes will include exploration of bioinformatic databases, R statistics, and analytical reading of scientific papers.

Skills developed through this course

- C1 : Design and prototype innovative systems that create value
  - C1C2 : Dare
    - Intermediate

Skills assessed through this course

No skill observed

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Life below water / Life on land

Sustainable Development and Social Responsibility Positioning

The program integrates the ethical, societal and environmental issues associated with genomics and molecular biology technologies, particularly in biomedical research and clinical settings.

Assessment

Collective assessment: EVC 1 (coefficient 0.2)

Individual assessment: EVI 1 (coefficient 0.8)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	25 hrs	5 hrs	0 hrs	0 hrs	2 hrs

Computational Surgery [SIMCHI]

LEAD PROFESSOR(S): Domenico BORZACCHIELLO

Objectives

Computational surgery is a new discipline that focuses on the use of medical imaging, robotics and simulation. In this field, simulation techniques are of capital importance in order to have a faithful patient-specific model. This course covers the fundamentals in biophysics with application to surgical simulation. An introduction to numerical methods for efficient implementation and simulation of these models is also presented. Advanced topics include: 3D modeling based medical imaging techniques, computational anatomy and parametric modeling.

Course contents

-Introduction to Computational Surgery
-Mesh Generation from Medical Images
-Bone Mechanics
-The finite element method for biomechanics
-Fundamentals of Computational Anatomy

Course material

Slides and Course Notes
A selection of scientific articles provided by the teacher
Notebooks in Jupyter-Python and R

Skills developed through this course

- C1 : Design and prototype innovative systems that create value
  - C1C1 : Develop
    - Intermediate

Skills assessed through this course

No skill observed

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Industry, innovation and infrastructure / Partnership s for the goals

Sustainable Development and Social Responsibility Positioning

Computational surgery supports sustainable development and CSR by training students in patient-specific approaches using imaging, 3D modeling, robotics, and simulation to improve surgical planning and safety. Biophysical models and numerical methods make it possible to test scenarios and anticipate risks, which can help reduce complications, repeat procedures, and hospital stays. Simulation also enables training without constantly relying on clinical resources, while strengthening quality and patient safety. Finally, working with imaging data and parametric models builds awareness of ethics, privacy, and tool reliability—key requirements for responsible innovation in healthcare.

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	22 hrs	8 hrs	0 hrs	0 hrs	2 hrs

Statistics and machine learning [STAPRE]

LEAD PROFESSOR(S): Mathieu RIBATET

Objectives

Introduction to the principles of artificial intelligence and Machine Learning and statistical and in-depth study of statistics

Course contents

Machine learning:
+ Introduction to statistics
+ Clustering
+ Principal component analysis
+ Logistic regression

Survival analysis:
+ Framework and definition
+ Non parametric estimation
+ Comparison of survival curves
+ Cox proportional hazard model

Skills developed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C1 : Represent and model
    - Intermediate
    - Proficient

Skills assessed through this course

No skill observed

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	25 hrs	5 hrs	0 hrs	0 hrs	2 hrs

Immunology [IMMUNO]

LEAD PROFESSOR(S): Aurélien SERANDOUR / Sophie LIMOU

Objectives

The objective of this course is to give students basic training in biology focusing on the main cellular and molecular components of the immune response (innate and acquired), the implementation of this response in the fight against infectious agents and their use for vaccines or therapeutic purposes.

At the end of the Immunology course, the student:
1-Will postion the main cellular and molecular actors of the immune system during an innate and adaptive immune response.
2-Define and memorize the structure and function of the different lymphoid organs.
3-Will associate with each actor its main function.
4-Discuss the basics of the main successes and failures of immunology (vaccination, AIDS).
5-Explain the basics of the main analytical techniques using antibodies (flow cytometry, ELISA in particular).

Course contents

Overview of the immune system
Innate Immunity
Adaptive immunity
Major histocompatibility complex
Primary and secondary lymphoid organs
Activation of T lymphocytes
Directory of B lymphocytes
Transplantation
Acquired Immune Deficiencies (AIDS)
Autoimmune diseases
Anti-tumor immune response
Vaccination

Program of practical work (1 day):
Production and observation of a blood smear, application to the diagnosis of hemopathies in humans.
Analysis of the phenotype of lymphocytes circulating in human blood by multiparametric flow cytometry.

Skills developed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C2 : Solve and arbitrate
    - Intermediate
  - C2C3 : Think and act in an unpredictable and uncertain environments
    - Intermediate

Skills assessed through this course

No skill observed

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Life below water / Life on land / Reduced inequalities

Sustainable Development and Social Responsibility Positioning

This course highlights the central role of immunology in disease prevention, the development of vaccines and innovative therapies, contributing directly to the sustainable improvement of human health and the reduction of the global health burden. It also raises awareness of the ethical, societal, and economic issues related to the use of biotechnologies, diagnostics, vaccination, and equitable access to healthcare.

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	18 hrs	8 hrs	4 hrs	0 hrs	2 hrs

Systems Biology: Probablistic Modeling and Quantitative Analysis of Biological Networks [MOQUAN]

LEAD PROFESSOR(S): Sophie LIMOU

Objectives

Introduction to the modeling of biological systems

Course contents

Introduction to the modeling of biological systems / Principal laws and modeling based on differential equations / Approximation of dynamics based on probabilistic models (PBN and DBN) and asymptotic analysis of models: application to regulatory models / Approximation of dynamics at quasi-stationary equilibrium and stress-based analysis: application to metabolic models.

Skills developed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C2 : Solve and arbitrate
    - Intermediate

Skills assessed through this course

No skill observed

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Reduced inequalities

Sustainable Development and Social Responsibility Positioning

This course aims to model complex biological systems to improve our understanding of biological and clinical mechanisms.

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	21 hrs	9 hrs	0 hrs	0 hrs	2 hrs

Physiology [PHYSIO]

LEAD PROFESSOR(S): Aurélien SERANDOUR / Sophie LIMOU

Requirements

BIOCEL

Objectives

This is an introductory course to medicine designed to introduce the essential notions in human physiology.

Course contents

General physiology, muscle and bone physiology, and endocrinology

Renal and pulmonary physiology

Cardiovascular physiology

Brain function and major neurological diseases. Causes, underlying mechanisms, diagnostic methods, treatments, and future prospects

Skills developed through this course

- C1 : Design and prototype innovative systems that create value
  - C1C2 : Dare
    - Intermediate

Skills assessed through this course

No skill observed

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Life below water / Life on land / Reduced inequalities

Sustainable Development and Social Responsibility Positioning

This teaching is part of sustainable development and social responsibility by training in the understanding of major physiological functions and major chronic diseases, at the heart of public health issues.

Assessment

Collective assessment: EVC 1 (coefficient 0.3)

Individual assessment: EVI 1 (coefficient 0.7)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	24 hrs	6 hrs	0 hrs	0 hrs	2 hrs

Programming and computer framework for biological data analysis and visualization [PIAF]

LEAD PROFESSOR(S): Lucas LESTANDI

Objectives

Give you the tools to exploit large data sets from a variety of sources, such as those encountered in the life sciences.

By the end of this course, you should be able to:
- Set up a reproducible working environment suited to your objectives (Python or R)
- Write efficient programs using modern libraries, particularly for biological data analysis
- Manipulate, analyze, and visualize data with tools
- Produce publication-quality figures that comply with standards
- Structure and document your code to ensure its readability, maintainability, and reproducibility
- Collaborate effectively using version control tools

Course contents

1 Scientific Python: environment, code, and analysis (L. Lestandi - Manager)

Working effectively with Python (4 hours of lectures/tutorials)
Choosing a working environment: IDE, Jupyter notebooks, Python environment (conda, etc.)
Python philosophy and basic syntax
The basics of the Python interpreter
Best practices in Python programming (PEP8, etc.)

Structure and data types (4 hours of lectures/tutorials, 4 hours of practicals)
Variables, references, and memory management
Data types and structures
Object-oriented programming (OOP): classes
Writing robust code: architecture, introspection, exceptions, etc.
Decorators

Programming with modules (4 hours of lectures/tutorials, 4 hours of practicals)
The basics of modules
External libraries: with pip or conda
Basic scientific libraries: numpy, scipy, matplotlib
Creating your own modules

2 Development infrastructure: Git, versioning, and testing (M. Servières)

3 Introduction to R for life sciences (S. Limou)

Skills developed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C1 : Represent and model
    - Intermediate
  - C2C2 : Solve and arbitrate
    - Intermediate

Skills assessed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - Intermediate

Sustainable Development Goals (SDGs) covered by this course

Industry, innovation and infrastructure

Sustainable Development and Social Responsibility Positioning

This course contributes to the objectives of Industry, Innovation and Infrastructure by training students to design robust, reproducible, and scalable data analysis pipelines for biological data. Emphasis is placed on code structure, automation, and the quality of software infrastructures used in research and industry. The tools and practices introduced (Python, R, version control, testing) support scientific innovation, reliability of results, and long-term sustainability of data analysis and visualization workflows.

Assessment

Collective assessment: EVC 1 (coefficient 0.3)

Individual assessment: EVI 1 (coefficient 0.7)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	14 hrs	0 hrs	16 hrs	0 hrs	2 hrs

Tutorel project 1 [PROENC1]

LEAD PROFESSOR(S): Aurélien SERANDOUR / Sophie LIMOU

Objectives

Research Project from September to March in a Nantes lab

Course contents

Supervision/mentoring carried out by researchers and teacher-researchers from Nantes on their research theme at the mathematical / informatics / physics / biology interface
. Intermediate reporting all year long
. Intermediate oral presentation (December)
. Final written report (March)
. Final oral presentation (March)

Skills developed through this course

- C1 : Design and prototype innovative systems that create value
  - C1C1 : Develop
    - Intermediate
- C3 : Manage complex programmes or change responsibly
  - C3C1 : Design a project/programme
    - Intermediate
  - C3C2 : Manage/lead a project/programme
    - Intermediate
- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C2 : Solve and arbitrate
    - Intermediate
  - C2C3 : Think and act in an unpredictable and uncertain environments
    - Intermediate

Skills assessed through this course

- C1 : Design and prototype innovative systems that create value
  - Intermediate
- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - Intermediate

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Partnership s for the goals / Reduced inequalities

Sustainable Development and Social Responsibility Positioning

This course aims to put into practice the theoretical knowledge acquired in class (statistics/data science, modeling, biology, bioinformatics) within the framework of a research project hosted within one of our Nantes partner laboratories ('partnerships for achieving objectives' aim) on a biological or biomedical/clinical question. These projects thus contribute to better modeling, describing, understanding, and advancing health ('health and well-being' aim) for all ('reduced inequalities' aim).

Assessment

Collective assessment: EVC 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	1	0 hrs	0 hrs	0 hrs	32 hrs	0 hrs

BioInformatics and Genomics [BIOGEN]

LEAD PROFESSOR(S): Sophie LIMOU

Objectives

. Discovery of two big data approaches
. Overview of major challenges in bioinformatics
. Applications in a project

Course contents

1) Discovery of two big data approaches: genome-wide association studies, and single-cell transcriptomics
2) Overview of major challenges in bioinformatics: main databases in the biomedical field, sequence alignment, phylogeny and evolution basics, protein structures
3) Applications in a project by group of 2 students: bioinformatic analyses of a gene-disease pair

Skills developed through this course

- C1 : Design and prototype innovative systems that create value
  - C1C2 : Dare
    - Proficient
- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C2 : Solve and arbitrate
    - Proficient

Skills assessed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - Intermediate

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Reduced inequalities

Sustainable Development and Social Responsibility Positioning

This course aims to demonstrate how the analysis of molecular data and its integration with public databases can contribute to a better understanding of physiological and pathogenic mechanisms. These analyses contribute to innovative approaches for precision medicine, aiming towards increased personalization ('health and well-being' aim) and accessibility for all ('reduce inequalities' aim).

Assessment

Collective assessment: EVC 1 (coefficient 0.4)

Individual assessment: EVI 1 (coefficient 0.5)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	25 hrs	5 hrs	0 hrs	0 hrs	2 hrs

Conferences [CONFER]

LEAD PROFESSOR(S): Aurélien SERANDOUR / Sophie LIMOU

Objectives

Presentation of many different application fields in biomedical engineering from academia and private companies actors

Skills developed through this course

- C1 : Design and prototype innovative systems that create value
  - C1C2 : Dare
    - Intermediate

Skills assessed through this course

No skill observed

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Life below water / Life on land / Reduced inequalities

Sustainable Development and Social Responsibility Positioning

CONFER is directly involved in the challenges of sustainable development and social responsibility by exposing students to applications of biomedical engineering geared towards improving human health, reducing inequalities in access to care and responsible innovation.

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	30 hrs	0 hrs	0 hrs	0 hrs	2 hrs

Systems Biology: Discrete Modeling and Qualitative Analysis of Biological Networks [MODIAN]

LEAD PROFESSOR(S): Morgan MAGNIN

Requirements

Basic knowledge of computer science: modeling principles and implementation issues

Objectives

Knowledge:

- Boolean networks
Interaction graphs and associated properties
Analysis of the dynamics via the calculation of the transition graph
Formal verification of dynamic properties through model-checking (LTL / CTL)

- Petri nets:
Discrete properties (invariants)
Time extensions
Formal verification of dynamic properties thanks to parametric timed model-checking (TCTL and parametric extension)
Control of hybrid models

Skills:
- Given a specific problem, choose which of the different discrete and hybrid formalisms is the most suitable for analyzing a system biology problem?
- Validate a model / family of models with respect to a set of expected properties (logical reasoning, formal verification)
- Enrich a model with respect to issues of interest (for example, integrating a time dimension into the model when the temporal component plays a crucial role in the evolution of a system)
- Confront a model with biological data

Course contents

1. Boolean networks, their dynamics and influence graph
2. Temporal logic and model verification
3. Cell mutations and reprogramming
4. Other discrete models for modeling biological networks: Petri nets and automata
5. Model-checking of timed models

Course material

Kauffman, S. (1969). Homeostasis and differentiation in random genetic control networks. Nature, 224(5215), 177-178.

Thieffry, D., & Thomas, R. (1997, December). Qualitative analysis of gene networks. In Pacific Symposium on Biocomputing (Vol. 3, pp. 77-88).

Folschette, M., Paulevé, L., Magnin, M., & Roux, O. (2015). Sufficient conditions for reachability in automata networks with priorities. Theoretical Computer Science, 608, 66-83.

R. Alur, C. Courcoubetis, N. Halbwachs, T. A. Henzinger, P.-H. Ho, X. Nicollin, A. Olivero, J. Sifakis, and S. Yovine. The algorithmic analysis of hybrid systems. THEORETICAL COMPUTER SCIENCE, 138:3–34, 1995.

Louis-Marie Traonouez, Didier Lime, and Olivier (H.) Roux. Parametric model-checking of stopwatch petri nets. Journal of Universal Computer Science, 15(17):3273–3304, December 2009.

Skills developed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C1 : Represent and model
    - Proficient

Skills assessed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - Intermediate

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being

Sustainable Development and Social Responsibility Positioning

The MODIAN course offers mechanisms for modeling the dynamics of living dynamic systems. The aim of these models is to achieve a better understanding of the interactions at play and, ultimately, to contribute either to the discovery of new knowledge in health or to formal guarantees concerning the reaction of components (proteins, cells, etc.) to changes.

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	18 hrs	2 hrs	10 hrs	0 hrs	2 hrs

Tutored project 2 [PROENC2]

LEAD PROFESSOR(S): Aurélien SERANDOUR / Sophie LIMOU

Objectives

Research Project from September to March

Course contents

Supervision carried out by researchers and teacher-researchers from Nantes on their research theme at the mathematical / informatics / physics / biology interface
. Intermediate reporting all year long
. Intermediate oral presentation (December)
. Final written report (March)
. Final oral defense (March)

Skills developed through this course

- C1 : Design and prototype innovative systems that create value
  - C1C1 : Develop
    - Proficient
- C3 : Manage complex programmes or change responsibly
  - C3C1 : Design a project/programme
    - Proficient
  - C3C2 : Manage/lead a project/programme
    - Proficient
- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C2 : Solve and arbitrate
    - Proficient
  - C2C3 : Think and act in an unpredictable and uncertain environments
    - Proficient

Skills assessed through this course

- C1 : Design and prototype innovative systems that create value
  - Proficient
- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - Proficient
- C3 : Manage complex programmes or change responsibly
  - Proficient

Sustainable Development Goals (SDGs) covered by this course

Goo health and well-being / Partnership s for the goals / Reduced inequalities

Sustainable Development and Social Responsibility Positioning

This course aims to put into practice the theoretical knowledge acquired in class (statistics/data science, modeling, biology, bioinformatics) within the framework of a research project hosted within one of our Nantes partner laboratories ('partnerships for achieving objectives' aim) on a biological or biomedical/clinical question. These projects thus contribute to better modeling, describing, understanding, and advancing health ('health and well-being' aim) for all ('reduced inequalities'

aim).

Assessment

Collective assessment: EVC 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	2	0 hrs	0 hrs	0 hrs	48 hrs	0 hrs

Computer systems and Databases [SYSBAD]

LEAD PROFESSOR(S): Jean-Yves MARTIN

Objectives

The purpose of this course is to understand operating systems and database mechanisms.

For databases part, we study modélisation technics, conception tools, management tolls and the way to interact with databases.

For Operating System part, we study main basics for Operating Systems, Command language tools, and the way to use them.

Course contents

This course is divided in two parts.

For the Database part:
- Data modeling, Conceptual Data Model, Entity-Association Model
- Relationnal Model
- Phisical Data Model
- SQL
- Introduction to noSQL and BigData

For the Operating System part:
- Introduction to Operating Systems
- Command Language
- Data security
- Introduction to Batchs and Scheduling

Practical work aims at writing Shell script for the first part, and building and managing a database for the second part.

Skills developed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - C2C1 : Represent and model
    - Intermediate
  - C2C2 : Solve and arbitrate
    - Intermediate
  - C2C3 : Think and act in an unpredictable and uncertain environments
    - Intermediate

Skills assessed through this course

- C2 : Analyse a complex system from all angles (scientific, economic, human, social) and propose a solution
  - Intermediate

Sustainable Development Goals (SDGs) covered by this course

Quality education

Sustainable Development and Social Responsibility Positioning

The objective is to provide all students the ability to model problems effectively and responsibly and to be aware of the cost of the infrastructures.

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	3	14 hrs	8 hrs	8 hrs	0 hrs	2 hrs