ELECTRICAL ENGINEERING &COMPUTER SCIENCE (GEII)
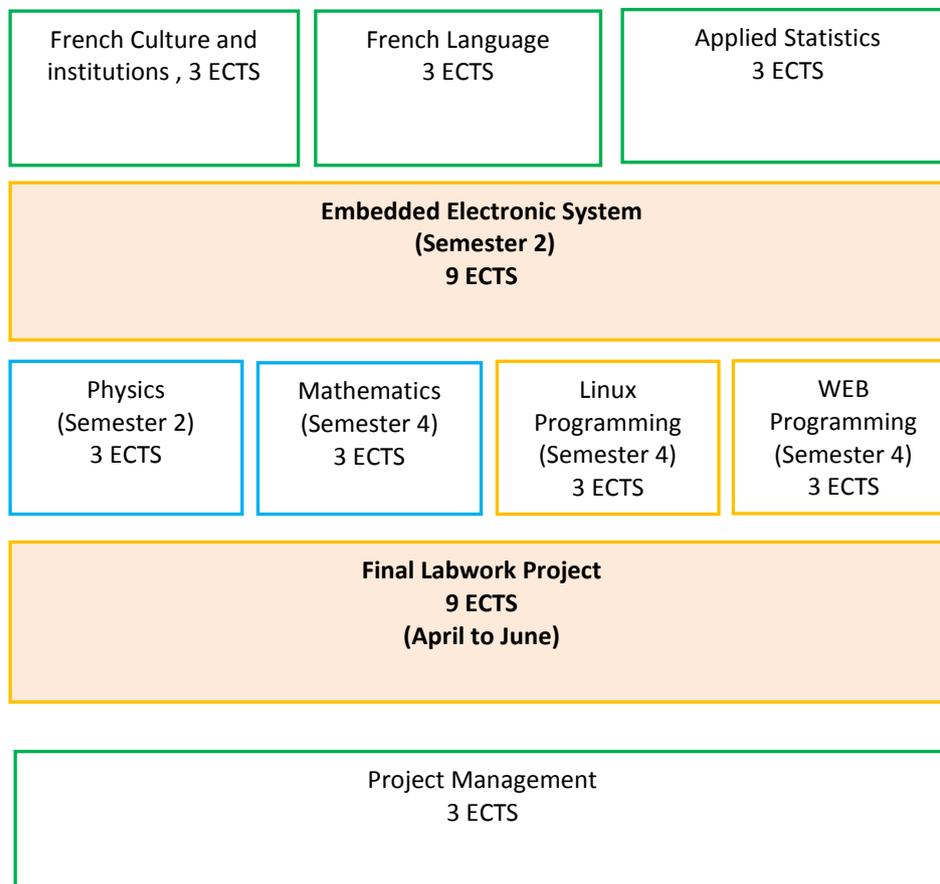
The department of electrical engineering and computer science offers a fully English-taught international semester based on **embedded electronic systems**. The course program consists of **2 compulsory units** (embedded electronic systems and a lab-work project) and 8 cross-disciplinary, scientific or technical electives accounting to **42 ECTS**. A final project allows the students to implement the knowledge and skills acquired during the semester.

The students will integrate a first-year or second- year group (or both) according to the units they choose.

French Culture and institutions , 3 ECTS	French Language 3 ECTS	Applied Statistics 3 ECTS

Embedded Electronic System (Semester 2) 9 ECTS

Physics (Semester 2) 3 ECTS	Mathematics (Semester 4) 3 ECTS	Linux Programming (Semester 4) 3 ECTS	WEB Programming (Semester 4) 3 ECTS

Final Labwork Project 9 ECTS (April to June)

Project Management 3 ECTS

1- **Embedded Electronic System** (compulsory)
 9 ECTS

Objectives : Development of small embedded systems (limited to moderately complex cases)

- Model a system within its environment
- Perform software development through its different stages (analysis, algorythm, coding, testing)
- Integrate hardware and software together
- Understand the architecture of a microcontroller system.
- Master the use of the peripherals of a microcontroller.
- Understand the mechanisms of interruption .

Content: Approach for developing an embedded computer application:

- Understand the hardware architecture of the target.
- Understand the management functions of typical devices (digital inputs / outputs, analog digital and digital analog converters, timer, serial communication, PWM ...),
- Analysis of the specification, identification of the material resources required and the mechanisms for their implementation (scan or interruption),
- Model the embedded application
- Code in an advanced language
- Use a predefined validation method,
- Use a debugging tool (debugger type)
- Use the language of material description of circuits
- Documentation of the source files.

2- **Lab Project – (compulsory) 9 ECTS**

 2 POSSIBILITIES :

 A . Project in electronics :

- completing a functional analysis of the Audio Amplifier
- analysing the preamplifier frequency behaviour through a SPICE simulation (Bode diagram)
- designing a PCB (Printed Components Board) and computing values of components, most of the components have to be SMC technology
- organising and achieving structural and functional tests of the two boards.
- programming the microcontroller ATMEGA32: this microcontroller makes the link between the IHM and the different subsystems of the audio amplifier

 B. Project topic chosen by the student and the IUT project supervisor :

- Topic chosen within the scope of our supervisors' research areas and the student's interests.
- 8 to 10 weeks

3- Electives

- French culture and institutions
  3 ECTS
- French Language
  3 ECTS
- Applied statistics
  3 ECTS
  - apply basic knowledge of statistics to understand certain problems in the fields of science, management, industry and daily life.

- Project management - 3ECTS
  - learn the methodology of project management
  - determine the stakes of the projet, its objectives, its feasability and risks
  - define the team, the contract, the schedule
  - follow up the technical realisation, the budget, management of differences ...

- Physics
  3 ECTS
  - Knowledge of the electric and magnetic field for the basic components (capacitor and coil)
  - be able to qualitatively draw lines of the electric field (positive charges towards negative charges) and the magnetic field (corkscrew rule)
  - Knowledge of the induction phenomenon
  - Knowledge and use of the appropriate units of vocabulary for measurements adapted to sensors
  - Knowledge of some typical electronic systems and their respective interests used to interface sensors

- Mathematics : linear algebra and applications
  3 ECTS
  - Vector spaces,
  - linear applications,
  - matrix calculus,
  - representation of a linear application by a matrix,
  - Matrix diagonalization.

- WEB Programming
  3 ECTS
  - Web fundamentals (Internet, http, server and web client).
  - Overview of the current web technologies.
  - Highlight on the interlacing between the technologies studied.
  - Structured around basic and relevant examples from the industry.
  - Programming languages: HTML, CSS, PHP, and JavaScript.
  - Design and development of a hosted dynamic web application.

- LINUX Programming
  3 ECTS

- Linux graphical environment
- architecture system
- different Linux distributions and free softwares
- constituents (or characteristics) of the system and their configuration
- shell programming
- C programming in Linux

CONTACTS

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