Embedded Systems

TAUGHT IN FRENCH

Angers

/ AIMS

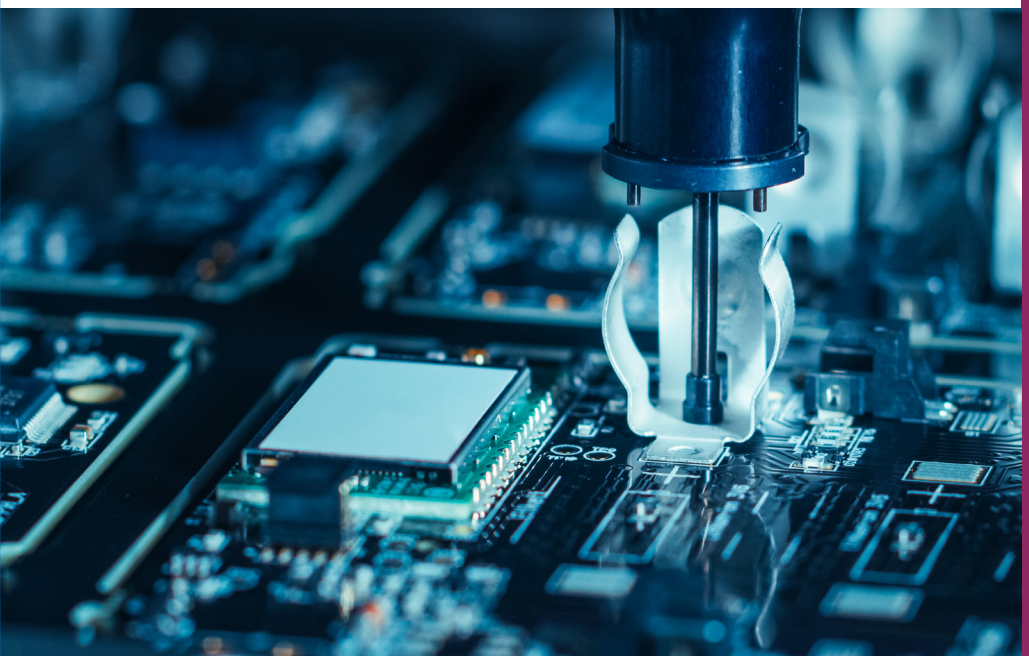
This major trains ESEO engineers to be proficient in developing an entire embedded system, from specifications to completion, including the computing aspect. They will be able to discuss with specialists involved in the development from different fields, such as signal processing, automation, electronics, transmission, EMC and more. Embedded systems are hardly known to the general public today, but they are already very much a part of our daily lives. They are at the forefront of innovation in many key areas of the future! It is a fast-growing sector that has been experiencing a shortage of specialised engineers for several years. Engineers in this field are therefore highly sought after by many industrialists.

/ ACQUIRED SKILLS

At the end of their training, students will be capable of:
• identifying, that is understanding the client's expectations and needs,
• designing a system in collaboration with various specialists in the embedded field,
• implementing and testing the future system.
The aim is to provide a reliable and high performance product as expected by the customer. The implementation stage is focused on software development and the use of existing electronic components.

/ CAREER OPPORTUNITIES

Career opportunities are mainly found in all industrial sectors involving embedded systems, especially those with safety or security needs, such as the transport, defense and medical sectors, but now also in the fields of IoT, banking, telecoms, and many more. Not only are these opportunities to be found in development, testing and quality management positions, but also in positions related to management or trade activities.



COURSE UNITS

/ SEMESTER 8

- **ES Project:** 110 hrs – 10 ECTS
- **ES Design:** 28 hrs – 2.5 ECTS
- **C Language Programming:** 28 hrs – 2.5 ECTS
- **Multitask Programming:** 28 hrs – 2.5 ECTS
- **Testing:** 28 hrs - 2.5 ECTS
- **Acquisition Chain:** 28 hrs – 2.5 ECTS
- **English:** 28 hrs – 2.5 ECTS
- **Transversal Skills:** 28 hrs – 2.5 ECTS

+ 1 Course Unit from:

- **Linux Administration:** 28 hrs – 2.5 ECTS
- **Android Development:** 28 hrs – 2.5 ECTS
- **Management and Quality:** 28 hrs – 2.5 ECTS

/ SEMESTER 9

- **Final Year Project:** 168 hrs - 14 ECTS
- **Object-oriented Software Design:** 28 hrs - 2 ECTS
- **Software Quality:** 28 hrs - 2 ECTS

+ 6 selected Course Units*:
168 hrs - 12 ECTS
(each Course Unit = 28 hrs - 2 ECTS)

*** To be chosen from the elective course units listed**

Elective Course Units

Elective course units should be chosen from the list below. Only one course unit can be chosen per numbered sub-table.

COURSES	PROVIDED BY
ELECTIVE COURSE UNIT 1	
Wireless Communication	Electronics & IoT
Protocols for the IoT	Electronics & IoT
Green IT	Software & Data
OS for Embedded Systems	Embedded Systems
Cryptography	Cloud, System & Security
ELECTIVE COURSE UNIT 2	
Architecture of Data Center	Cloud, System & Security
Antennas and Software-defined Radio (SDR) 4*	Electronics & IoT
Android Project	Software & Data
Model-driven Engineering (MDE)	Embedded Systems / Software & Data
ELECTIVE COURSE UNIT 3	
Efficient & Safe Programming	Embedded Systems
Information Systems & Business Strategy 1*	Software & Data
Offensive Security	Cloud, System & Security
Monolithic Microwave Integrated Circuits (MMIC)	Electronics & IoT
Artificial Intelligence 1*	Software & Data
Linux Platforms	Electronics & IoT/ Embedded Systems
Embedded Security for the IoT	Electronics & IoT
ELECTIVE COURSE UNIT 4	
Docker Infrastructure	Cloud, System & Security
Real-time Programming	Embedded Systems
Batteries and Energy Harvesting 4*	Electronics & IoT
Client-side Web Development using REACT	Software & Data
ELECTIVE COURSE UNIT 5	
Machine Learning for Embedded Systems	Embedded Systems
Exploration of a LoRa Tracking IoT Navigation System	Electronics & IoT
Creativity & Innovation	Software & Data
Network Security	Cloud, System & Security
Android Software	Electronics & IoT / Embedded Systems
VMWare Infrastructure (VCenter)	Cloud, System & Security

COURSES	PROVIDED BY
ELECTIVE COURSE UNIT 6	
Formal Modelling	Embedded Systems
Embedded Linux 5*	Electronics & IoT / Embedded Systems
Infrastructure Monitoring	Cloud, System & Security
Web Technologies and Continuous Integration	Software & Data
Engineering of Communication Systems	Electronics & IoT
ELECTIVE COURSE UNIT 7	
Information Systems and Business Strategy 2*	Software & Data
Infrastructure Design & Security	Cloud, System & Security
Artificial Intelligence 2*	Software & Data
Advanced Testing	Embedded Systems
Rapid Prototyping	Embedded Systems
Advanced Processor-based Architectures	Electronics & IoT
Multiphysics Systems	Electronics & IoT
ELECTIVE COURSE UNIT 8	
Advanced Databases & NoSQL	Software & Data
Communications in Embedded systems	Embedded Systems
Systems-on-Chip (SoC) Digital Design 4*	Electronics & IoT
Security for Embedded Systems	Software & Data
.NET Platform	Software & Data
Cloud Orchestration: Openstack	Cloud, System & Security
ELECTIVE COURSE UNIT 9	
Information Systems and Business Strategy 3*	Software & Data
Applied Cryptography for Developers (AC4D)	Software & Data
Systems-on-Chip (SoC) Analogue Design 5*	Electronics & IoT
Artificial Intelligence 3*	Software & Data
Security Audit	Cloud, System & Security
Operational Security	Embedded Systems

1 - 2* - 3* Students choosing «Information Systems & Business Strategy» and «Artificial Intelligence» should take **all 3 course units** in tables 3, 7 and 9*

4 Compulsory Course Units for Electronics & IoT students*

5 One of these two Course Units is compulsory for Electronics & IoT students, depending on the block chosen in semester 8*