Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF482	Fundamentals of Embedded System Design	8	4	0	0	4	5

Prerequisites	
Admission Requirements	

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	The aim of the Embedded Systems and Software course is to teach students end-to-end embedded system design. Within this process, students will learn to define the requirements of the system they will design, select appropriate external hardware and microprocessors, analyze the system's power consumption and cost, anticipate the environmental impacts of the system they develop, and ensure compliance with applicable laws and regulations.
Content	Within this course, Week 1 will introduce embedded systems; Week 2 will cover energy sources, batteries, consumption, costs, and environmental impacts; Week 3 will focus on the design process, requirement specification, optimization, and project selection; Week 4 will examine standards, regulations, and laws; Week 5 will introduce embedded software development; Week 6 will address programming hardware components (I2C, EEPROM, SPI, UART); Week 7 will cover communication with peripherals; Week 8 will include the midterm exam; Week 9 will focus on software for real-time systems; Week 10 will examine different types of interrupts and response times; Week 11 will analyze power consumption from both hardware and software perspectives; Week 12 will introduce the Internet of Things (IoT); Week 13 will discuss the future of embedded systems, various technologies, and productization of learned concepts; and Week 14 will cover embedded system testing and verification.
References	Making Embedded Systems: Design Patterns for Great Software (Paperback)

Theory Topics

Week	Weekly Contents
1	Introduction to Embedded Systems
2	Energy sources, batteries, consumption, costs, and environmental impacts
3	Design process, requirement specification and optimization - Project selection
4	Standards, regulations, and laws
5	Introduction to embedded software development
6	Programming hardware components - I2C, EEPROM, SPI, UART
7	Communication with peripheral devices
8	Midterm Exam
9	Software for real-time systems
10	Different types of interrupts and response times
11	Hardware and software analysis of power consumption
12	Internet of Things
13	Future of embedded systems, various embedded system technologies, translating learning into products

Week	Weekly Contents
14	Embedded system testing and validation