

Digital Functions and Technologies



Component

École Nationale
Supérieure
d'Électrotechnique
d'Électronique
d'Informatique
d'Hydraulique
et des
Télécommunications



Semester

Automne

In brief

- > **Amety's Code:** N5EE03B
- > **Open to exchange students:** Yes

Presentation

Objectives

The main objective of this course is to cover the fundamental principles and concepts of digital electronics and to present certain technological elements related to experimental implementation.

Description

The first part will be devoted to discovering the technological principles behind simple logic functions (TTL/CMOS logic, static/dynamic aspects, power consumption). After a brief review of NMOS and PMOS transistors, a detailed analysis of the principles of constructing logic functions in CMOS logic will be presented.

The second part will cover the main functions of combinational logic (encoders, decoders, multiplexers, comparators, etc.).

The third part will address the issue of information storage, with a particular focus on the different principles for implementing a "memory point." In particular, the external and internal functioning of the main flip-flops (RS, JK, D latch, D flip-flop, registers) will be detailed.

The fourth part will be devoted to the study of classic sequential functions: counters and counters (synchronous and asynchronous).

The fifth part will cover the technological principles involved in storing information. The concept of BUS (data/addresses) will be introduced. The different types of memory (RAM, SRAM, DRAM, ROM, EPROM, EEPROM, etc.) will then be presented from a technological perspective.

The sixth and final part will be devoted to an introduction to programmable components. After a brief history to put the evolution of these technologies (PAL/PLD, etc.) into context, the different functional blocks that make up an FPGA will be discussed.

Pre-requisites

UE N5EE04 Circuit Fundamentals

UE N5EE03 Logic System Design