

AUTOMATION, ELECTRONICS AND COMPUTING 2 FIELD_9 ECTS

Introducing

Description

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

 Toulouse

Logics

Introducing

Description

This course deals with logic. After introducing Boolean algebra and logical functions, various minimisation methods are discussed. The general structure of a sequential system and elementary sequential systems are also studied (counters, flip-flops, etc.). A method for designing synchronous sequential systems using flip-flops is studied.

Objectives

By the end of this module, students should have understood and be able to explain (key concepts):

- The concepts of combinational and sequential systems,
- The concepts of synchronous and asynchronous systems (circuits),
- The methods for designing and implementing these systems.

Students should be able to:

- Represent and minimise logic functions,
- Design a combinational or sequential logic system.

Necessary prerequisites

none

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Practical info

Location(s)

 Toulouse

Hardware architecture

Introducing

Description

- Functional description of the fundamental components of a conventional processor-based computer and their interactions.
- Description and contextualization of computer architecture models.
- Functional description of the processor, its memory and caches, and associated technologies.
- Hardware-level functional description of paging and memory virtualization.

Objectives

At the end of this module, students will be able to describe how a computer works, based on its internal structural elements, and define the actions required at hardware level to perform a given task.

Necessary prerequisites

Basic notions of algorithmics and logic.

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Practical info

Location(s)

 Toulouse

Digital electronics

Introducing

Description

Numerical representation of information (base 2, binary coding, signed numbers, hexadecimal)

Basic digital components: diodes, Zener, LED, trigger, level adaptation circuits

Combinational logic: TTL logic gates, Fan-In, Fan-Out

Synchronous counters, reset circuits

Oscillators (ICM7555), LED blinking

Sampling and analog-to-digital conversion

Prototyping and component selection (BOM, datasheets)

continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

 Toulouse

Objectives

Learning Objectives

Acquire fundamentals of digital electronics.

Understand data representation and analog-to-digital conversion.

Design and size logical circuits and digital interfaces.

Explore the operation of digital integrated circuits.

Learning Outcomes

Represent and manipulate digital signals.

Design digital circuit architectures.

Interpret component datasheets.

Analyze and size circuits based on specifications.

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en

Operating systems

Introducing

Description

The command interpreter (the shell), variables, iterative structures, control structures,
Programming using the command language (essentially bash),
Handling the file system and, in particular, access rights,
User management (uid, gid, home directory, etc),
I/O and pipe redirection mechanisms.
Some general information on documentation, archiving, compression and a few network commands.

Objectives

At the end of this module, the student will be able to use the command interface of the Unix operating system independently.

Necessary prerequisites

No required

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Practical info

Location(s)

 Toulouse

Computing



ECTS



Hourly volume
56h

Introducing

Description

Programme (detailed contents):

- 1- breakdown in sub programs
- 2- constraint and non constraint arrays
- 3- recursive algorithms: principle, examples
- 4- pointers and linked lists

Objectives

At the end of this module, the student will have understood and will be able to explain (main concepts):

- functional breakdown: procedure choice, setting of procedures
- differences between several data structures: arrays, records, pointers and linked lists
- recursive algorithms
- array exploring, sorting and merging

The student will be able to:

- analyze an advanced problem
- breakdown it into subprograms
- choose adapted data structures
- specify (recursive) algorithms
- implement algorithms in ADA language
- specify and realize test cases.

Necessary prerequisites

L1 algorithm lecture.

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Practical info

Location(s)

 Toulouse

Digital culture and skills 1

Introducing

Description

Introductory course to AI: history, algorithms, issues.
"No code" discovery of neural networks on Vittascience;
notebook for building a small character recognition
network.
Presentation of PIX and study of a certain number of
themes independently with the objective of passing the
PIX certification at the end of the 3rd year.

Objectives

At the end of this module, the student will have
discovered the first dimensions of the field of AI:
history, examples of what AI allows, distinction between
supervised and unsupervised learning, rapid scope of
techniques and algorithms, ethical aspects, risks and
controversies. In a second part, the student will have
advanced his PIX course according to the defined
program.

Necessary prerequisites

Basics of Python Programming

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Practical info

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 Toulouse