SEMESTER 3_2nd YEAR FAS NUMERICAL

Practical info

Location(s)

 Toulouse

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Algebra et analysis

ECTS
7 crédits

Hourly volume
82h

Practical info

Location(s)

Toulouse

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Electrostatics

ECTS
4 crédits

Hourly volume
33h

Introducing

Objectives

Understand the main physical concepts: elementary charge, electrostatic fields, vector field, etc.

Analyze the symmetries of the system and use the relevant physical laws to describe it

Determine expressions for electrostatic fields and potentials

Necessary prerequisites

1st year Mathematics
1st year Point kinematics

Practical info

Location(s)

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Computer programming ¿ Unix Operating System

ECTS
4 crédits

Hourly volume
51h

Introducing

Objectives

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

Computer programming :
- breakdown into functions: designing procedures, passing parameters
- differences between basic data structures: arrays, records, pointers and linked lists
- recursive algorithms
- basic algorithms for searching, sorting, and mergingarrays

Unix :
- main issues associated to the file system and the associated commands
- main issues associated to the organization and the management of process
- main issues associated to the shell

The student will be able to:

Computer programming :
- analyze an advanced problem
- break it up into subprograms
- choose appropriate data structures
- specify (recursive) algorithms
- implement algorithms in ADA language
- specify and realize test cases.

Unix :
- managing files and directories thanks to Unix shell commands
- coding shell programs including variables, iterative structures, control structures, redirection and pipe mechanisms
- managing process thanks to Unix shell commands

Practical info

Location(s)

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Logic and hardware computing

ECTS
4 crédits

Hourly volume
38h

Introducing

Location(s)

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Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
¿ combinational logic
¿ sequential logic : synthesis and analysis
¿ information coding
¿ Computer architecture¿s models
¿ memory hierarchy (cache, main memory, secondary memory)
¿ virtual memory and pagination
¿ processor¿s architecture and functionnal model

The student will be able to:
¿ do the minimal synthesis and the analysis of a combination system
¿ do the minimal synthesis and the design of a sequential system with flip-flops (including sequencer)
¿ Extract, explain and justify, given a scheme, the structural components of a machine (associated process architecture, exchanges¿ nature, field of utilization, ¿)
¿ Describe, given a machine state and a task, the different actions at the hardware layer to process the task (operations¿ scheduling, components involved, ¿)
¿ Identify, given an algorithm and a memory state, the successive internal states of a processor¿s cache

Practical info

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Electronic systems for communications

ECTS
4 crédits

Hourly volume
60h

Introducing

Objectives

Objectives:

At the end of this module, the student will have understood and be able to explain (main concepts):
· Fundamentals of signal processing (amplification, filtering, Fourier transform)
· Ideal operational amplifier (OA) and limitations of real OA
· Basic analog circuits
· Conditions of linear/saturated regime of an OA
· Difference between analog and digital electronics
· Basic principles of analog to digital conversion (sampling, quantification,
Shannon theorem)
· Physical characteristics of a digital circuit
· Architecture of simple digital circuits based on gates and latches
· Basic principles of transmission of digital signals
· Basic principles of analog and digital modulations

The student will be able to:
· Compute the Laplace transform of the transfer function for an analog circuit
· Design a first order filter
· Design a simple analog function based on OA (amplifier, integrator…)
· Design an analog to digital converter
· building analog and digital circuits using datasheet

information

Necessary prerequisites

Necessary knowledge:

General laws of electricity
Signal processing basics (Fourier transform, frequency domain representation)
Logic systems

Practical info

Location(s)

 Toulouse

Non-contractual information

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Company knowledge and communication

ECTS
5 crédits

Hourly volume
108h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
¿ how to give an oral presentation
¿ some of the historical, geographical and/or geopolitical aspects of different English-speaking socio-cultural contexts
¿ how to produce a structured written synthesis in French.
¿ how to write a training period report and present it orally
¿ inner workings of contemporary economy and interdependence of macroeconomic scales

The student will be able to:

In French
¿ write the synthesis of a set of press articles and present it orally with Powerpoint visual aids
¿ write a training period report and give an oral presentation describing a particular company, reporting on and analysing a work experience.

In English:
¿ give a Powerpoint oral presentation in front of a group and orally interact with the audience
¿ demonstrate creativity, initiative and open mindedness in teamwork
¿ develop a thorough knowledge and a critical mind about different English-speaking socio-cultural contexts, taking into account historical, geographical

and/or geopolitical considerations.

In Economics :

¿ understand current major economic and societal stakes
¿ discuss and debate using arguments grounded in the knowledge of fundamental economic mechanisms and some economic thinking theories

Necessary prerequisites

Necessary knowledge :
-Expression 1 in the first-year « Grand Domaine Humanités » (D1FAHU01)
-Writing and oral skills in English in the first-year « Grand Domaine Humanités » (D1FAHU01)

Practical info

Location(s)

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Non-contractual information

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Improving one's autonomy and building one's own professional project – level 2A

ECTS
2 crédits

Hourly volume
44h

Practical info

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