

Liste d'éléments pédagogiques

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

Fundamentals in Computer Science



ECTS
7 crédits



Hourly volume
72h

Introducing

Description

Objectives

This course is heterogeneous course and groups 3 parts :

- Fonctionnal Programming & Caml (FP- Caml)
- Formal Logic and Logic Programming in Prolog (FL- Prolog)
- Advanced Algorithmics (« AA »)

At the end of this module, students are expected to :

[FP-Caml]

- understand and write pure functional programs,
- design recursive functions to iterate over recursive data types,
- define variants or parameterized types,
- more generally think in terms of higher-order functions in order to write reusable codes.
- describe the semantics of simple lambda terms
- have a basic theoretical understanding of the type systems theory

[FL-Prolog part]

- translate natural language statements into formulas of propositional logic and of 1st order predicate calculus
- apply several methods in order to check the validity

and

the consistency of a formula

- explain the fundamentals of logic programming and of Prolog.
- express problem solving as a demonstration (proof) based on axioms and theorems describing the particular properties of the problem.
- design a Prolog program and trace its execution

[AA Part]

Some paradigms in algorithmics for discrete optimization :

- Exhaustive enumeration
- Divide and Conquer
- Dynamic Programming
- Greedy Algorithms

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Practical info

Location(s)

 Toulouse

Hardware Computing μ controllers



ECTS
4 crédits



Hourly volume

Introducing

I3MAIF22 : Langage dassemblag

Description

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Objectives

At the end of this module, the student will have understood

and be able to explain (main concepts):

- o Programming specificities of the peripheral units for microcontroller.
- o How to take into account hardware constraints for the design of embedded system.

The student will be able to:

- o To select an architecture processor adapted to the software application and to the process configuration.
- o To conceive and test the techniques of the programming by hardware interruption.
- o To use debug tools and test in the context of crossdevelopment.
- o To find information into datasheet.

Practical info

Location(s)

 Toulouse

Necessary prerequisites

I2MAIF11 : Informatique matérielle Electronique numérique

Internet and Security



ECTS
5 crédits



Hourly volume

Introducing

Description

Objectives

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

- Network interconnection part:
 - o the basic concepts and techniques allowing interconnecting local area networks in the Internet: repeater, bridge, router
 - o the basic concepts and techniques allowing interconnecting LAN in the Internet : subnetting, CIDR, VLAN, VPN, applicative proxy, NAT
 - o the main protocols of the TCP/IP Internet architecture : UDP, TCP, IP, ARP/proxy ARP, ICMP, DHCP (Note : RIP, OSPF and BGP are briefly introduced).
- Distributed algorithm part:
 - o principal characteristics of the distributed systems (asynchronism, distribution of control and the data, absence of common knowledge, dynamicity, etc),
 - o their specific problems and the difficulty of their solution in a distributed context (mutual exclusion, management of the shared data, distributed choice, diffusion, detection of the termination, etc),
 - o some generic algorithmic tools allowing to solve them: causality, distributed recursivity (waves) and distributed iteration (phases), specific topological

structures.

- Security part:
 - o principles of computer security through the properties that characterize it as well as the classification of the major threats and the corresponding countermeasures,
 - o main vulnerabilities of computer networks, in particular the Internet network as well as the corresponding countermeasures,
 - o main software vulnerabilities as well as some countermeasures.

The student will be able to:

- Network Interconnection part:
 - o do architecture choices allowing to take into account requirements and constraints associated to a LAN interconnection,
 - o do basic or complex addressing and routing schemas,
 - o set up (administrate) Ethernet and IP networks in the basic and advanced interconnection contexts considered in the course.
- Distributed algorithm part:
 - o solve generic problems involved in the implementation of systems distributed
 - o handle the most general tools allowing to conceptualize them.
- Security part:
 - o analyse a computer network and its software in order to identify the main vulnerabilities, from software and network point of view and to propose corresponding countermeasures to improve the security of the whole system.

Necessary prerequisites

Course Introduction to computer networks (3MIC)
Cours de programmation distribuée dans les
réseaux (socket API) (3MIC)

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Practical info

Location(s)

 Toulouse

Object Oriented Design and Object Oriented Programming



ECTS
6 crédits



Hourly volume
85h

Introducing

Description

Objectives

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

Object oriented application design based on the UML language, and the object oriented programming (Java language)

The student will be able to:

- * Master object theory and the UML design modelling language
- * Master a design methodology based on use cases and integrating detailed analysis and design phases.
- * Apply the object concepts and a design methodology using the JAVA language
- * Understand the advantages of following best practices guidelines provided by the use of design patterns
- * Configure and use the configuration management tools (e.g. Git, Maven, etc.)
- * Explore the use of standard documents for project management, requirements specification, software design and software tests.
- * Configure and use collaborative workspaces applied to the software development process (e.g., JIRA).
- * Have an initial experience to the project management

challenges in a software development process project.

* Plan and play designer and developer roles within a software development process.

Necessary prerequisites

Structured programming (ADA, C, Pascal, etc)
Object-oriented programming (basic)

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Practical info

Location(s)

 Toulouse

Improving one's autonomy and building one's own professional project level 2 S7



ECTS
4 crédits



Hourly volume
46h

Introducing

Description

Objectives

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

Physical and Sports Activities

The student will be able to:

to list the problems to be solved:

- ¿ Know the Physical and Sports Activity (rules, meaning, roles, etc.),

- ¿ Design the objective of the project.

to organize:

- ¿ Know the constraints, the resources, and the means available,

- ¿ Know how to choose and plan actions over time,

- ¿ Know how to get involved in the group and the project: know how to adapt, dare to stimulate action, know how to give up, propose, etc.

to regulate:

- ¿ Know how to observe,

- ¿ Know how to carry out a balance sheet,

- ¿ Know how to readjust the choices if necessary.

Individualized Professional Project

The student should be able to:

- ¿ Develop your professional vision and define a strategy.

- ¿ Customize, present and compare your project to professionals

- ¿ Enrich your professional network

- ¿ Set development axes, objectives and action plans

Necessary prerequisites

Learning outcomes 1st, 2nd, 3rd year.

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Practical info

Location(s)

Toulouse

French I



ECTS
3 crédits



Hourly volume

Introducing

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Practical info

Location(s)

 Toulouse

Political sciences semester 1



ECTS
3 crédits



Hourly volume

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