INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

SEMESTER 7_4th YEAR IR

Practical info

Location(s)

Toulouse

Improve your management abilities

ECTS
4 crédits

Hourly volume
45h

Management I3CCGE51

Introducing

Objectives

At the end of this module, the student will

¿ Know the legal environment and responsibilities of a business
activity
¿ Be able to objectively assess the financial health of a company and evaluate the rentability of an investment
¿ Realize a market diagnosis (benchmarking) and a business diagnosis in order to make decisions and set goals and strategies
¿ Collect the market data and put in action a business plan adapted to the means and goals of the company
Module L 2
The objectives, defined in reference to the CEFRL for the 5 language activities, are specific for the language studied Chinese, German, Spanish ¿ and the level of the student.

They can be consulted on :

https://moodle.insa-toulouse.fr/course/view.php?id=44

In certain cases, students may be authorised to follow an English module instead of another language

Necessary prerequisites

Practical info

Location(s)

Toulouse

INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Toulouse School of Management

Practical info

Location(s)

Toulouse

Fundamentals in Computer Science

ECTS
7 crédits

Hourly volume
72h

Introducing

Objectives

This course is heterogeneous course and groups 3 parts :
- Functionnal 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

Practical info

Location(s)

Toulouse

Hardware Computing µcontrollers

ECTS
4 crédits

Hourly volume

Introducing

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.

Necessary prerequisites

I2MAIF11 : Informatique matérielle Electronique numérique
I3MAIF22 : Langage dassemblag

Practical info

Location(s)

Toulouse

Internet and Security

ECTS
5 crédits

Hourly volume

Introducing

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,¿),
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,¿),
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)

Practical info

Location(s)

Toulouse

Object Oriented Design and Object Oriented Programming

ECTS
6 crédits

Hourly volume
85h

Introducing

Objectives

At the end of this module, the student will understandd 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)

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

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.

Practical info

Location(s)

Toulouse

French I

ECTS
3 crédits

Hourly volume

Practical info

Location(s)

Toulouse

Political sciences semester 1

ECTS
3 crédits

Hourly volume

Practical info

Location(s)

Toulouse

Improve your management abilities

ECTS
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Hourly volume
45h

Management I3CCGE51

Introducing

Objectives

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Practical info

Location(s)

Toulouse

Mobiles networks and wireless networks

ECTS
6 crédits

Hourly volume
55h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
Mobile networks and wireless networks functioning and deployment principles and their communication and network architecture

The student will be able to:
-understand the cellular architecture of mobile and wireless
networks
-design and deploy a mobile cellular network
-handle the communication and network architecture of mobile networks, the roaming and handover principles
-master the radio access network (RAN) and its impact on
the design of the whole network architecture
-understand the information transmission (voice, data, multimedia) in mobile and wireless network
-understand the energy management and the principles to
adapt the emission power in wireless and mobiles networks
-identify the specificity of wireless local and personal networks and their effects on the network architecture
-handle the main functioning principles of local and personal wireless networks
-design and deploy an enterprise local wireless network

Necessary prerequisites

Telecommunication and Network classes

Practical info

Location(s)

Toulouse

[FRANCAIS] Systèmes de transmission

ECTS
5 crédits

Hourly volume
68h

Introducing

Objectives

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

- How the properties and limitations of channels influence transmission
- The different perturbation sources
- The properties of most antennas
- Modulation and demodulation techniques
- Coding and error-correction techniques.

The student will be able to:
- Identify the limitations of a channel and how they alter the signal
- Build a model of a transmission channel, so as to conceive an adapted and optimized transmission link
- Dimension an antenna, taking into account the propagation setting
- Use a software-defined radio module to carry out numerical modulations (ASK, FSK, PSK, APSK, QAM).

Necessary prerequisites

Electromagnetism, electronics, linear algebra, telecommunications and related hardware (basic notions).

Practical info

Location(s)

Toulouse

Internet and Security

ECTS
5 crédits

Hourly volume

Introducing

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Practical info

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Toulouse

French I

ECTS
3 crédits

Hourly volume

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

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Necessary prerequisites

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

Practical info

Location(s)

Toulouse

Political sciences semester 1

ECTS
3 crédits

Hourly volume

Practical info

Location(s)

Toulouse

[FRANCAIS] Challenge – Formation ECIU

ECTS
1 crédits

Hourly volume

Practical info

Location(s)

Toulouse

[FRANCAIS] Challenge – Formation ECIU

ECTS
2 crédits

Hourly volume

Practical info

Location(s)

Toulouse

[FRANCAIS] Challenge – Formation ECIU

ECTS
3 crédits

Hourly volume

Practical info

Location(s)

Toulouse

[FRANCAIS] Challenge – Formation ECIU

ECTS
4 crédits

Hourly volume

Practical info

Location(s)

Toulouse

[FRANCAIS] Challenge – Formation ECIU

ECTS
5 crédits

Hourly volume

Practical info

Location(s)

Toulouse