

## Liste d'éléments pédagogiques

### Practical info

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#### Location(s)

 Toulouse

# Mobiles networks and wireless networks



ECTS

6 crédits



Hourly volume

55h

## Introducing

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### 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
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## Necessary prerequisites

Telecommunication and Network classes

## Practical info

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### Location(s)



Toulouse

## [FRANCAIS] Systèmes de transmission



ECTS  
5 crédits



Hourly volume  
68h

### Introducing

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#### 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).

### Practical info

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#### Location(s)

 Toulouse

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### Necessary prerequisites

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

# 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, 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)

## Practical info

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### Location(s)

 Toulouse

# Object Oriented Design and Object Oriented Programming



ECTS  
6 crédits



Hourly volume  
85h

## Introducing

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### 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.

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## Necessary prerequisites

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

## Practical info

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### Location(s)

 Toulouse

## French I



ECTS  
3 crédits



Hourly volume

## Practical info

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### 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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- ¿ Enrich your professional network
- ¿ Set development axes, objectives and action plans

### 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

### Necessary prerequisites

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

### Practical info

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#### Location(s)

 Toulouse



## Political sciences semester 1



ECTS  
3 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse