

## SEMESTER 8\_4th YEAR GM

### Practical info

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#### Location(s)

 Toulouse

## Advanced heat transferts and fluid flow



ECTS  
5 crédits



Hourly volume

## Introducing

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### Objectives

At the end of this course, the student should have understood and will be able to explain the basics allowing to approach a phenomenon involving real (viscous) fluids. He will be able to tackle situations involving more or less complex heat and mass transfers.

The student will also be able to conduct a numerical simulation with Ansys Fluent code.

### Necessary prerequisites

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Inviscid fluid dynamics (I3ICFT01 & Fluid Mechanics 1)

Introduction to heat transfer (I3ICFT01 & heat Transfer 1)

## Practical info

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### Location(s)



Toulouse

# Materials, vibrations and advanced mechanical modeling



ECTS  
7 crédits



Hourly volume  
100h

## Introducing

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### Objectives

the end of this module, the student will have understood and be able to explain how works a pre-stressed (or preloaded) mechanical system, basis of fracture mechanics and computations of vibrations and transient dynamics

The student will be able to identify mechanical systems that are preloaded, discuss with a specialist of fracture mechanics and carry out a simulation of vibrations and transient dynamics.

### Necessary prerequisites

Basis on mechanical design, materials and vibrations

## Practical info

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### Location(s)

 Toulouse

## Research projects and sports



ECTS

6 crédits



Hourly volume

2h

## Introducing

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### Objectives

The module aims at giving the students a first experience with research through a tutored project in teams (2 to 4 students).

At the end of the module, the student will :

- know how to conduct a bibliography search, synthesise and cite it, for a given scientific topic;
- communicate with rigor in English, orally or through written documents to highlight the research activity performed;
- perform a simple research action in a team organization to generate scientific propositions, then implement and finally assess them

### Necessary prerequisites

None

## Practical info

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### Location(s)

 Toulouse

## Multidisciplinary industrial project



ECTS  
6 crédits



Hourly volume  
85h

## Introducing

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### Objectives

At the end of this module, the student will have understood and be able to explain the main principles and definitions of quality management, the importance of health and safety at work, how to assess and prevent risks, eco-design and life-cycle analysis.

The student will be able to develop their capabilities in mechanical design in an industrial project.

### Necessary prerequisites

Bachelor in mechanical design

## Practical info

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### Location(s)

 Toulouse

## French II



ECTS  
3 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse

## Communication in organisations with LV2



ECTS

6 crédits



Hourly volume

### Introducing

#### Objectives

Objectives:

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

- How to answer the demand of the civil society for technical and scientific information
- How to carry out critical analysis in order to give appropriate answers when questioned about such issues
- How to consider the circulation and content of information within the organizations in which they will be hired

The classes given in English will focus on the specific linguistic characteristics of the English used in scientific contexts in order for the students to understand and master them.

The students will also be made aware of the specificities of scientific English as relates to publications in his specific field of research.

Module L 2

The objectives, defined in reference to the CEFR 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

Necessary knowledge:

For classes in English : understanding of scientific English

### Practical info

#### Location(s)



Toulouse

## Political sciences semestre 2



ECTS  
3 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse



## Systems Engineering processes



ECTS  
5 crédits



Hourly volume  
77h

## Introducing

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### Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):  
What are the engineering processes to develop a system, how they must be implemented and managed in companies, what are the associated standards.

The student will be able to:

- define, capture, analyze and express the stakeholders
- needs
- transform the needs into requirements
- define several logical and physical solutions from the needs, evaluate them and choose one manage development processes

## Practical info

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### Location(s)

 Toulouse

## Mechatronic project



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):

- power and information channels of mechatronic systems
- the place of system simulation activities in the design cycle (V design cycle) of complex systems
- the principle of data acquisition with computers

The student will be able to:

- Establish models suitable for various engineering tasks during the design of mechatronic systems.
- Implement models in a system simulation environment and perform validation and verification tasks associated to the V design cycle.
- Specify and conduct model-in-the-loop and software-in-the-loop activities for a complex system.
- Design the different elements of a simple data acquisition system
- Implement a graphical programming language dedicated to the acquisition (LabVIEW )
- Perform a security analysis
- Perform a lifecycle analysis with a dedicated software

### Necessary prerequisites

Basics of mechanics, electronics, heat transfer, and automation.

Basic of algorithmic

## Practical info

### Location(s)

 Toulouse

## Quality, security, environment and sports



ECTS  
4 crédits



Hourly volume  
61h

## Introducing

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### Objectives

At the end of this module, the student will have understood and be able to explain the main principles and definitions of quality management, the importance of health and safety at work, how to assess and prevent risks, eco-design and life-cycle analysis.

The students will be able to develop their capabilities in eco design in a project related to mechatronics.

Sports:

The student will have to build a project with his team by:

- Taking into account everyone's skills,
- Seeking to enhance the strengths of each partner and compensate potential weaknesses.
- Analyzing the balance of power they will be confronted with.

## Practical info

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### Location(s)

 Toulouse

## Dynamics of structures and control



ECTS  
4 crédits



Hourly volume  
22h

## Introducing

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### Objectives

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

Vibrations of mechanical systems and structures.

Controlling the articulated systems and flexible structures.

The global and local modelling of electromagnetic actuators.

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### Necessary prerequisites

Basis in electromagnetism, solid mechanics and control

## Practical info

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### Location(s)

 Toulouse

# Object-Oriented and Real-Time Programming



ECTS  
3 crédits



Hourly volume  
50h

## Introducing

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### Objectives

This module consists of two parts:

- The part on real time systems introduces real time systems, key concepts, applications, constraints, and teaches the programming of these systems using the services of real time operating systems.
- At the end of the object programming part, students will be able to produce C++ code from a UML class diagram with relationships, inheritance and polymorphism.

## Practical info

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### Location(s)



Toulouse

## Research Initiating Project



ECTS  
4 crédits



Hourly volume

## Introducing

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### Objectives

The module aims at motivating students with research activities through a selection of tutored projects. Each project involves a team of 6 students tutored by a researcher or an industrial partner. Those projects also benefit from a preliminary training on documentary research techniques to facilitate the writing of a state-of-the-art review of the domain. A course on project management techniques is also provided to guide students during the realisation phase of the project.

At the end of this module, the student will have a practical experience of the following activities :

- identify a bibliography on a given topic, and present it through a standard formulation (IEEE form).
- write a state-of-the-art synthesis.
- precise the perimeter of the realization phase.
- apply project management and collaborative work techniques.
- write a project report and prepare a presentation in English for its project defense.

## Practical info

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### Location(s)



Toulouse

# Communication in organisations with LV2



ECTS

6 crédits



Hourly volume

## Introducing

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### Necessary prerequisites

Necessary knowledge:

For classes in English : understanding of scientific English

## Practical info

### Location(s)

 Toulouse

## French II



ECTS  
3 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse



## Political sciences semestre 2



ECTS  
3 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse

## [FRANCAIS] Challenge – Formation ECIU



ECTS  
1 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse

## [FRANCAIS] Challenge – Formation ECIU



ECTS  
2 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse

## [FRANCAIS] Challenge – Formation ECIU



ECTS  
3 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse

## [FRANCAIS] Challenge – Formation ECIU



ECTS  
4 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse

## [FRANCAIS] Challenge – Formation ECIU



ECTS  
5 crédits



Hourly volume

## Practical info

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### Location(s)



Toulouse