

## 5th YEAR GM INSA\_APPENTICESHIPS SEMESTER 9

## Practical info

## Location(s)

 Toulouse

[FRANCAIS] Relations Humaines et Professionnelles,  
éthique ECTS  
6 crédits Hourly volume

## Practical info

### Location(s)

 Toulouse

## Industrialization



ECTS

3 crédits



Hourly volume

## Practical info

### Location(s)

 Toulouse

## Industrial training



ECTS

4 crédits



Hourly volume

10h

## Introducing

### Objectives

The apprentice will carry out his end-of-study project within his company or on international mobility.

The objective is to put into practice his knowledge and engineering skills in the professional environment.

### Practical info

#### Location(s)



Toulouse

# System level modelling and simulation



ECTS

3 crédits



Hourly volume

29h

## Introducing

### Objectives

The student will be able to model, simulate and analyse multi-domain power systems

### Necessary prerequisites

Dynamic systems, fluid mechanics, solid rigid mechanics.

## Practical info

### Location(s)

Toulouse

# Composite structures and case study



ECTS

3 crédits



Hourly volume

46h

## Introducing

### Objectives

The student will be able to perform simple sizing of composite structures and to choose a couple manufacturing/material for a given case study.

The student will be able to:

- Choice a couple of fibers and matrix and their commercial products.
- Choice a type of composite architecture: laminates, sandwichs, 2D1/2,3D, 4D.
- Determine the manufacturing method: hand layup, fiber placement, RTM, LRI, RFI.
- To be inspired by solutions of automotive, naval, wind energy or aerospace industry.
- To be inspired by past experience in aeronautic industry.
- Know and use laminate theory.
- Knows and use simple sizing of junctions.
- Know issues of impact and ageing.
- Know issues of failure and damage.
- Realize a case study: example wing box of an acrobatic aircraft
- Make a presentation of their sizing and their design.
- Work in a collaborative manner.

### Necessary prerequisites

Beam theory, continuum mechanics, materials

behaviors.

Matrix Calculation

### Practical info

#### Location(s)



Toulouse

# Heat Engines, Refrigerators and Heat Pumps



ECTS

3 crédits



Hourly volume

38h

## Introducing

### Objectives

At the end of this course, the student should have understood and will be able to explain the operation of conventional heat engines, refrigerators and heat pumps as well as the basics of combustion

The student should be able to size and optimize conventional heat engines, refrigerators and heat pumps

### Necessary prerequisites

Fundamentals in thermodynamics (1st year)  
Thermodynamics and Thermodynamic Analysis (1st year)

## Practical info

### Location(s)



## Optional modulus



ECTS

7 crédits



Hourly volume

30h

## Introducing

### Objectives

The student will be able to successfully follow 3 optional modules related to mechanical design skills

## Practical info

### Location(s)

Toulouse

## Non destructive testing – English



ECTS

4 crédits



Hourly volume

20h

## Introducing

### Objectives

#### Module 1 : Non Destructive testing (NDT)

Students have to know the main nondestructive testing methods with advantages/drawbacks and how to apply them to practical industrial cases. They must be able to choose the most appropriate method to solve specific industrial issues.

Module 2 : Metallic alloys for high temperature applications & Creep behaviour

Analysis of the physics occurring during creep and of the parameters which affect creep resistance.

How to apply basic theoretical models to calculate rupture life expectancy.

Knowledge of the main metallic alloys withstanding creep at high temperatures.

#### Module 3 : English

Students must be able to organize their scientific speech and writing logically, to use proper English in a concise and appropriate style while meeting genre conventions; master technical terms; resort to appropriate registers (specialized/non specialized audiences/readers) and quote scientific sources according to international citation standards.

Module 1: Nondestructive testing (NDT)

L1, 2 and 3 courses or equivalent: knowledge of fundamental principles in physics i.e. electricity, electromagnetism, optics, atomic structure and Materials Science.

Module 2 : Metallic alloys for high temperature applications & Creep behaviour

Mechanics of Materials: defects in metallic materials and plastic deformation mechanisms; behaviour of materials

Module 3 : English

Students must master general English and know how to write and talk about general scientific elements in a rigorous way (1st, 2nd, 3rd & 4th year English courses).

## Practical info

### Location(s)



Toulouse

## Necessary prerequisites

## Human relations



ECTS

6 crédits



Hourly volume

78h

## Introducing

### Location(s)



Toulouse

## Objectives

L'étudiant devra être capable de :

- Analyser des situations de groupe avec des concepts issus de la psychologie sociale
- Identifier les dimensions éthiques de ces situations et prendre position
- Repérer et comprendre des informations liées aux RH
- Analyser une situation de management d'équipe en référence à un cadre théorique
- Formuler et argumenter des solutions managériales
- Agir dans un milieu naturel : analyser, décider, agir ; mettre en œuvre la sécurité, utiliser du matériel spécifique. découvrir un site.
- Respecter et s'intégrer dans un environnement différent de ses habitudes
- S'engager avec cohérence dans le projet d'activités
- Prendre part activement au collectif
- Valider son projet professionnel et construire une stratégie pour trouver un emploi

## Necessary prerequisites

None

## Practical info