

4th YEAR APPLIED PHYSICS

Practical info

Location(s)

 Toulouse

Improve your management abilities



ECTS

4 crédits



Hourly volume

45h

Introducing

Management I3CCGE51

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 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

Practical info

Location(s)



Toulouse

Necessary prerequisites

Toulouse School of Management

Practical info

Location(s)

 Toulouse

Laboratory Works Multiphysics Measurements 1



ECTS
5 crédits



Hourly volume
163h

Practical info

Location(s)



Toulouse

Multidisciplinary project



ECTS
6 crédits



Hourly volume
61h

Practical info

Location(s)



Toulouse

Condensed Matter Physics I



ECTS
5 crédits



Hourly volume
65h

Practical info

Location(s)



Toulouse

Instrumentation



ECTS
5 crédits



Hourly volume
32h

Practical info

Location(s)



Toulouse

Electronic and signal processing



ECTS
5 crédits



Hourly volume
57h

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

Laboratory Works Multiphysics Measurements 1



ECTS
3 crédits



Hourly volume
232h

Practical info

Location(s)



Toulouse

Physical properties of Condensed Matter 2



ECTS
4 crédits



Hourly volume
85h

Practical info

Location(s)



Toulouse

Multidisciplinary project



ECTS
3 crédits



Hourly volume
40h

Practical info

Location(s)

 Toulouse

Micro-nano technologies



ECTS
3 crédits



Hourly volume
23h

Introducing

Location(s)

 Toulouse

Objectives

The goal of the course is to introduce the techniques used in the micro-electronics industry for the fabrication of integrated circuits (photolithography, growth and deposition of thin films, doping, etching techniques), as well as various optical and electrical characterization techniques.

The physical and the chemical processes involved in these techniques are studied.

The complete fabrication process of NMOS and CMOS circuits is presented.

The students are also initiated to the design and the simulation of integrated circuits.

Necessary prerequisites

Semiconductor physics (electrons, holes, doping, band structure).

Design and working principle of basics electronics components (PN junction, MOS transistor).

Practical info

From the sensor to the test bench in open source hardware



ECTS
3 crédits



Hourly volume
92h

Introducing

Objectives

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

THE MANUFACTURING OF *low tech* SENSORS based on graphite: with elements of physics (electronic transport) allowing the understanding of the electrical characteristics of a sensor based on a granular system (graphite nanoparticles).

SENSORS AND ACQUISITION CHAIN:

- The criteria for the design and use of this sensor and an adapted acquisition chain

It will be capable of handling:

- The physical principles of sensors operation
- The concepts used in metrology
- Procedures implemented,
- electrical "conditioners"
- The design of an acquisition chain.

DESIGN OF A CIRCUIT IN ANALOG ELECTRONICS:

It will be able to design and simulate an amplification stage dedicated to the measurement of the sensor realized

MICROCONTROLLERS AND OPEN SOURCE HARDWARE:

Elements to master the microcontrollers allowing the design and implementation of concrete applications in Open Source Hardware,

- The architecture and operation of ATMEL AVR

microcontrollers,

- Programming in the C and C++ language of the Arduino and IDE development environment,
- Creating his own libraries and programs,
- Creating its own human/machine interfaces: in Arduino / Processing, Android and python,
- The achievement of its own circuit boards (PCB + Eagle...)
- Board interfacing with various devices (displays, motors, sensors, Nunchuk, touch screens, I2C bus, wifi, Bluetooth LE ...)
- Intellectual property in open source hardware

REALIZATION OF AN ANDROID APPLICATION:

He will be able to create an ANDROID application to retrieve data from the graphite sensor.

REALIZATION OF A TEST BENCH ADAPTED TO THE SENSOR

He will be able to build a bench allowing characterizing in a optimal and reproducible way the electrical characteristics of the sensor.

REALIZATION OF THE SENSOR DATASHEET

Finally, he will realize the data sheet of the sensor realized.

Necessary prerequisites

Knowledge of Fortran, C and even C++

Knowledge of algorithmic

Practical info

Location(s)

 Toulouse

Safety, quality and applications to measurement



ECTS

4 crédits



Hourly volume

186h

Introducing

Objectives

This module provides a theoretical and experimental approach of the main concepts involved in the field of quality, safety, environment and measurement. The following topics are covered:

- ↳ design of experiments,
- ↳ Statistical process control.
- ↳ component failure
- ↳ Metrology and testing
- ↳ decision making and risk analysis

This entire course is motivating for the student by putting it in concrete situation with report to the problems they might encounter in his life as a future engineer.

In this framework, the guiding principle of the training is to focus on the one hand on the work group around applications and unifying themes and secondly, strengthening the link between academic courses of their curriculum and the concepts they will required during practical training in laboratory and/or company.

At the end of this UF, the student will:

- 1 - Be able to define, build and analyze an experimental design of a complex physics problem and have a critical look on the obtained results.
- 2 - Master the requirements of the space industry in terms of reliability as well as its normative aspects with the consequences that this can sometimes have (limitation of performances, etc...).
- 3 - Be aware of safety, quality, decision, environmental

risks and risk analysis

Practical info

Location(s)

 Toulouse

[FRANCAIS] Physique pour la transistion énergétique



ECTS
3 crédits



Hourly volume
32h

Practical info

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

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



ECTS
4 crédits



Hourly volume
40h

Practical info

Location(s)

 Toulouse

Political sciences semestre 2



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