INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

EMBEDDED ELECTRONICS

Introducing

Description

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

Toulouse

Device modeling and digital circuit architectures

ECTS
4 crédits

Hourly volume
55h

Introducing

Description

Objectives

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

-the electronic device and digital electronic systems modelling

-the issue of the integration of electronic circuits

-the design and performance optimisation of digital architectures

The student will be able to understand the models of main electronics active devices and digital complex architectures. The student will be prepared for the future technological breakout in their professional life.

Necessary prerequisites

Electrical circuits, electrostatics, analog and digital electronics, digital hardware.

Évaluation

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Practical info

Location(s)

Toulouse

Analog electronic system architecture

ECTS
4 crédits

Hourly volume
54h

Location(s)

Toulouse

Introducing

Description

Objectives

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

Dimension and design of analog electronic functions of information processing (filtering, amplification, automatic gain control, voltage controlled oscillators, modulators / demodulators AM and FM;Optimize the signal to noise ratio in each subset of an embedded systemModeling architectures for robust usage constraints (consumption, temperature to dissipate), the thermal variations of the environment and dispersions characteristics of components

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Practical info

Systems analysis complex

ECTS
4 crédits

Hourly volume
50h

Introducing

Description

Objectives

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

Principles, difficulties and limits of the modeling of systems with multiple inputs and multiple outputs.Design and implementation of control of systems with multiple inputs and multiple outputs.Main possible and observable behaviors which can occur in the nonlinear systems (equilibrium states, limit cycles, complex behaviors) and their evolution by variation of the parameters.Basis of the theory of Lyapunov

The student will be able to:

To apprehend the implementation of the control of a process with multiple inputs and multiple outputs.To begin the analysis of a nonlinear system by various techniques (qualitative, geometrical, and simulations)To lean on numerical analysis (Matlab©) to establish, confirm, validate, simulate and implement the theoretical results discussed during the courses.

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Practical info

Location(s)

Toulouse

Digital signal acquisition architectures and computed controlled systems

ECTS
4 crédits

Hourly volume
60h

Introducing

Description

Objectives

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

The complete modelling from sensor to actuator is presented, associated with digital control technics. A specific labwork deal with the implementation of a complete chain of acquisition and digital processing in order to carry out the control of an actuator.

Évaluation

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Practical info

Location(s)

Toulouse

Hardware

ECTS
4 crédits

Hourly volume
55h

Introducing

Description

Objectives

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

Programming of microcontroller part : Programming specificities of the peripheral units for microcontroller.How to take into account hardware constraints for the design of embedded system. System Design part: o the concepts of object paradigm.o the concepts of object-oriented design processo the main UML diagrams involved in an object modelling: use case diagram, sequence diagram, state and activity diagram and composite structure diagram.

The student will be able to:

Programming of microcontroller part : To select an architecture processor adapted to the software application and to the process configuration.To conceive and test the techniques of the programming by hardware interruption.To use debug tools o and test in the context of cross- development.To find information into datasheet. System Design part: o breakdown a system (which could be software or hardware) with an object-oriented approacho choose the diagrams which are most appropriated according the student viewpoint: structure, behaviour, interaction

propose an object-oriented UML model of a software or hardware system

Évaluation

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Practical info

Location(s)

Toulouse

QSE APS 4A GEI

ECTS
4 crédits

Hourly volume
47h

Introducing

Description

Évaluation

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Practical info

Location(s)

Toulouse

Communicating within organizations

ECTS
6 crédits

Hourly volume
75h

Introducing

Description

Objectives

The classes given in French will focus on :
- How to react to society's demand for technical and scientific information
- How to foster critical thinking in order to give appropriate answers when questioned about such issues
- How to communicate effectively in the workplace

The classes given in English will focus on the specific linguistic characteristics of English used in such contexts in order for the students to understand and master them.
The students will also be made aware of the specificity of professional communication within the English-speaking world

Module L2
The objectives, defined in reference to the CEFRL for the 5 language activities, depend on 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

For classes in English : mastery of general English.

Évaluation

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Practical info

Location(s)

Toulouse