INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

SEMESTER 8_4th YEAR AE_THEME SE

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

Improve your management abilities

ECTS
4 crédits

Hourly volume
45h

Introducing

Description

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 CEFRL 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

Management I3CCGE51

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Practical info

Location(s)

Toulouse

Toulouse School of Management

Introducing

Description

Évaluation

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Practical info

Location(s)

Toulouse

Practical Work in Control

ECTS
3 crédits

Hourly volume
34h

Introducing

Description

Objectives

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

This teaching illustrates all the 4th year automation courses (control of nonlinear systems, optimal control, numerical control, multi-variable control, graphs).

The student should be able to:
- Model/identify a system
- Synthesize a control according to a specification (performance) and implement it
- Know how to be critical on a command
- Know how to write a report

Necessary prerequisites

Analysis of non-linear systems - Multivariable systems - Peripherals - Numerical control - Acquisition chains and numerical control - optimal control - graph

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Practical info

Location(s)

Toulouse

Energy management for embedded systems

ECTS
3 crédits

Hourly volume

Introducing

Description

Objectives

- At the end of this module, the student will have understood and be able to explain (main concepts):
- The characteristics of the energy sources that can be used on embedded systems,
- The characteristics of quantities in electrical distribution networks
- Power converter architectures,
- The modeling of an electric motor/generator based on its coupled electrical and mechanical values.
- The operation of a transformer and its model.
- The structures and main characteristics of single-phase and three-phase AC-DC converters.
- The main chopper structures, their properties, reversibilities and their control.
- The principle of torque and/or speed regulation of a DC machine using a chopper.

The student should be able to:
- Analyze the energy needs of an on-board system and propose and size a solution,
- Use coupled electrical and mechanical equations to model an electro-mechanical system
- Analyze a mechanical system and identify the drive requirements, the type of converter that must be associated with the machine.
- Dimension the elements of an electrical energy conversion chain which allows to drive a given actuator.

Necessary prerequisites

General knowledge of electricity, alternating current, electrical circuits, analog and digital electronics as well as
mathematical tools (Fourier and Laplace transforms) and
the basics of automatic control (transfer functions and block
diagrams)

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Practical info

Location(s)

Toulouse

Non-contractual information

Discrete and Continuous Systems Optimisation

ECTS
5 crédits

Hourly volume

Introducing

Description

Objectives

At the end of this module, the student will have understood
and be able to explain (main concepts):
- different approaches to analyse, evaluate the performance of discrete event systems through different
models (deterministic or stochastic, graphs) and to optimise them (linear programming)
- the optimisation methods for continuous systems :
-static (first and second order conditions)
- dynamic (dynamic programming)
- their applications to optimal or model predictive control mainly for linear systems

The student will be able to:
- to analyse, model and solve an optimization problem of
discrete systems by a linear programming or a graph, by
applying relevant algorithms (simplex, usual graphs and
networks algorithms, combinatorial optimization)
- to model and to characterize: stationary Makovian processes with discrete state space (chains) and continuous or discrete time, queuing systems, to analyse
their transient and stationary behaviours, to evaluate their
performances
- to model a discrete event systems by Petri nets and to analyse the properties by enumerative and structural approaches.
- to formalise and solve a quadratic criterion, nonlinear,
without or with constraints optimisation problem in the case
of systems with real variables
-to develop and design an optimal control law (LQG) for a
linear or linearized process.

Necessary prerequisites

Linear algebra ¿ Probabilities ¿ Dynamic systems (state concept) - Basic elements in logic systems and Petri nets.

Évaluation

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Practical info

Location(s)

Toulouse

Research project

ECTS
4 crédits

Hourly volume

Introducing

Description

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 facilit the writing of a state-of-theart review of the domain. A course to project management techniques is also provided to guide students during the realisation phase of the project.

At the end of this module, the student wil 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 proj

Évaluation

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Practical info

Location(s)

Toulouse

INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Computer science

ECTS
5 crédits

Hourly volume

Introducing

Description

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
- Object-Oriented Programming part:
. The principles of object-oriented programming: method call, classes.
.The application of those notions for programming connected objects

- Networks part:
. The basic concepts and techniques allowing interconnecting local area networks in the Internet: repeater, bridge, router
.the basic concepts and techniques allowing interconnecting LAN in the Internet : subnetting, CIDR, VLAN, VPN, applicative proxy, NAT
. the main protocols of the TCP/IP Internet architecture : UDP, TCP, IP, ARP/proxy ARP, ICMP, DHCP, RIP, OSPF, BGP

- Real-Time part:
.Designing real time applications.
. Understand and manipulate a real time kernel.

The student will be able to:

- Oject-Oriented Programming part:
. Develop java applications, using a modular object-oriented style.

- Networks part:
.Do architecture choices allowing to take into account requirements and constraints associated to a LAN interconnection.
. Do basic or complex addressing and routing schemas.
. Set up (administrate) Ethernet and IP networks in the basic and advanced interconnection contexts considered in the course.

- Real-Time part
.Set up a design methodology to respond to a specification.
. Design software architectures for real time applications.
. Ajust the tasks parameters to reach the expected performances.
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- Simulate and analyze real-time applications performance

Necessary prerequisites

Software Engineering, introduction to networking, C programming

Évaluation

Non-contractual information

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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

Introducing

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Practical info

Location(s)

Toulouse

Communication in organisations with LV2

ECTS
6 crédits

Hourly volume

Introducing

Description

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
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Necessary prerequisites

Necessary knowledge:
For classes in English : understanding of scientific English

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Practical info

Location(s)

Toulouse

Communication in organisations

ECTS
6 crédits

Hourly volume
42h

Introducing

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Practical info

Location(s)

Toulouse

Political sciences semestre 2

ECTS
3 crédits

Hourly volume

Introducing

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Practical info

Location(s)

Toulouse

Non-contractual information