INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

THIRD YEAR INSA TOULOUSE

Practical info

Location(s)

Toulouse

Microbiology and statistics

ECTS
5 crédits

Hourly volume
61h

Practical info

Location(s)

Toulouse

Modelling and numerical solving in fluid mechanics

ECTS
6 crédits

Hourly volume
87h

Practical info

Location(s)

Toulouse

Hydraulics and dispersed systems

ECTS
5 crédits

Hourly volume
39h

Practical info

Location(s)

Toulouse

Engineering and ecological issues

ECTS
3 crédits

Hourly volume
30h

Practical info

Location(s)

Toulouse

[FRANCAIS] Remise à niveau 3A ICBE

ECTS
3 crédits

Hourly volume
68h

Practical info

Location(s)

Toulouse

Fluid Properties

ECTS
4 crédits

Hourly volume
37h

Toulouse

Introducing

Objectives

At the end of this module,
1) students will be able to write and use thermodynamic models and correlations leading to the determination of fluid properties as well as the calculation of enthalpy, entropy and fugacity in polyphase mixtures .
2) students will then be able to apply these concepts to the phase equilibria (liquid-vapor, liquid-liquid) necessary for the characterization of the main limitations and the efficiency of the different unit operations.
3) students know how to use Prophy software to determine fluid properties and equilibrium conditions for pure substances and mixtures.

Necessary prerequisites

I2BETH11: Thermodynamique approfondissement et application aux systèmes physico-chimiques

Practical info

Location(s)

Molecular biology

ECTS
4 crédits

Hourly volume
47h

Introducing

Objectives

Objectives:
At the end of this module, the student will have understood and be able to explain (main concepts):
- Nucleic acids properties, genome organization and DNA replication
- Gene transcription and messenger RNA translation leading from DNA to proteins
- RNA processing and modifications
- Proteins folding, modifications, interactions, secretion and turnover

The student will be able to:
- Define and describe the main molecular elements enabling genome organization and gene expression.

The aim of this UF is to provide the molecular biology knowledge that is absolutely required to master the biotechnology tools. The student must be able to formulate, interpret and solve a molecular problem around the basic molecular processes allowing gene expression in order to master biotechnological tools and for optimizing and/or modifying living organisms of industrial interest

Necessary prerequisites

Necessary knowledge :

Basics in biochemistry and microbiology

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project – level 3

ECTS
2 crédits

Hourly volume
44h

Practical info

Location(s)

Toulouse

Job search and language

ECTS
5 crédits

Hourly volume
37h

Introducing

Objectives

Job search modules in French and in English

By the end of these modules, the student is expected to understand how to successfully obtain an internship or job and will grasp the differences in the job-search process between France and English-speaking countries.
The student will be able to:
¿ make a personal statement, and start developing a career plan
¿ use current research tools (web, online networks, company websites) to conduct a documentary survey on recruitment
¿ seek work placements matching his/her objectives and profile
¿ find and analyze an English advert in his/her future field
¿ adapt his/her CV and cover letter to a specific job application
¿ write a CV in English following various country-relevant templates
¿ ensure his/her job application meets the company's requirements
¿ prepare for an interview (self-knowledge, company awareness, preparation of adequate questions)
¿ show adequate degree of proficiency in job search related technical English to be able to take a professional job interview

Second language course (optional ¿ commitment for years 3 and 4)

The objectives are defined according to European specifications for the five language skills and specific to the various languages proposed - German, Spanish, and Chinese ¿ and to students' levels.
Whenever his/her level is sufficient, the student will be able to:
¿ Synthesize and present professional documents
¿ give an oral presentation in front of a group
¿ take into account the various dimensions of interculturality
¿ Analyze a job ad
¿ simulate a job interview
¿ write a CV and a cover letter in the studies language

Remedial English (upon teachers¿ decision)

In some specific cases, a remedial English course is offered in replacement of the second language course with the objective of reinforcing the language skills useful for the TOEIC, i.e. reading and listening, grammar and vocabulary.

Necessary prerequisites

¿ TRE (in French): min. C1 level in French ¿ Course not open to exchange students

¿ Job Search (in English): min. B1 level in English ¿ Course open to exchange students

¿ LV2: min. A2 in the language studied ¿ Course not open to exchange students

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

Bioseparation, enzyme kinetic and gene regulation

ECTS
7 crédits

Hourly volume
116h

Introducing

Objectives

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

- the mechanisms of separation techniques usually used in biochemistry-biotechnology, more particularly in the case of biocatalysts: techniques of precipitation (proteins, nucleic acids), techniques of centrifugation and ultracentrifugation, membrane techniques (MF, UF, NF) and electrophoretic techniques;
- the bases of the measure of the reaction rate of an enzyme, the various models allowing the description of the behaviour of an enzyme, from the simplest to the most complex, the effect of physico-chemical parameters such as the pH or the temperature
- the main pathways of gene expression regulation

The student will be able to:

- choose the most suited method of bioseparation to a context by knowing correctly its functioning
- to use from a practical point of view the equipment and the techniques adapted in the purification of proteins and to the control of their purification (low and medium pressure chromatography, electrophoresis)
- to establish complex enzymatic equations of reaction rate by means of models.
- to determine experimentally the various kinetic parameters of an enzyme as well as its optimal conditions of functioning
- explain and analyse data concerning gene expression regulation in prokaryotic and eukaryotic organisms

Necessary prerequisites

Necessary knowledge:
Organic chemistry (I2BECH11), structural biochemistry (I2BEBC11), transport phenomena and reaction in fluids (I2BETF11). Analytical method (I2BEAN11). Molecular biology.

Practical info

Location(s)

Toulouse

Organic and structural chemistry

ECTS
6 crédits

Hourly volume
80h

Introducing

Objectives

Objectives:
At the end of this module, the student will have understood and be able to explain (main concepts):
- the theory and practice of the main analytical techniques used in chemistry and biochemistry.
- the main reaction mechanisms encountered in chemistry and biology.

The student must be able to:
- solving structure of chemical compounds and simple biochemistry molecule using analytical methods: NMR, MS, IR, UV.
-Understand and explain the reaction mechanisms.
- Achieve a multidisciplinary experimental project (bibliographical search, devise a schedule of manipulation, carry out manipulations, make a presentation of the main results)

Necessary prerequisites

Necessary knowledge:

UF Chemistry - Biotechnology (I1ANCH11)
UF Organic Chemistry (I2BECH11)
UF Structural Biochemistry (I2BEBC11)
UF Analytic Methods I (I2BEAN12)

Practical info

Location(s)

Toulouse

Production sectors

ECTS
3 crédits

Hourly volume
8h

Introducing

Objectives

Objectives:

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

the main actors in the sectors on which the "Biochemical Engineering" specialty leads in France and abroad, their relations and their market share
the structuring of the sector: is it made up of large national or international groups, SMEs, start-ups ... Are these multinationals, family businesses ...?
the evolution of this structuring: is the sector stable over time or does it know (or has it known in the recent past) changes (eg mergers)?
the location of the different activities (production, R & D ...). Are they done in France, in Europe ...?
the structuring the capital of these players (share of turnover devoted to R & D, communication ...)

Practical info

Location(s)

Toulouse

Analytical methods II

ECTS
3 crédits

Hourly volume
32h

Practical info

Location(s)

Toulouse

heat and mass Transfer

ECTS
4 crédits

Hourly volume
74h

Practical info

Location(s)

Toulouse

Chemical reaction engineering 2

ECTS
3 crédits

Hourly volume
37h

Practical info

Location(s)

Toulouse

Engineering thermodynamics

ECTS
3 crédits

Hourly volume
38h

Practical info

Location(s)

Toulouse

Processes for mass and energy transformation

ECTS
3 crédits

Hourly volume
30h

Practical info

Location(s)

Toulouse

Process Control

ECTS
4 crédits

Hourly volume
36h

Introducing

Objectives

Objectives ¿ Learning outcomes :
At the end of this module, the student will have understood and be able to explain (main concepts):
Dynamic (unsteady-state) modelling of processes and its approximation by simple transfer functions such as 1rst and 2nd order without or with time delay. Implementation of feedback control loop.

The student will be able to:

Establish unsteady state mass or energy balances, obtain transfer functions from linearization of these balances or from analysis of step of impulse responses, implement a feed-back control loop with PID type controllers and study the response of the whole closed-loop system to changes (set-point variations or disturbances) as function of these controllers tuning parameters and analyse its stability.

Necessary prerequisites

Necessary knowledge :

Resolution of Ordinary Differential Equations, Laplace-transform.

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project

ECTS
5 crédits

Hourly volume
48h

Practical info

Location(s)

Toulouse

Companies in their environments and languages

ECTS
5 crédits

Hourly volume
63h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
- An overall view of financial documents used by the company. Introduction to the calculation of costs in the industrial firm
- the interdependence of the functions of the company through decision making and results analysis
- Students will also be prepared for their careers by reviewing
and further developing both oral and written transversal communication skills.

The student will be able to:
- understand companies, their structure and their environment
- use newly-acquired Business English vocabulary
- develop financial statements used and calculate business costs for a company
- organise a group project : create their own company, hold meetings¿
- give an oral presentation of a documentary synthesis and a business report (in English), using presentation skills
- create basic management tools
- optimise resources to make the company profitable
- take ethical concerns into account
- take into account cultural differences in business
- appreciate the impact of the major parameters of the socio-economic and financial environment on a company
- write professional letters and emails

Second language course (optional ¿ commitment for years 3 and 4)
The objectives are defined according to European specifications for the five language skills and specific to the various languages proposed - German, Spanish, and Chinese, Italian or Sign language ¿ and to students' levels.

Whenever his/her level is sufficient, the student will be able to:
¿ synthesise and present professional documents
¿ give an oral presentation in front of a group
¿ take into account the various dimensions of interculturality
¿ analyse a job ad
¿ simulate a job interview
¿ write a CV and a cover letter

Remedial English (upon teachers¿ decision)
In some specific cases, a remedial English course is offered in replacement of the second language course with the objective of reinforcing the language skills useful for the TOEIC, i.e reading, listening, grammar and vocabulary

Necessary prerequisites

Management notions : non
Level : B2 in English (intermediate)

LV2 : A2 min. in the studied language German,

Spanish, Italian. A1 in Chinese ans Sign language ¿
Course not open to exchange students

Practical info

Location(s)

Toulouse

Engineering and ecological issues 2nd semester

ECTS
3 crédits

Hourly volume
26h

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

Mechanics

ECTS
3 crédits

Hourly volume
42h

Practical info

Location(s)

Toulouse

Mechanics

ECTS
3 crédits

Hourly volume
40h

Introducing

Objectives

The student will be expected to understand and be able to explain (main concepts) the mechanics of deformable solids, the notions of stress, linearized strain, displacement fields and elasticity behaviour.

The student should be able to
- This course is intended to provide students with the opportunity to: - analyse the state of stress and strain of a solid under load.
- Calculate the stress state knowing the strain state and vice versa.
- Calculate the state of strain knowing the displacement field.
- Establish the equations for writing the local equilibrium of the solid at any point.
- Translate the boundary conditions of a model into equations.
- Propose a relevant model of a real problem, especially in terms of the boundary conditions.
- Calculate the state of stress, strain and displacement of some simple elasticity problems.
- Switch from stress fields to internal stress fields in the framework of beam theory.

Necessary prerequisites

Basic mathematical tools, statics of rigid solids, equilibrium, resultants in force and moment.

Practical info

Location(s)

Toulouse

Industrialisation process

ECTS
3 crédits

Hourly volume
39h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
- the main types of production processes for mechanical parts,
- principles of industrialization that permit starting a 3D digital model to obtain a real mechanical part (digital process chain),
- the general approach to implement a production process.

The student will be able to:
- make the link between the Product, the Process and the Material associating the form of a part made of a given material to one or more manufacturing processes,
- describe the physical principles of a manufacturing process to produce a mechanical part.
- identify the influencing parameters of a production process

The skills assessed in this course are:
1_5 mastering basic industrial techniques (industrial design, manufacturing ...)
3_3 be able to use generic digital tools (ENT, programming, collaborative work ...)
3_4 Define, build and operate an experiment in a critical view
6_3 Knowing how to use the methods of creativity and demonstrate independence.

The skills deployed in this course are:
2_5 Managing a production tool.

Necessary prerequisites

1) Interpretation a digital model of a mechanical part (3D model).
2) Reading the specifications of a mechanical part.

Practical info

Location(s)

Toulouse

Introduction to systems engineering

ECTS
3 crédits

Hourly volume
37h

Practical info

Location(s)

Toulouse

[FRANCAIS] Matériaux cimentaires et Environnement

ECTS
3 crédits

Hourly volume

Introducing

Objectives

Know how Portland cement works (chemistry, hardening, etc.)

Understand the evolution of the development of mechanical performance, as well as the influential parameters.

Understand the basic notions of the physical properties of granular materials and their granulometric characterizations

Know what are the standard pathologies affecting concrete and the associated means of prevention

Practical info

Location(s)

Toulouse

INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Architecture

ECTS
3 crédits

Hourly volume

Practical info

Location(s)

Toulouse

Numerical schemes – PDE model – Theory of sizing (II)

ECTS
6 crédits

Hourly volume
81h

Practical info

Location(s)

Toulouse

Heat transfer and fluid mechanics 1

ECTS
5 crédits

Hourly volume
67h

Practical info

Location(s)

Toulouse

Eco Design and Engineering

ECTS
6 crédits

Hourly volume
70h

Practical info

Location(s)

Toulouse

Eco Design and Engineering

ECTS
6 crédits

Hourly volume
68h

Introducing

Objectives

The objective of this teaching unit is to increase skills in the design and manufacture of mechanical products.

Necessary prerequisites

2IC CO12
2IC CT12

Practical info

Location(s)

Toulouse

Engineering and ecological issues

ECTS
3 crédits

Hourly volume
30h

Practical info

Location(s)

Toulouse

Job search and language

ECTS
5 crédits

Hourly volume
37h

Introducing

Objectives

Job search modules in French and in English

By the end of these modules, the student is expected to understand how to successfully obtain an internship or job and will grasp the differences in the job-search process between France and English-speaking countries.
The student will be able to:
¿ make a personal statement, and start developing a career plan
¿ use current research tools (web, online networks, company websites) to conduct a documentary survey on recruitment
¿ seek work placements matching his/her objectives and profile
¿ find and analyze an English advert in his/her future field
¿ adapt his/her CV and cover letter to a specific job application
¿ write a CV in English following various country-relevant templates
¿ ensure his/her job application meets the company's requirements
¿ prepare for an interview (self-knowledge, company awareness, preparation of adequate questions)
¿ show adequate degree of proficiency in job search related technical English to be able to take a professional job interview

Second language course (optional ¿ commitment for years 3 and 4)

The objectives are defined according to European specifications for the five language skills and specific to the various languages proposed - German, Spanish, and Chinese ¿ and to students' levels.
Whenever his/her level is sufficient, the student will be able to:
¿ Synthesize and present professional documents
¿ give an oral presentation in front of a group
¿ take into account the various dimensions of interculturality
¿ Analyze a job ad
¿ simulate a job interview
¿ write a CV and a cover letter in the studies language

Remedial English (upon teachers¿ decision)

In some specific cases, a remedial English course is offered in replacement of the second language course with the objective of reinforcing the language skills useful for the TOEIC, i.e. reading and listening, grammar and vocabulary.

Necessary prerequisites

¿ TRE (in French): min. C1 level in French ¿ Course not open to exchange students

¿ Job Search (in English): min. B1 level in English ¿ Course open to exchange students

¿ LV2: min. A2 in the language studied ¿ Course not open to exchange students

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project – level 3

ECTS
2 crédits

Hourly volume
44h

Practical info

Location(s)

Toulouse

Upgrading 3A

ECTS
3 crédits

Hourly volume
98h

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

Geotechnics 1

ECTS
5 crédits

Hourly volume
57h

Practical info

Location(s)

Toulouse

Reinforced concrete

ECTS
5 crédits

Hourly volume
78h

Practical info

Location(s)

Toulouse

Heat and Mass Transfers, 2

ECTS
6 crédits

Hourly volume
83h

Practical info

Location(s)

Toulouse

Analysis of Static and Dynamic Structures

ECTS
4 crédits

Hourly volume
56h

Introducing

Objectives

The student will be expected to understand and be able to explain (main concepts):
- the distribution of internal forces in structures under static mechanical loads (continuous beams, trusses, frames, etc.) and that of the associated stress, strain and displacement fields,
- the dynamic behaviour of discrete and continuous structures,
- The student must be able to: - understand the basic principles of the design process.

The student must be able to
- formulate and justify relevant assumptions for the static resolution of a structure,
- determine the degree of hyperstaticity of a structure,
- The student must be able to: formulate and justify relevant hypotheses for the static resolution of a structure, determine the degree of hyperstaticity of a structure, solve a hyperstatic structure by implementing the method of forces,
- solve a hyperstatic structure using the displacement method,
- argue on the choice of the method of resolution,
- calculate the support reactions of the structure,
- draw diagrams of internal forces (bending moment, shear force, normal force),
- calculate the deformation of the structure (displacements, rotations),
- formulate and justify relevant hypotheses for the dynamic resolution of a structure,
- Put into equations a simple dynamic problem (discrete or continuous system),
- determine the solution of a simple dynamic problem, including dissipative and excited,
- determine the eigenmodes of a dynamic system by solving the associated equations,
- determine the eigenmodes of a dynamical system by implementing the Rayleigh-Ritz method,
- write a clear, fair and synthetic calculation note.

Competences INSA (GC) mobilized :
1.1: Master the mathematical concepts and the calculatory tools of the engineer
1.2 : Master the concepts of physics, mechanics, chemistry, thermodynamics for the engineer
1.3 : Implement rigorous scientific reasoning and develop the capacity for abstraction
4.3 : Manage a group: lead a team, argue and negotiate, communicate in crisis situations
4.6 : Be able to integrate socially in a group to progress together

INSA competences (GC) evaluated :
2.1 : Know, understand and apply the methods of calculation of structures and evaluate or predict their behaviour
2.2 : Know and master the formulation, characteristics and performances of the main materials used
2.4: Know and implement the main procedures, regulations and methods applicable to construction operations
3.1: Formulate and model problems, especially in complex systems
3.2: Solve, in an analytical or systemic way, a problem (decompose, prioritise, mobilise resources)

Necessary prerequisites

- Notions of stresses, strains, displacements, rigid body movements.
- Support conditions.
- Fundamental principle of Statics.
- Integration and derivation of polynomial functions.
- Geometry (calculation of surfaces, centres of gravity, lengths, angles, etc.).
- Characterisation of sections.
- Internal forces: bending moment, normal force, shear force.
- Degree of hyperstaticity.
- Resolution of isostatic structures (calculation of support reactions, internal force diagrams, calculation of the deformation by integration of the moment-curvature relation).
- Fundamental Principle of Dynamics.
- Solving second member differential equations, with constant coefficients and variable second member.

Practical info

Location(s)

Toulouse

Mechatronics

ECTS
3 crédits

Hourly volume
32h

Practical info

Location(s)

Toulouse

Manufacturing 2

ECTS
3 crédits

Hourly volume
30h

Toulouse

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
Methods and the implementation of the NC machining and CAM from a digital definition and scanning methods and control.

The student will be able to:
_ Develop a production program a part and the NC program ISO manually or by CAM,
_ Scan a part and build its numerical model,
_ Develop an inspection CMM or to design a monitoring arrangement.

Necessary prerequisites

Read technical drawings with functional dimensioning, reading NC ISO code, line manufacturing of simple parts, Generation of surfaces by simple cutting tool.

Practical info

Location(s)

Dynamics and Control

ECTS
7 crédits

Hourly volume
103h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain:
- the fundamentals on signals and systems
- the analysis methods for the prediction of the dynamic performance of systems
- the fundamentals of control engineering for linear systems in time and frequency domains
- the main tools and methods for the specification and sequential control of automated production systems.

The student will have to be able to:
- Build the dynamical model of a system using Matlab/Simulink;
- Predict the dynamic performance of a medium complexity system (1st or 2nd order) out of its dynamic model;
- Conduct the preliminary design of a medium complexity system (1st or 2nd order) in order to fulfil a set of dynamic specifications;
- Design a controller to fulfil a set of required dynamic performance, by using Matlab;
- Design the sequential control of an automated production system;
- Implement on a Programmable Logic Controller the various operating modes of a sequential automated system of medium complexity.

Necessary prerequisites

Linear algebra, ordinary differential equations, fundamentals of mechanics, electrical circuits, heat transfer and hydraulics.

Practical info

Location(s)

Toulouse

Mechanical Design and Manufacturing

ECTS
6 crédits

Hourly volume
113h

Practical info

Location(s)

Toulouse

Finite elements design

ECTS
4 crédits

Hourly volume
38h

Introducing

Objectives

At the end of this module, the student should have understood and be able to explain (main concepts):
the fundamentals of the finite element method applied to the design of structures in the field of linear elasticity.

The student should be able to:
- build and assemble elementary operators for certain types of simple elements (bars, beams, plane elasticity)
- analyze the behaviour of a simple mechanical part subjected to static using an industrial FE software.
- propose a model of a real problem by choosing a small but sufficient number of suitable elements and apply representative boundary conditions.
- take the usual precautions to obtain reliable results.
- critically analyze the quality of the solution with respect to the numerical phenomena that can alter it.

Necessary prerequisites

Rigid body mechanics (statics)
Continuum Mechanics (stress, strain, constitutive relation, boundary conditions)
Beam theory

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project

ECTS
5 crédits

Hourly volume
48h

Practical info

Location(s)

Toulouse

Companies in their environments and languages

ECTS
5 crédits

Hourly volume
63h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
- An overall view of financial documents used by the company. Introduction to the calculation of costs in the industrial firm
- the interdependence of the functions of the company through decision making and results analysis
- Students will also be prepared for their careers by reviewing
and further developing both oral and written transversal communication skills.

The student will be able to:
- understand companies, their structure and their environment
- use newly-acquired Business English vocabulary
- develop financial statements used and calculate business costs for a company
- organise a group project : create their own company, hold meetings¿
- give an oral presentation of a documentary synthesis and a business report (in English), using presentation skills
- create basic management tools
- optimise resources to make the company profitable
- take ethical concerns into account
- take into account cultural differences in business
- appreciate the impact of the major parameters of the socio-economic and financial environment on a company
- write professional letters and emails

Second language course (optional ¿ commitment for years 3 and 4)
The objectives are defined according to European specifications for the five language skills and specific to the various languages proposed - German, Spanish, and Chinese, Italian or Sign language ¿ and to students' levels.

Whenever his/her level is sufficient, the student will be able to:
¿ synthesise and present professional documents
¿ give an oral presentation in front of a group
¿ take into account the various dimensions of interculturality
¿ analyse a job ad
¿ simulate a job interview
¿ write a CV and a cover letter

Remedial English (upon teachers¿ decision)
In some specific cases, a remedial English course is offered in replacement of the second language course with the objective of reinforcing the language skills useful for the TOEIC, i.e reading, listening, grammar and vocabulary

Necessary prerequisites

Management notions : non
Level : B2 in English (intermediate)

LV2 : A2 min. in the studied language German,

Spanish, Italian. A1 in Chinese ans Sign language ¿
Course not open to exchange students

Practical info

Location(s)

Toulouse

Engineering and ecological issues 2nd semester

ECTS
3 crédits

Hourly volume
26h

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

C language, Numerical analysis and Computer networks

ECTS
6 crédits

Hourly volume
71h

Practical info

Location(s)

Toulouse

Experimental physics and stochastic modelling

ECTS
5 crédits

Hourly volume
59h

Toulouse

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
- Operation of the different sensors used during the lab sessions. They will know how to use them in order to solve a problem and view the results critically.
- Stochastic modelling of measurements, confidence intervals, statistical hypothesis tests, linear models.

The student will be able to build a data acquisition system starting from different sensors, to analyse the result and quantify the various components in measurement errors, to build a statistical model from observations in order to confirm or invalidate hypotheses concerning the problem at hand, and to plan experiments in simple cases.

Necessary prerequisites

I2AIMT21 Probability in IMACS

Practical info

Location(s)

Electronic and Control

ECTS
5 crédits

Hourly volume
72h

Practical info

Location(s)

Toulouse

Electromagnetism in materials, wave guides – Classical mechanics

ECTS
4 crédits

Hourly volume
54h

Toulouse

Introducing

Objectives

Electromagnetisms in matter : use Maxwell's equations to determine the nature of the electromagnetic waves in a simple system (L.H.I. material, interface between two materials, confined space between two planes of conductive material). They will be able to determine the conditions and the characteristics of electromagnetic wave propagation in metallic and optical-fibre waveguides

Mechanics : solve a problem of planar mechanics. -The student should be able to handle the notions of force, power and energy.

Necessary prerequisites

Electromagnetism (I2MAPH21)

Practical info

Location(s)

Engineering and ecological issues

ECTS
3 crédits

Hourly volume
30h

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project – level 3

ECTS
2 crédits

Hourly volume
44h

Practical info

Location(s)

Toulouse

Job search and language

ECTS
5 crédits

Hourly volume
37h

Introducing

Objectives

Job search modules in French and in English

By the end of these modules, the student is expected to understand how to successfully obtain an internship or job and will grasp the differences in the job-search process between France and English-speaking countries.
The student will be able to:
¿ make a personal statement, and start developing a career plan
¿ use current research tools (web, online networks, company websites) to conduct a documentary survey on recruitment
¿ seek work placements matching his/her objectives and profile
¿ find and analyze an English advert in his/her future field
¿ adapt his/her CV and cover letter to a specific job application
¿ write a CV in English following various country-relevant templates
¿ ensure his/her job application meets the company's requirements
¿ prepare for an interview (self-knowledge, company awareness, preparation of adequate questions)
¿ show adequate degree of proficiency in job search related technical English to be able to take a professional job interview

Second language course (optional ¿ commitment for years 3 and 4)

The objectives are defined according to European specifications for the five language skills and specific to the various languages proposed - German, Spanish, and Chinese ¿ and to students' levels.
Whenever his/her level is sufficient, the student will be able to:
¿ Synthesize and present professional documents
¿ give an oral presentation in front of a group
¿ take into account the various dimensions of interculturality
¿ Analyze a job ad
¿ simulate a job interview
¿ write a CV and a cover letter in the studies language

Remedial English (upon teachers¿ decision)

In some specific cases, a remedial English course is offered in replacement of the second language course with the objective of reinforcing the language skills useful for the TOEIC, i.e. reading and listening, grammar and vocabulary.

Necessary prerequisites

¿ TRE (in French): min. C1 level in French ¿ Course not open to exchange students

¿ Job Search (in English): min. B1 level in English ¿ Course open to exchange students

¿ LV2: min. A2 in the language studied ¿ Course not open to exchange students

Practical info

Location(s)

Toulouse

[FRANCAIS] Remise à niveau 3A IMACS

ECTS
3 crédits

Hourly volume
115h

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

Computer Hardware

ECTS
5 crédits

Hourly volume
55h

Practical info

Location(s)

Toulouse

Databases, C and Network programming

ECTS
4 crédits

Hourly volume
58h

Introducing

Objectives

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

Database:
- The different data models, their advantages and limits
- What is DBMS (Database management system)
- UML based data model
- The different concepts of the relational model
- The normalization and its importance
- Data integrity constraints
- Relational algebra and SQL languages

The student will be able to :

- Design an UML based database model
- Derive the relational model from UML model and vice versa
- Normalize and validate a relational model
- Implement the designed database while ensuring integrity constraints
- Write requests based on relational algebra and implement them in SQL for database interrogation and manipulation

C and network programming

- Manipulate the following notions using the C language: pointers, strings and parameter passing,
- Program a simple distributed internet application using the socket interface (TCP/UDP socket API),
- Be familiar with the major internet applications (http, ftp, smtp, etc.).

Necessary prerequisites

C and network programming :
First and second year courses on Algorithms and Programming (I1ANIF12, I1ANIF20, I2AIIF20).
Third year course on C language.
Third year course on computer networks.

Practical info

Location(s)

Toulouse

Modelisation and automatic control

ECTS
5 crédits

Hourly volume
71h

Introducing

Objectives

At the end of this module, the student should have understood and be able to explain (main concepts):
-The basic principles of discrete event system modeling tools (Finite State Machines, Statecharts, Petri nets),
-Different techniques for controlling a discrete event system (FPGA, PLC, real-time target).

- The main methods for synthesizing state-space control laws for time-invariant linear systems
- The basic principles of observer synthesis for time-invariant linear systems

The student should be able to:
Model and implement the control of a discrete event system,
Define the major characteristics of the control law from the specifications,
Design the control law in the state space (pole placement).

Necessary prerequisites

- Lectures "Informatique matérielle" (I2MAIF11)
- Automatic control: frequential approaches
- State space representation

Practical info

Location(s)

Toulouse

Electronics and Signal

ECTS
6 crédits

Hourly volume
74h

Toulouse

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
Electronics section:
* This course is devoted to analog electronic design and implementation from the basic transistor to operational amplifier

Signal Processing section:
* For a good understanding of signals and systems, principles of signal theory and methods of signal processing, with emphasize on spectral analysis and digital filter design.

The student will be able to:
Electronics section:
* design an electronic circuit, given the design specification
* perform simulations of analog circuits
* choose appropriate components
* build and test a prototype with a bread-board
* do the layout and assemble a printed circuit board

Practical info

Location(s)

Thermodynamics and Diffusion

ECTS
5 crédits

Hourly volume
54h

Introducing

Objectives

At the end of this module, the student should have understood and be able to explain (main concepts):
- The laws of thermodynamics, the notions of work, heat, energy associated with a transformation,
- The application to thermal machines, thermodynamic cycles, and the calculation of efficiency.
- This course is intended to provide students with an understanding of the laws of thermodynamics and the concepts of work, heat and energy associated with a transformation,
- simple phase diagrams and binary materials.
- This course is intended to provide students with the opportunity to learn more about the following topics: - The concepts of diffusion and heat/matter transport.

The student will have to integrate notions, contextualise them and then be able to decontextualise them to be able to project them into an adidactic situation.

Necessary prerequisites

Basics of mathematical analysis: functions of several variables, derivatives, integrations, differential equations.
General notions of thermodynamics of physical-chemical systems

Practical info

Location(s)

Toulouse

Material Physics

ECTS
4 crédits

Hourly volume
85h

Introducing

Objectives

At the end of this module the student should be able to:
- structurally characterize and orient a crystal: employ of basic X-ray and electron diffraction techniques, then analysis of the results.
- describe dislocations and their interactions from a geometric and energetic point of view, and relate them to the mechanical properties of the crystalline material: fragility and ductility
- calculate and predict electrical, thermal and mechanical effects resulting from electrical, thermal and mechanical solicitations applied to the crystal in particular directions.
- master the piezoelectric effect for applications of sensors and micro-actuators, and acousto-optical and electro-optical effects for applications of filtering, modulation or optical addressing and optoelectronic components.

Practical info

Location(s)

Toulouse

Applied material physics

ECTS
5 crédits

Hourly volume
64h

Introducing

Objectives

This UF constitutes an experimental approach to the physics of materials. The educational objectives are:
- acquire scientific knowledge relating to the techniques used in material science
- acquire practical skills on these techniques,
- acquire an experimental work method in physics (how to choose the experimental parameters, carry out the experiment, analyze the results)

The student should be able to:
- reproduce and apply techniques for the development and characterization of materials among the techniques mentioned in the program.

Necessary prerequisites

- UF Physics of materials must be completed before the practicals.
- Thermodynamic prerequisite : The following notions must be seen before the practicals: enthalpy, heat capacity and phase diagram.

Location(s)

Toulouse

Practical info

Quantum and statistical physics

ECTS
6 crédits

Hourly volume
57h

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project

ECTS
5 crédits

Hourly volume
48h

Practical info

Location(s)

Toulouse

Companies in their environments and languages

ECTS
5 crédits

Hourly volume
63h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
- An overall view of financial documents used by the company. Introduction to the calculation of costs in the industrial firm
- the interdependence of the functions of the company through decision making and results analysis
- Students will also be prepared for their careers by reviewing
and further developing both oral and written transversal communication skills.

The student will be able to:
- understand companies, their structure and their environment
- use newly-acquired Business English vocabulary
- develop financial statements used and calculate business costs for a company
- organise a group project : create their own company, hold meetings¿
- give an oral presentation of a documentary synthesis and a business report (in English), using presentation skills
- create basic management tools
- optimise resources to make the company profitable
- take ethical concerns into account
- take into account cultural differences in business
- appreciate the impact of the major parameters of the socio-economic and financial environment on a company
- write professional letters and emails

Second language course (optional ¿ commitment for years 3 and 4)
The objectives are defined according to European specifications for the five language skills and specific to the various languages proposed - German, Spanish, and Chinese, Italian or Sign language ¿ and to students' levels.

Whenever his/her level is sufficient, the student will be able to:
¿ synthesise and present professional documents
¿ give an oral presentation in front of a group
¿ take into account the various dimensions of interculturality
¿ analyse a job ad
¿ simulate a job interview
¿ write a CV and a cover letter

Remedial English (upon teachers¿ decision)
In some specific cases, a remedial English course is offered in replacement of the second language course with the objective of reinforcing the language skills useful for the TOEIC, i.e reading, listening, grammar and vocabulary

Necessary prerequisites

Management notions : non
Level : B2 in English (intermediate)

LV2 : A2 min. in the studied language German,

Spanish, Italian. A1 in Chinese ans Sign language ¿
Course not open to exchange students

Practical info

Location(s)

Toulouse

Engineering and ecological issues 2nd semester

ECTS
3 crédits

Hourly volume
26h

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

Optimization, numerical analysis and Markov Chains

ECTS
6 crédits

Hourly volume
87h

Introducing

Necessary prerequisites

Necessary knowledge :
- Precedent courses on the following subjects : linear algebra
- Differential Calculus from the 2nd year
- Probability course of second year level.
- Basic programming in Python

Practical info

Location(s)

Toulouse

OS, C Language, Computer networks, data bases

ECTS
6 crédits

Hourly volume
87h

Practical info

Location(s)

Toulouse

ODE and numerical resolution

ECTS
4 crédits

Hourly volume
47h

Introducing

Objectives

Objectives:
At the end of this module, the stubent will have understood and will be able to
- Define A Cauchy Problem
- Prove the existence and uniqueness of the solution of a linear and non linear Cauchy Problem
- Obtain qualitative properties for the solution of an ODE and draw a phase portrait
- Analyze and develop algorithm to solve an ODE

Necessary prerequisites

Necessary knowledge:
Differential and integral Calculus, linear algebra

Practical info

Location(s)

Toulouse

Measure Theory and probability

ECTS
4 crédits

Hourly volume
45h

Introducing

Objectives

Objectives:
We will introduce the modern notion of integration established by H. Lebesgue at the beginning of the 20th century. At the end of the course, the student will be able to (among other things):
- show that a given function is measurable and integrable in the Lebesgue sense;
- use the notion of measure;
- switch a limit (or a derivative) and an integral sign;
- understand the various concepts of convergence (almost everywhere, Lp, etc);
- discuss the belonging of a given function in Lp;
- use Cauchy-Schwarz¿ and Hölder¿s inequalities;
- compute a convolution product.

Practical info

Location(s)

Toulouse

Database 1 and Web programming

ECTS
4 crédits

Hourly volume
40h

Introducing

Objectives

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

Database 1:
- The different data models, their advantages and limits
- What is DBMS (Database management system)
- UML based data model
- The different concepts of the relational model
- The normalization and its importance
- Data integrity constraints

Web programming

¿ Understand the concepts and technologies of the Web
¿ HTML5 language
¿ CSS language
¿ JavaScript language

The student will be able to:

Database 1:

- Design a relationnal database based on UML
- Derive the relational model from UML model and vice versa
- Normalize and validate a relational model

Web programming

- Design a static Web site with HTML5
- Define a CSS file
Write scripts with JavaScript

Necessary prerequisites

Necessary knowledge :
Algorithmic for Web programming

Practical info

Location(s)

Toulouse

Theoretical tools for computer science

ECTS
4 crédits

Hourly volume
60h

Introducing

Objectives

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

- Complexity of algorithms and problems
- Information theory and its applications to data compression, error-correcting codes and cryptography
- Linear programming
- Regular expressions

The student will be able to:

- Evaluate the asymptotic complexity of an algorithm, recognize and apply some algorithmic patterns (divide and conquer, dynamic programming, greedy algorithms), and determine the complexity class of a problem
- Use basic information theory concepts in data compression, error-correcting codes and cryptography settings
- Develop a linear programming model for a problem and solve it with the simplex algorithm
- Identify a problem solvable using regular expressions, choose the appropriate tool, and find quickly the solution

Necessary prerequisites

Necessary knowledge:
Basic mathematics (linear algebra, probabilities, modular arithmetic)
Algorithmics, information representation, data structures, Unix Shell

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project – level 3

ECTS
2 crédits

Hourly volume
44h

Practical info

Location(s)

Toulouse

Job search and language

ECTS
5 crédits

Hourly volume
37h

Introducing

Objectives

Job search modules in French and in English

By the end of these modules, the student is expected to understand how to successfully obtain an internship or job and will grasp the differences in the job-search process between France and English-speaking countries.
The student will be able to:
¿ make a personal statement, and start developing a career plan
¿ use current research tools (web, online networks, company websites) to conduct a documentary survey on recruitment
¿ seek work placements matching his/her objectives and profile
¿ find and analyze an English advert in his/her future field
¿ adapt his/her CV and cover letter to a specific job application
¿ write a CV in English following various country-relevant templates
¿ ensure his/her job application meets the company's requirements
¿ prepare for an interview (self-knowledge, company awareness, preparation of adequate questions)
¿ show adequate degree of proficiency in job search related technical English to be able to take a professional job interview

Second language course (optional ¿ commitment for years 3 and 4)

The objectives are defined according to European specifications for the five language skills and specific to the various languages proposed - German, Spanish, and Chinese ¿ and to students' levels.
Whenever his/her level is sufficient, the student will be able to:
¿ Synthesize and present professional documents
¿ give an oral presentation in front of a group
¿ take into account the various dimensions of interculturality
¿ Analyze a job ad
¿ simulate a job interview
¿ write a CV and a cover letter in the studies language

Remedial English (upon teachers¿ decision)

In some specific cases, a remedial English course is offered in replacement of the second language course with the objective of reinforcing the language skills useful for the TOEIC, i.e. reading and listening, grammar and vocabulary.

Necessary prerequisites

¿ TRE (in French): min. C1 level in French ¿ Course not open to exchange students

¿ Job Search (in English): min. B1 level in English ¿ Course open to exchange students

¿ LV2: min. A2 in the language studied ¿ Course not open to exchange students

Practical info

Location(s)

Toulouse

Engineering and ecological issues

ECTS
3 crédits

Hourly volume
30h

Practical info

Location(s)

Toulouse

[FRANCAIS] Remise à niveau 3A MIC

ECTS
3 crédits

Hourly volume
145h

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

System and Network Programming

ECTS
5 crédits

Hourly volume
59h

Practical info

Location(s)

Toulouse

Object oriented Programming and Graphs

ECTS
4 crédits

Hourly volume
54h

Introducing

Objectives

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

- the principles and fundamental notions of objects oriented design and programing,
- the principles of UML class diagram and object oriented programming in Java
- the different kinds of graphs, several classical problems on graphs and solving methods, comparison between several graph representations and algorithms
- Apply the Graph theory for modelling various problems
- Conception and Implementation of efficient algorithms based on graph data structure to solve a given problem.

The student will be able to:

- design class diagrams of an application
- design and program in JAVA a simple application,
- to develop a classical graph algorithm aimed at solving a well-known problem whose specificity is to manipulate great amount of data,
- to develop and compare different implementation of a well-known algorithm with the aim to apprehend the notion of algorithm complexity,
- to propose and adapt classical algorithms aimed at solving a new problem,
- to perform relevant measurements tests aimed at evaluating performances of different algorithms.

Necessary prerequisites

Necessary knowledge:

- C Language (3e year MIC)
- Introduction to complexity (3e year MIC)
- Algorithms and Data structures (2e year MIC, 1st year)

Practical info

Location(s)

Toulouse

Signal processing and telecommunications

ECTS
5 crédits

Hourly volume
68h

Practical info

Location(s)

Toulouse

Concepts and Hardware for Data Transmission

ECTS
6 crédits

Hourly volume
81h

Introducing

Objectives

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

-The differences between ARM and x86 architectures, and how they are taken into account by the compiler (in particular for function calls, memory management and security);
-The design and optimization of an embedded operating system and its software layer;
-The computer toolchain: compiler, assembler, linker and debugger;
-The advantages and constraints of parallel architectures (Multi-core, GPU);
-The recent security threats in computer science, especially low level attacks at the interface of software and hardware.

The student will be able to:
-analyze desassembly code
-develop assembly functions and their integration to C code
-design and optimize an embedded system project
-manipulate hardware attacks simulators

Location(s)

Toulouse

Practical info

Modelling

ECTS
7 crédits

Hourly volume
64h

Introducing

Objectives

At the end of this module, the student should have understood and be able to explain the following notions for each subject :

¿ Mechanics : understanding the behaviour of a moving solid subjected to external actions.

¿ Introduction to numerical modelling : fundamentals of the finite difference method (order of a scheme, stability, discrete maximum principle, convergence); formal definition of the Brownian motion and principles of the Monte-Carlo method for parabolic PDEs; the use of PDE for modelling problems with continuous variables.

¿ Modelling project : how to model mathematically and numerically a given industrial ¿ engineering - scientific problem.

The student should have the following skills :

¿ Mechanics : to parameterize a moving solid in the space; To apply the Newton¿s laws to moving solids.

¿ Introduction to numerical modelling : to model simple problems using PDEs; to analyse stability and consistency of a finite difference scheme; to program with Python a finite difference scheme or the Monte-Carlo method for solving a linear parabolic PDE; to analyse numerical results and identify / explain numerical errors.

¿ Modelling project : to develop a solution to the initial engineering problem by employing the different mathematical and numerical tools studied in his other courses.

Necessary prerequisites

Required knowledge for each subject :

¿ Mechanics : mathematics (derivation, intégration, PDE), atomic structure , point mass mechanics.

¿ Introduction to numerical modelling : basis of probability theory, of integral and differential calculus, and of numerical analysis.

¿ Modelling project : numerical analysis, matrix computations, optimisation, ODE, PDE, geometrical modelling, probabilities, statistics, programming (Python).

Practical info

Location(s)

Toulouse

Martix computation and geometry

ECTS
4 crédits

Hourly volume
51h

Introducing

Objectives

Objectives:
At the end of this module, the student will have understood and be able to explain (main concepts):
- QR factorization: the Gram-Schmidt and Householder methods
- Singular value decomposition
- Application to the least squares problem.
- Piecewise functions, Ck continuity, natural cubic splines and their local and global representations, basis of B-Splines, B-Spline curves and their control points.
- The extension to NURBS curves and to surface modelling in CAD.

The student will be able to:
- Determine the most efficient method to solve a least squares problem by identifying the characteristics of the problem.
- Determine and compute the interpolating spline, the smoothing spline, and the least squares spline of n given points.
- Build a B-Spline curve of n given points (analytically and by a subdivision algorithm (de Casteljau, de Boor))
- Apprehend, modify a NURBS curve.

Necessary prerequisites

Necessary knowledge:

Linear algebra, resolution of linear systems, use of matlab or python.

Practical info

Location(s)

Toulouse

Statistics

ECTS
6 crédits

Hourly volume

Practical info

Location(s)

Toulouse

Object oriented coding

ECTS
3 crédits

Hourly volume
42h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts) the concepts of the object programming. The student will be able to create simple programs in object language.

Practical info

Location(s)

Toulouse

Improving one's autonomy and building one's own professional project

ECTS
5 crédits

Hourly volume
48h

Practical info

Location(s)

Toulouse

Companies in their environments and languages

ECTS
5 crédits

Hourly volume
63h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
- An overall view of financial documents used by the company. Introduction to the calculation of costs in the industrial firm
- the interdependence of the functions of the company through decision making and results analysis
- Students will also be prepared for their careers by reviewing
and further developing both oral and written transversal communication skills.

The student will be able to:
- understand companies, their structure and their environment
- use newly-acquired Business English vocabulary
- develop financial statements used and calculate business costs for a company
- organise a group project : create their own company, hold meetings¿
- give an oral presentation of a documentary synthesis and a business report (in English), using presentation skills
- create basic management tools
- optimise resources to make the company profitable
- take ethical concerns into account
- take into account cultural differences in business
- appreciate the impact of the major parameters of the socio-economic and financial environment on a company
- write professional letters and emails

Second language course (optional ¿ commitment for years 3 and 4)
The objectives are defined according to European specifications for the five language skills and specific to the various languages proposed - German, Spanish, and Chinese, Italian or Sign language ¿ and to students' levels.

Whenever his/her level is sufficient, the student will be able to:
¿ synthesise and present professional documents
¿ give an oral presentation in front of a group
¿ take into account the various dimensions of interculturality
¿ analyse a job ad
¿ simulate a job interview
¿ write a CV and a cover letter

Remedial English (upon teachers¿ decision)
In some specific cases, a remedial English course is offered in replacement of the second language course with the objective of reinforcing the language skills useful for the TOEIC, i.e reading, listening, grammar and vocabulary

Necessary prerequisites

Management notions : non
Level : B2 in English (intermediate)

LV2 : A2 min. in the studied language German,

Spanish, Italian. A1 in Chinese ans Sign language ¿
Course not open to exchange students

Practical info

Location(s)

Toulouse

Engineering and ecological issues 2nd semester

ECTS
3 crédits

Hourly volume
26h

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