

Spring semester

Building project	5 credits	74h
Construction environment 2	3 credits	36h
Initiation to research	3 credits	45h
Improving autonomy and building a professional project	4 credits	39h
Communicating within organizations	6 credits	75h
Steel & timber structures	4 credits	86h
Prestressed concrete structure & bridges	5 credits	67h
Air conditioning	5 credits	66h
Equipments Acoustics	4 credits	48h
Building project	5 credits	74h
Construction environment 2	3 credits	36h
Initiation to research	3 credits	45h
Communicating within organizations	6 credits	75h
Improving autonomy and building a professional project	4 credits	39h

Building project

 **ECTS**
5 credits

 **Component**
INSTITUT
NATIONAL
DES SCIENCES
APPLIQUEES
TOULOUSE

 **Number of
hours**
74h

Presentation

Description

The students apply what they have learned during the previous semester in structural design.

The project is divided in three parts:

1) Technical equipments

Acoustic and thermal insulation, choice and design of air conditioning and heating equipments. Installation plan.

2) Structural design

Foundations: actions on foundations, pad footings, pile caps.

Vertical load carrying components: columns, concrete walls, timber walls.

Horizontal load carrying components: continuous beams, concrete floors (continuous supported slabs), timber floors

3) Environmental impacts

Mass and energy management and their environmental impacts, both during the construction process and the use period of the project.

Organisation:

Session of presentation, technical installation part, structural design part with technical conferences interspersed, environmental approach. The numerical model of the project is then updated.

Objectives

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

Main stages of design of a concrete building for the frame as well as for the air conditioning and heating systems.

The student will be able to:

Identify and calculate actions on structure, determine the energetic demands, understand the mechanical behavior of a frame as a whole, design and calculate the main structural members and heating or air conditioning circuits, use and enrich a numerical model.

Pre-requisites

Structural analysis and engineering

Concrete structures 1

Useful info

Contacts

Education manager

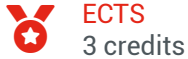
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Place

➤ Toulouse

Construction environment 2



ECTS
3 credits



Component
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Number of
hours
36h

Presentation

Notions sur la logistique de chantier dans le domaine de la construction (supply chain, LEAN).

Description

The components covered are:

- Prevention and Fire Safety for buildings,
- Accessibility for disabled persons in buildings,
- Indoor Air Quality,
- General Approach of Logistics and Construction (LEAN)
- Sustainable development

A project about Prevention and Fire Safety illustrates the lessons

Courses are mostly carried out by engineers from the professional world.

Objectives

Acquérir les approches réglementaires dans les domaines de l'Accessibilité et de la Sécurité Incendie dans les ERP. Sensibiliser aux problématiques de Qualité de l'Air Intérieur.

Useful info

Contacts

Education manager

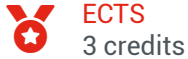
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Place

➤ Toulouse

Initiation to research



ECTS
3 credits



Component
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Number of
hours
45h

Presentation

Description

Program (detailed contents):

- How to publish a scientific paper
- How to achieve a scientific littérature review
- Fundamentals of a given scientific field
- Modelling and / or testing
- Summarizing the research project by the mean of a scientific paper and a speech
- 3 subjects are proposed each year, the student have to pick one.

Organisation:

This teaching proceeds with a single research project which includes :

- A short presentation of scientific journals and Zotero

- A lecture used to introduce the research context and the main equations
- The research project, organized by groups of 4 students
- A speech

The scientific report will be written in English during the project. English courses are tailored to help the student with this.

Objectives

At the end of this course, the student will be able to explain :

- How the research results are disseminated / shared within the scientific community ;
- What are the main expectations of a scientific report ;
- The fundamentals of a specific scientific field (note that the topic is different every year).

The student will be able to :

- Search for a relevant scientific study in a database ;
- Use a numerical software to quote published scientific work.

- Summarize the main informations obtained during the research project by using the standards of a given scientific journal ;
- Make the information accessible to a lay audience.

Useful info

Contacts

Education manager

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Place

➤ Toulouse

Improving autonomy and building a professional project



ECTS
4 credits



Component
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Number of
hours
39h

Presentation

Place

Objectives

➤ Toulouse

Construire une équipe projet, Approfondir ses connaissances,


Investir le métier, les domaines d'activité, les fonctions.

L'étudiant devra être capable de :

- d'analyser avec les autres un problème posé (Identifier le problème, définir les axes d'approche dans un bilan interactif : organisation, physique, technique, stratégique, motivation, confiance...
- de décider ensemble (permettre à tout le monde d'exprimer son avis, ajuster et réguler sa conduite en fonction de l'analyse collective),
- d'identifier les ressources du groupe (sens critique, repérage des points forts et faibles de chacun).

Useful info

Communicating within organizations

 **ECTS**
6 credits **Component**
INSTITUT
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TOULOUSE **Number of
hours**
75h

Presentation

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 CEFR 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.

Pre-requisites

For classes in English : mastery of general English.

Useful info

Place

> Toulouse

Steel & timber structures

 **ECTS**
4 credits **Component**
INSTITUT
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TOULOUSE **Number of
hours**
86h

Presentation

Description

Programme (detailed contents):

- * Review of industrial branches timber and steel.
- * Properties of used materials (timber, wood products, steel).
- * Influence of environmental conditions on timber and wood products properties.
- * Classification and geometrical features of cross-sections.
- * Construction systems and frames (horizontal and vertical bearing members).
- * Structural behavior and effect of connections between members.
- * Actions and action combinations, principles of verification.
- * Consideration of structural imperfections.
- * Verification of resistance ultimate limit states of cross-sections.
- * Verification of stability ultimate limit states of members and shells.
- * Verification of serviceability limit states.
- * Principles and calculation of bracing systems and members.
- * Technology and calculation of main types of connection.
- * Verification of fire resistance.

Organisation:

Lectures, aided works, demonstrative lab works

Objectives

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

The principles of design and calculation of steel structures and timber structures according to Eurocodes.

The student will be able to:

Analyse the structural behaviour of a timber or steel structure, justify the technological structural choices and materials, design the structural bearing and bracing members.

Pre-requisites

Analyse des structures statiques et dynamiques

Structures Béton Bois

Mécanique Avancée

Useful info

Place

➤ Toulouse

Prestressed concrete structure & bridges



ECTS
5 credits



Component
INSTITUT
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Number of
hours
67h

Presentation

Description

Programme (detailed contents):

Prestressed concrete structures

Design rules (EC2): minimum requirements towards cracking, stress limitation, minimum reinforcement and various layouts, calculation of the minimum prestress force, calculation of the prestress losses – Tensioning stages – Stress control – Calculation of the stresses in cracked cross-section under serviceability limit state – Calculation of the reinforcement areas.

Bridges

Terminology, bridge classification – Data for the project, design procedure – Technical regulation – Foundations: design and execution – Supports: piers and abutments – Superstructures: wearing surfaces, barrier walls, bearings, pavement joint, drainage, sidewalks – Concrete bridges: materials, field of use, pre-design, execution – Steel bridges: materials, field of use, joints, classification, pre-design, execution.

Organisation:

Lecture, tutorials project.

Objectives

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

- * Technology, design and calculations of a prestressed concrete structure;
- * Technology and design of metallic, concrete or composite bridges.

The student will be able to:

- * State the required assumptions;
- * Calculate a prestressed concrete structure;

Define the technical choices for designing a bridge.

Pre-requisites

Reinforced Concrete and prestressed concrete

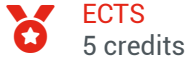
Structural analysis and engineering

Useful info

Place

➤ Toulouse

Air conditioning



ECTS
5 credits



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Number of
hours
66h

Presentation

Description

This teaching provides additional elements on several parts of air conditioning (HVAC) topic :

- Calculation of thermal balances of rooms and buildings ;
- Principal air conditioning systems (HVAC) ;
- Air filtration ;
- Regulation of air conditioning installations.

Tutorials, labworks and project are realised during this formation. A visit on site is proposed.

Objectives

Main goal of this teaching is to allow student to learn conception elements and also best practices rules of air conditioning installations.

Expected skills :

* Analyze an air conditioning installation (HVAC) from the schematic drawing and determined specifications;

* Design main elements of an HVAC installation;

Identify and prioritize main elements of the control system from an installation;

Pre-requisites

Indoor building physics

Useful info

Contacts

Education manager

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Place

➤ Toulouse

Equipments Acoustics

 **ECTS**
4 credits

 **Component**
INSTITUT
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TOULOUSE

 **Number of
hours**
48h

Presentation

Description

Programme (detailed contents):

Diffuse field, direct field

Different sound absorbers

Determination of absorption coefficient

Auditorium acoustics

Acoustic power of building services

Design methods

Objectives

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

- Diffusion of sound waves inside and outside rooms
- Transfer of acoustic waves along ductworks
- Transfer of vibrations generated by building services

The student will be able to:

- Calculate walls absorption to restrict noise dose absorption by workers
- Reduce noise propagation in ducts
- Define noise proof walls to protect the surrounding
- Size vibration pads

Pre-requisites

Indoor building physics

Useful info

Place

➤ Toulouse