FIFTH YEAR INSA TOULOUSE

Autumn semester

Human Resources Management and Group Work	6 credits	75h
HVAC - Building physics	7 credits	99h
Future buildings	6 credits	72h
Methods and English	6 credits	
Human Resources Management and Group Work	6 credits	75h
Bridge Project & Conferences	7 credits	115h
Road engineering and structures	6 credits	70h
Methods and English	6 credits	
Human Resources Management and Group Work	6 credits	75h
Frames and Composite steel and concrete structures	6 credits	75h
Concrete structures 2 & masonry	7 credits	105h
Methods and English	6 credits	
Eco building & Environmental impact	5 credits	60h
BIM Environment	5 credits	
Project ownership assistance	5 credits	
ID-RIMS	30 credits	

Spring semester

Training period (5th year)	21 credits	2h
Training period (4th year)	9 credits	1h

Human Resources Management and Group Work

ECTS
6 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
75h

Presentation

Objectives

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

Human Resource Management

Aims and organisation of a Human Resources position, job analysis and forecasting, recruiting, work motivation, skills, salary, training, career management, conflict mitigation, work contract

Social Psychology

Groups, what they are, their influences and dynamics

The student will be able to analyse a group situation

Pre-requisites

None

Place

Toulouse

Useful info

HVAC - Building physics

ECTS
7 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
99h

Presentation

Description

Teaching handles on conception of air conditioning installations devoted to a specific application (hotel supermarket, swimming pool, etc...). It is an Organised Project which is divided into several phases as thermal balances, Summary Request for Proposal (SRQ), Final Request for Proposal (FRQ). An economic analyze is also included in the project.

Student work in groups of three or four persons and and little by little their requirements they receive informations during the project session.

Objectives

At the end of this formation unit, the student will be able to dimension, to conceive and to propose a pertinent regulation of varied air conditioning installations.

Expected skills :

* Design an air conditioning installation (HVAC) from determined specifications
* Design a control system to optimize this facility
* Design main elements of the installation

Useful info

Contacts

Education manager
CLAIRE OMS MULTON
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Place

Toulouse

Future buildings

ECTS
6 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
72h

In brief

Teaching language(s): Français, Anglais

Presentation

Description

This teaching is divided into three modules.

- The High Environnemental Quality (HQE)..... on quality norm (ISO 9000) en environmental norm (ISO 14001). It mainly describes targets devoted to hygrothermal comfort and to management of energy.

- The renewable energies mainly used in the building sector: thermal solar, geothermics, biomass and photovoltaic.

- The Building Technical Management which enters upon concepts of bus and communication networks (main functionalities, advantages in terms of energy savings, etc...)

These different units are teach under lectures and projects and are completed by installation visits.

Teachers :

S. Ginestet, Professionals (DeltaDore, GA, Tecsol, etc.)

Objectives

This teaching describes some of the great concepts of building and of running of buildings of the future. Namely, High Environnemental Quality (HQE), Renewable Energies and Technical Management of Buildings (TMB).

Main goal of this teaching is to make student sensitive to these different concepts.

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

- Targets and areas of HQE , how to take them into account in the labeling of a building project

- The main principles of the methods of controlling an air conditioning system , and the operation of control systems in the HVAC industry

- The physical principles of different renewable energy sources (solar , geothermal, biomass , etc.) and associated technologies

The student will be able to:

- carry out a HQE study on a simplified building

- describe and analyze a control system of an HVAC installation

- calculate and design a renewable energy system design for a real building project

Expected skills :

* calculate energy coming from renewable sources from a CCTP, design the hydraulic and / or ventilation pattern of an HVAC plant using renewable energy
* implement the HQE method on a building project

* design a control system of an HVAC installation

Macro-skills evaluated : 2_1, 2_2, 2_3, 3_1, 3_2, 3_6, 3_8

Pre-requisites

- General lectures of semesters 7 and 8 of climatic engineering - year 4 ;

- Basic physic.

Useful info

Place

Toulouse

Methods and English

ECTS
6 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES DE TOULOUSE

Presentation

Description

Programme (detailed contents):

Methods:

Preparing sites and roadworks – Defining missions and assignments – Site facilities – Temporary works – Special formworks (piles, deck) – Lifting apparatus – Production means – Operating methods and special equipments

Planning:

Cycles and phases study – Equipment and workforce saturation – Implementation.

Budget and site management:

Type a call for tenders in public works – Project manager approach – Enterprise approach – Establishing selling price from cost price - Price study (quantities, sub-details, organization, cost prices, selling prices) – Budget and financial margin.

Lean Management applied to Construction

Lean construction, management of operations and quality, organization and management of flows, logistics

English :

Through targeted activities (contextual presentations, experience reports, projects) students will learn and use English for civil engineering projects

Organization:

Lecture, projects, workshops

Main difficulties for students:

Managing the set of data and information related to the project, performing a complex calculation in several stages.

Objectives

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

* Elaborating means, planning and budget of a construction operation

* Main techniques and methods in various sectors (building, bridges and roads)

* Principles of Lean Management applied to Civil Engineering projects

* Use specific vocabulary of Civil Engineering to complete reports and discuss key elements of a project

The student will be able to:

* Elaborate methods.
* Estimate a budget and establish a planning of works.
* Pilot a project referring to Lean Management concepts
* Communicate in English civil engineering environment

Useful info

Contacts

Education manager
CLAIRE OMS MULTON
oms@insa-toulouse.fr

Place

Toulouse

Bridge Project & Conferences

ECTS
7 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
115h

Presentation

Description

Programme (detailed contents):

Lecture

Technical regulations – Loading: Eurocode 1 part 2 – Foundations: volume 61 part V of the general technical clauses notebook; soil-structure interaction modelling –Concrete-steel composed and steel bridge decks: French regulation and Eurocodes; accounting for fatigue effects – Concrete bridge decks: transversal load distribution and transversal flexure of girder and slab bridges; special verification and provisions for bridges constructed by incremental launching or segmental cantilever.

Project:

Defining the main components from plan (spans and footings type) – Calculation of applied loads – Calculation of the minimum prestress force according to Fauchart method – Verification of the deck under SLS and ULS – Minimum reinforcement – Calculating forces on piles – Design and calculation of foundations – Cost estimate.

Organisation:

Lecture, project in 3 parts (deck, foundations, cost estimate)

Objectives

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

Main steps in design and calculation of a prestressed concrete bridge.

The student will be able to:

Define and calculate the main structural components of a concrete bridge.

Pre-requisites

Prestressed Concrete Structures & Bridges

Useful info

Place

Toulouse

Road engineering and structures

ECTS
6 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
70h

Presentation

Description

Programme (detailed contents):

Road technics:

Mechanical behaviour and design of all types of pavements – Basic components, requirements and quality control (gravels, binding and fines) – Laboratory study (composition, mechanical performances, durability) – Production and processing (roles, tender spots and normalization request) – Quality tests of pavements – Work compliance and control processes - Maintenance of pavements: inspection, design, specific techniques.

Tunnels:

Different types of works - Main technics of boring and types of tunnel boring machines – Microtunnels – End works – Retaining structures and underground hydraulics – Safety in underground works – Case studies.

Management of infrastructures:

Inventory and classification of bridges – Condition state estimation (inspection, diagnosis) – IQOA method – Ranking and planning of maintenance works – Global approach to identification and estimation od risks – Principles of risk-based maintenance.

Organisation:

Lectures, projects, conferences

Objectives

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

* Main road techniques.
* Methods for boring tunnels
* Practice and stakes of bridge management

The student will be able to:

* Design of a structural pavement.
* Elaborate methods for boring tunnels.
* Participate to bridge management process

Pre-requisites

Cours de matériaux de génie civil.

Useful info

Place

- Toulouse

Frames and Composite steel and concrete structures

ECTS
6 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
75h

Presentation

Description

Programme (detailed contents):

Steel and timbers structures and frames:

Studying the main framework, and stability system - Determining wind and snow loads - Designing certain structural components: roof components, joists, slab beams, gable posts, column and girder of the portal frame, stability members – Fire resistance of timber members – Designing connections - Calculating loads applied on foundations.

Composite steel and concrete structures: Technology of composite steel and concrete structures, benefits in case of fire, design of columns, beams and slabs according Eurocode 4.

Organization: lecture, project.

Objectives

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

* Elaborating methods, planning and budget for a construction project.
* Designing and calculating an steel structure and timber component

The student will be able to:

* Foresee the execution methods.
* Establish a projected budget and planning
* Design the framework and stability of a steel structure
* Calculate members and components according to EC3 and EC5.

Pre-requisites

Steel & timber structures

Useful info

Place

Toulouse

Concrete structures 2 & masonry

ECTS
7 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
105h

Presentation

Description

Programme (detailed contents): Calculation and design of buildings in seismic area according to Eurocode 8, design of beams, walls with and without openings, foundations, design project.

Calculation of structures in case of fire according the eurocodes: combinations of actions, behaviour of warm materials, design of columns, beams and slabs, verification on reinforcements, technology.

Technology of masonry structures, French and European standards, design of masonry walls according to Eurocode 6.

Organisation:

Lectures, TD and project in earthquake engineering.

Objectives

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

The principles of design for building concrete structures under earthquake and under fire, the principles of design of masonry structures according to EC6.

The student will be able to:

Design and check simple concrete structures in case of fire, or built in seismic zone.

Write a calculation note and justify the structural elements.

Know the limite of EUROCODE 6 and justify a masonry wall.Calculation and design of buildings in seismic area according to Eurocode 8, design of beams, walls with and without openings, foundations, design project.

Useful info

Contacts

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Place

Toulouse

Eco building & Environmental impact

ECTS
5 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
60h

Presentation

Description

Programme (detailed contents):

- Thermal dynamic simulation of buildings: bioclimatic design; heat transfer in unsteady state; use of a software to carry out a thermal dynamic simulation of a buildings and a sensitivity factor analysis (PLEIADES+COMFIE)

- Environmental Indicators for life cycle analysis (LCA); application to buildings and their integration in a district ; use of a LCA software dedicated to building (NovaEQUER)

- Principles of the Bilan Carbon method and application on an example;

- Diagnosis of energy performance (DPE): principles and application to a study project.

Organisation:

This teaching proceeds with projects. Some full-classes courses and conferences are given to present the key-concepts useful to carry on the projects.

Objectives

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

- Interest and principles being used to establish a diagnosis of energetic performance (DPE).

- Interest and the principle of a thermal dynamic simulation for buildings to help with the design - renovating of the buildings in a bioclimatic approach

- Interest and principles of methods to evaluate global environmental impacts in a project of new or renovated building: life cycle analysis (LCA), Bilan Carbone and other methods.

The student will be able to:

- carry out the DPE and the thermal dynamic simulation of a project of building, analyze results obtained and propose improvements with the studied project

- analyze and take into account a study report on the environmental impacts of a project

- carry out a simplified LCA to study a building

Expected skills :

* To optimize a building according to bioclimatic principles, using a dynamic thermal simulation software
* To assess the environmental impact of a building (or part of a building) via LCA and / or a Carbon Footprint analyze.

Useful info

Contacts

Education manager

STEPHANE GINESTET

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Place

Toulouse

BIM Environment

ECTS
5 credits

Presentation

Description

Programme (detailed contents):

* Principles and elaboration of a BIM project
* Responsibilities of the stakeholders
* Making of the numerical model
* BIM design / BIM project / BIM works
* Work on a real multisite collaborative project.

Objectives

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

* Organisation of a collaborative work thanks to the numerical model
* Role, limit and responsibilities of the stakeholders in a BIM project

The student will be able to:

* Give principles of the process for elaborating the numerical model as function of the invitation to tender
* Participate to a BIM construction project
* Know how to interact with the participants of a BIM construction project

Useful info

Contacts

Education manager
SEBASTIEN MERCADIER
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Project ownership assistance

ECTS
5 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Useful info

Contacts

Education manager
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Place

Toulouse

ID-RIMS

ECTS
30 credits

Presentation

Description

- Unit 1: Formulation and microstructure (4 ECTS)

- Unit 2: Transfers in unsaturated environments, Thermal transfers (4 ECTS)

- Unit 3: Physico-chemistry of durability (6 ECTS)

- Unit 4: Mechanics of materials and buildings (5 ECTS)

- Unit 5: Physics of non-destructive testing (5 ECTS)

- Unit 6: Maintenance of civil engineering buildings (5 ECTS)

- Unit 7: English (2 ECTS)

Please find more information regarding the program and admission conditions : http://geniecivil.univ-tlse3.fr/M2_IDRIMS.htm

Useful info

Contacts

Education manager

GABRIEL SAMSON
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Training period (5th year)

ECTS
21 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
2h

In brief

Teaching language(s): Français, Anglais

Useful info

Place

Toulouse

Training period (4th year)

ECTS
9 credits

Component
INSTITUT NATIONAL DES SCIENCES APPLIQUEES TOULOUSE

Number of hours
1h

In brief

Teaching language(s): Français, Anglais

Useful info

Place

Toulouse