

Acoustics II	GCU09-ACOUS2
Total hours : 12.00 h	1.00 ECTS credit
CM : 12h	
Reference Teacher(s) : MOLEZ Laurent	

Objectives :

Building Acoustics: Isolation, absorption, calculation models, regulations

Urban Acoustics: Noise sources in urban environments, regulations, main technical solutions for noise mitigation

Content :

1. Building Acoustics
 - a. Sound insulation
 - b. Absorption
 - c. Calculation models
 - d. Regulatory aspects
 - e. Basics of large room acoustics
2. Urban Acoustics
 - a. Noise sources
 - b. Propagation models
 - c. Measurement
 - d. Regulations
 - e. Some technical solutions

Bibliography :

JOSSE R., 1977, "Notions d'acoustique", Ed. Eyrolles

JOUHANNEAU J., 1997, "Acoustique des salles et sonorisation", Lavoisier Tec et Doc

Requirements :

Physical Acoustics

Organisation :

Calculation Report. Personal Work: 16 hours

Evaluation :

Calculation report

Target :

5GCU – BAT and GU specializations

Subject name: Timber Structures 2	Code EC: GCU09-CBOI2
Number of hours per student: 12H	ECTS Number: 1
Reference Teacher: Fabrice Bernard	

Generalities

Objectives (2000 characters)

The Timber Structures 2 course, for students in the Building Engineering option, builds upon the design principles introduced in Timber Structures 1. By the end of Timber Structures 1 and 2, all sections of Eurocode 5 will have been covered. The concepts learned throughout the course will be applied through the development of a timber-construction mini-project.

Description (2000 characters)

Chapter 1. Design of timber structures under fire conditions.
 Chapter 2. Design of traditional timber-timber connections.
 Chapter 3. Connections under fire conditions.
 Chapter 4. Design of (pedestrian) timber bridges.

Requirements (2000 characters)

Timber Structures 1 and Structural Analysis.

Course requirements and assessments

Teaching Language (2000 characters)

French

Teaching methods (500 characters)

Lectures, applied problem-solving, and project supervision.

Number of hours per course type: (2000 characters)

CM: 12H

TD:

TP:

PR:

CONF:

Autres:

Evaluation (200 characters)

Mini-projects, by groups of 3-4 students

Bibliography

Bibliography (2000 characters)

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Contacts

Contacts (2000 characters)

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Other information

Other information

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Steel structures 2	GCU09-CM2
Number of hours : 36.00 h	2.00 ECTS credit
CM : 36.00 h	
Reference Teacher(s) : COUCHAUX Mael	

Objectives :

This module provides the basis of designing a steel building and its assemblies. The main stages in the design of a steel building are then studied and applied within the framework of a project.

Content :

- 1- Design of steel buildings and connections
- 2- Actions on steel buildings (combination, snow, wind)
- 3- Global analysis of steel buildings (modelling, imperfections, second order, SLS)
- 4- Resistance of the elements (resistance in section, buckling, lateral-torsional buckling, etc.)
- 5- Calculation of the connections (column base plates, bracing connections, bolted end-plates).

Bibliography :

- [1] Bonnes pratiques pour la construction en acier, bâtiments à usages industriels, Eurobuild
- [2] Bonnes pratiques pour la construction en acier, bâtiments à usages commerciaux, Eurobuild
- [3] Lescouarc'h Y., Construction Métallique : Conception des structures de bâtiments, Cours de l'Ecole Nationale des Ponts et Chaussées, 2008.
- [4] Volume 1 - Assemblages de continuité de poutres réalisés par platines d'about – Guide de choix et dimensionnement- Collection : « les guides Ascap », CTICM.
- [5] Volume 2 - Encastrement de poutres sur poteaux réalisés par platines d'about – Guide de choix et dimensionnement - Collection : « les guides Ascap », CTICM.
- [6] Volume 3 - Attaches de poutres réalisées par double cornière– Guide de choix et dimensionnement - Collection : « les guides Ascap », CTICM.
- [7] Joints in Steel Construction: Simple Joints to Eurocode 3, SCI P358, ISBN : 978-1-85942-201-4.
- [8] Rodier A. – Calcul suivant les Eurocodes d'un bâtiment en acier à l'usage des praticiens, CTICM, 2015.

Requirements :

Steel Structures I, Plastic Calculation of Structures, Elastic Analysis of Structures

Organisation :

Lecture and design project in groups of 3/4 students.

Evaluation :

1 project, followed by an oral evaluation in the form of feedback on correction.

Seismic Design II	GCU09-CPA2
Number of hours : 12.00 h	1.00 ECTS credit
CM : 12.00 h	
Reference Teacher(s) : COUCHAUX Mael	

Objectives :

This module covers seismic design of building and focuses on concrete and steel buildings. It is accompanied by a project that backs up to the Steel Structures II project. The constructive and calculation details related to each material are discussed as well as the consequences of the different ductility classes (DCL, DCM and DCH).

Content :

- 1- Seismic analysis of steel buildings,
- 2- Steel buildings in DCL class,
- 3- Steel buildings in DCM/DCH class.

Bibliography :

- [1] P.O. Martin, Conception parasismique des bâtiments industriels à ossature métallique, Editions CTICM, 2014
- [2] M.Bruneau, O.Clifton, G.MacRae, R.Leon, A.Fussell, Comportement des bâtiments métalliques lors du séisme de Christchurch, Nouvelle Zélande, en 2010 et 2011, Revue Construction Métallique, N°4, 2011
- [3] A.Rodier – Calcul suivant les Eurocodes d'un bâtiment en acier à l'usage des praticiens, CTICM, 2015
- [4] P-O. Martin, J-M. Aribert – Effets du séisme sur les structures métalliques – D'après l'Eurocode 8 – Calcul de la résistance au séisme des ossatures en acier – Plan Europe – CSTB Editions – Avril 2011

Requirements :

Steel structures II, Concrete Structures II and III, Plastic Calculation of Structures, Seismic design I

Organisation :

Lecture and design project in groups of 3/4 students.

Evaluation :

1 project coupled with the Steel Structures II project, followed by an oral evaluation in the form of feedback on correction.

Fluids and Building Equipment	GCU09-FETB
Number of hours : 12.00 h	1.00 ECTS credit
CM : 12.00 h	
Reference Teacher(s) : RAGHAVAN Balaji	

Objectives :

Mastering the regulatory aspects concerning security in buildings. Become familiar with the technical layouts for the implementation of building networks.

Content :

- 1) Regulatory approach: Charts and related texts (ERP, Residential CDT)
- 2) Key concepts: stability and fire resistance, reaction to fire (M4-M2-M1), clearances (widths depending on numbers), Stairs, external defense
- 3) Smoke evacuation (manual and mechanical)
- 4) Fire & Security systems
- 5) Alarm
- 6) Elevator
- 7) Fluids and networks : Electricity, heating systems, gas

Bibliography :

- Collectif CSTB, Sécurité incendie & Réglementation -Habitations, ERP, locaux d'activité, Editions CSTB
- Casso et Associés, Guide Sécurité incendie - Guide d'application de la réglementation incendie, Editions Le Moniteur

Requirements :

Organisation :

Study of cases, pedagogy by projects

Evaluation :

Project in group

Thermal Conditioning	GCU09-TCOND
Number of hours : 12.00 h	1.50 ECTS credit
CM : 12.00 h	
Reference Teacher(s) : RAGHAVAN Balaji	

Objectives :

Familiarize students with the concepts of thermal conditioning. Learn to dimension. Raise awareness to energy saving context.

Content :

- 1) what you need to know before starting
- 2) a heating system
- 3) a ventilation system
- 4) an air conditioning system
- 5) control of an hvac installation

Bibliography :

LIBERT, A., Génie climatique de A à Z. N° spécial de la revue Chaud-froid plomberie
LE RECKNAGEL, Manuel Pratique du Génie Climatique - 3ème édition, librairie du centre

Requirements :

Thermic, aeraulic

Organisation :

Course, study of cases

Evaluation :

Small project

Heat Transfer Engineering III	GCU09-THER3
Number of hours : 24.00 h	1.50 ECTS credit
CM : 24.00 h	
Reference Teacher(s) : DUPONT Pascal	

Objectives :

Standard quality of building is mainly studied through the global static parameter Ubat and then the main issue of this course is to work further on unstationary situations. For this purpose, the concept of thermal inertia is introduced through the quantification of stored energy either in external wall or internal one. An upgrade of the latest French Thermal regulatory calculus is made with professional lecturers.

Content :

- I. Introduction
- II. Thermal basis
 - II.1. Building budget
 - II.2. Thermal stresses
 - II.3. Free parameters in the conception
- III. Simplified dynamical model
 - III.1. Equivalent electrical scheme
 - III.2. Simple wall model
 - III.3. Two time constante model
 - III.4. Thermal regulation model
- IV. RT 2012
 - IV.1. Actual thermal regulation
- V. Software
 - V.1. DPE
 - V.2. Dynamic simulation
 - V.3. Regulatory calculus

Bibliography :

- Cortès H. et Blot J., "Transferts thermiques-Application à l'habitat ", chez Ellipse, 1999, présent à la BU INSA
- "Traité de physique du bâtiment, Tome 1 : connaissances de base", edition du CSTB, présent à la BU INSA
- "RT2005", Base de données I-Reef du CSTB en ligne sur l'intranet de l'INSA dans les services de la BU
- Hernot D., Porcher G., "Thermique appliquée aux bâtiments", aux éditions parisiennes CFP, 1984, présent à la BU INSA
- Incropera F.P., De Witt D.P., "Introduction to heat transfert ", chez Wiley New York, 1996.
- Recknagel et col., "Manuel pratique du génie climatique- tome 1 :données fondamentales",
- Cours de Nicolas Tixier enseignant-Chercheur à l'Ecole d'Architecture de Grenoble (disponible sur le net)

Requirements :

Thermal sciences 1&2 of the forth year.

Organisation :

The course is organized through a general presentation of the thermal science applied to building with a major focus on unstationary regimes. Many hours are spent in the computer room to write mathematical model and realize progressively personal small project. Some lectures were done by external people on actual issues and thermal regulation (RT). A precise building is given to perform unstationary analysis and regulatory calculus.

Evaluation :

It is achieve through personal project on a precise building.