

Eurocodes fundamentals



SCHOOL

Polytech Graduate School of
Engineering



CAMPUS

Belle-Beille



LEVEL

Engineering 3rd year



OPEN TO EXCHANGE STUDENTS

Yes



SEMESTER

Spring (S2)

> **Degree course:** Building and Safety

> **Teaching unit:** Building and Civil Engineering

> **Course language:** English

> **Duration (hours):** 24

> **ECTS:** 3

> **Teacher(s):** David BIGAUD

> **Assessment:**

Continuous assessment

Final exam

> **Teaching methods:**

Lecture course 12 hours

Tutorial course 12 hours

Practical work hours

Case study

Project

COURSE DESCRIPTION

- General introduction - Course objectives and general objectives of Eurocodes (EC)
- Eurocodes collection in 2013
- Relation between Eurocodes
- EC used for building design
- Reliability requirements
- Skillness, experience and quality requirements
- Semi-probabilistic approach and limit states

EC0

- Requirements (equilibrium, strength, service capability)
- Basic variables (actions, material properties, geometrical data)

EC1

- Density of materials
- Operation load within buildings
- Variable loads (snow, wind, thermal, during execution, traffic loads)
- Exercises: Moment calculation, continuous beams, combined actions.

EC2

- Reinforced concrete principles
- Fundamentals of design - Partial safety coefficient related to materials
- Materials, simplified behaviour laws
- Durability and steel cover
- Design principles for a reinforced concrete beam
- Examples of RC beam design

OBJECTIVES

- To understand the challenges (safety, durability, costs) and the design principles of building's structural elements and to be able to carry out basic design
- To catch the influence of material, geometrical, environmental (loads, temperature, moisture, chemical attacks?) parameters on the design and the stability of reinforced concrete, wood or metallic structures.

PREREQUISITES

Mechanics of solids, applied mechanics

SELECTIVE BIBLIOGRAPHY

- EN 1990, Eurocode Base de calcul des structures
- EN 1991, Eurocode 1. Actions sur les structures
- EN 1992, Eurocode 2. Calcul des structures en béton
- EN 1993, Eurocode 3. Calcul des structures métalliques
- EN 1995, Eurocode 5. Calcul des structures en bois
- Eurocode 2. Béton armé Dispositions et données générales, J. Perchat, Techniques de l'ingénieur, collection Les bétons spéciaux dans la construction, article C2330, mai 2006.
- Eurocode 2. Béton armé Vérification des états-limites ultimes, J. Perchat, Techniques de l'ingénieur, collection Les bétons spéciaux dans la construction, article C2331, mai 2006.
- Eurocode 2. Béton armé Vérification des états-limites de service, J. Perchat, Techniques de l'ingénieur, collection Les bétons spéciaux dans la construction, article C2332, novembre 2006.
- Eurocode 2 ? Béton armé Dispositions constructives, J. Perchat, Techniques de l'ingénieur, collection Les bétons spéciaux dans la construction, article C2333, novembre 2006.
- Base de calcul de l'Eurocode 3, Techniques de l'ingénieur, collection Techniques du bâtiment: Construire métallique, article TBA1350, mars 2006.
- Eurocode 5 - Calcul des structures en bois, Guide d'application, Y. Benoit, B. Legrand, V. Tastet, Afnor, Ed. Eyrolles, 2009, 510 pages.
- Sécurité incendie des ouvrages en structures métalliques: partie 1, J. Kruppa, Techniques de l'ingénieur, collection Les constructions métalliques, article C2506, novembre 2004.
- Sécurité incendie des ouvrages en structures