Second Cycle

Year 4

I4.8 Nantes

CONSTRUCTION AND CIVIL ENGINEERING - CCE

Targeted professions

Engineering works manager / Project chief engineer / Business engineer in CCE

Core CCE subjects

Competencies to be acquired

Materials	• Identify materials extracted from quarries (basic materials and extraction techniques), as well as asphalts. • Formulate the mechanics of powdered materials and apply them on simple cases. • Formulate the necessary basic tools for soil mechanics. • List the different types of concrete as well as their manufacturing techniques, their advantages and disadvantages (mechanical properties, ageing behaviour, etc.). • List the different road engineering techniques, their advantages and disadvantages
Regulations	Ex 1 : manufacture of concrete test-tubes and 3 point bending test. Ex 2 and 3 : Ex crisis management (FH) or ERICSSON Negotiation in English (2 sessions). Ex 4 : shock tests on concrete + comparison with model E.F.
Calculation – sizing	• Consult legislation on reinforced concrete and interpret it. • Consult legislation on steel frameworks and interpret it. • Conduct the sizing of concrete structures by using specific techniques in the building field.
Extended CCE Topic	• Analyse and perform an analytical calculation of the mechanical properties of reinforced concrete : master the basic tools for sizing structures. • State the sizing situations : o Static resistance. o Seismic response. o Impact response. o Fire resistance.

Crisis management of problems on the site.
Art of negotiation : negotiate with your teams and subcontractors.
Project management

- Draw up a technical and human resources timetable.
- Draw up a financial (monitoring) timetable for a CCE construction project.

CCE Market

- Interpret the economical decisions of the CCE sector, particularly in relation to new (innovative) materials.

Sustainable development

- Consult the regulatory context of sustainable development (eco-construction of roads and buildings).
- Analyse then calculate a carbon footprint.

Critical analysis of calculations

- Argue the hypotheses of a calculation.
- Confirm a calculation result (by comparison with other results, in a physical sense…).
- Apply critical analysis to one's own work.

Organisation

Lectures / Tutorials	• Basic materials extracted from quarries, types of concrete, coatings – SCREG • Technical sizing of roads – COLAS • Rules and practice for sizing of metal frameworks – BRIAND • Checking of roads and structures – IFSTTAR • Mechanics of powdered materials – IFSTTAR Assessments : Two 2 hrs DS
Practical Exercises	Ex1 : manufacture of concrete test-tubes and 3 point bending test. Ex 2 and 3 : Ex crisis management (FH) or ERICSSON Negotiation in English (2 sessions). Ex 4 : shock tests on concrete + comparison with model E.F.
Project	24 hrs scheduled in the timetable. About 90h of independent work by student. Groups of 10 to 12 students. Subject : managing a crisis situation. Assessment : report, oral viva, interview with a professional.
Extended CCE Topic	• Lectures / Tutorials • Research and innovation in the field – IFSTTAR • Repairing works of art – IFSTTAR • Earthquake and impact resistance of concrete structures – Icam Assessments : 2 hrs DS