

5 credits

30.0 h + 30.0 h

Q1

Teacher(s)	Cap Jean-François ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	See part 'Content' hereunder.
Aims	<i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i>
Evaluation methods	The exam covers the theoretical concepts seen in the course, as well as practical exercises. The details are specified during the course and described on Moodle.
Teaching methods	Ex cathedra courses with slides. Workshop exercises.
Content	<p>Topics are discussed in the context of calculations in service (elastic behavior hypothesis) and rupture (plastic behavior hypothesis). The design methods presented refer to the rules prescribed in the current European standards (Eurocode 2).</p> <p>History of reinforced concrete                      Mechanical and physical properties of concrete                      Mechanical and physical properties of reinforcement steel                      Basic principles of calculation of reinforced concrete structures                      Structural safety and limit states                      Fundamental principles of bending calculation                      Behavior of a beam led to rupture by simple bending                      Elastic calculation and calculation at break of the sections subjected to the simple bending.                      Section subjected to a simple compression                      Sections subjected to the composite bending, elastic design and plastic design.                      Sections subjected to shear force                      Sections subject to torsion                      Shear forces at interfaces between 2 concrete zones                      Punching slabs                      Slender elements subjected to compression (buckling)                      Serviceability limit states: limitation of the stresses in service, limitation of the cracking, arrows.                      Plastic calculations by means of tie-rods                      Technological aspects of reinforcement of reinforced concrete elements</p>
Inline resources	Available on Moodle
Bibliography	<ul style="list-style-type: none"> <li>- Transparents du cours (syllabus) et Formulaire EN 1992-1-1+ ANB ;</li> <li>- Norme NBN EN 1992-1-1 - Eurocode 2 : Calcul des structures en béton - Partie 1-1 : Règles générales et règles pour les bâtiments</li> <li>- René Walther, Manfred Miehlsbradt. Dimensionnement des structures en béton - Traité de Génie Civil Volume 7 . Presses polytechniques et universitaires romandes.</li> <li>R. Favre, J.-P. Jaccoud, O. Burdet, H. Charif. Dimensionnement des structures en béton - Traité de Génie Civil Volume 8 . Presses polytechniques et universitaires romandes.</li> </ul>
Faculty or entity in charge	GC

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Civil Engineering	GCE2M	5		