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7.00 credits	42.5 h + 40.0 h	Q1
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Teacher(s)	Rattez Hadrien ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	This project requires in-depth knowledge of structural materials, mechanics of structures, stability of structures, soil mechanics, basic construction methods and reinforced concrete structures, as taught in the following courses: LGCIV1031, LGCIV1022, LGCIV1072 , LGCIV1023, LGCIV1032.
Main themes	This project, carried out by groups of several students, aims to place the student in the context of the study and design of a concrete multi-storey building, by passing through the main stages that characterize the design of such a building, including architectural design and finishing. This is done with the use of REVIT software allowing the BIM (Building Information Management) approach
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p>With reference to the AA reference framework of the "Master Civil Engineer of Constructions" program, this course contributes to the development, acquisition and evaluation of the following learning outcomes: AA1.1, AA1.2, AA1.3, AA2.1, AA2.2, AA2.3, AA2.4, AA2.5, AA4.1, AA4.2, AA4.3, AA4.4, AA5.1, AA5.2, AA5.3, AA5.4, AA5.5, AA5.6, AA6.1, AA6.2, AA6.3, AA6.4</p> <p>More specifically, at the end of this course, the student must be able to:</p> <ul style="list-style-type: none"> • Apply the general rules of structural and architectural design of a multi-storey building (choice of horizontal and vertical load-bearing systems depending on the spans, loads, wind bracing, expansion joints, etc); • Choose a foundation system according to characteristics soil; • Design structural elements such as cast-in-place or prefabricated slabs, prestressed slabs, beams, columns and walls made of reinforced concrete, pre-slabs and pre-walls, metal beams and roofs, surface or deep foundations, etc. ; • Choose the types of covers and finishing with the help of commercial documentation ; • Master the functionalities of a BIM (Revit) software: integrate the geometric characteristics of a simple building, deduce a measurement, integrate a planning and calculate a price.
Evaluation methods	<p>There is no second session for this project. Students absent from the first session of S1 without valid justification will be excluded from the project. Any other unjustified absence will be penalized by a two-point reduction in the final grade.</p> <p>Evaluation will be based on:</p> <ul style="list-style-type: none"> • The students' regular work and attendance during the practical work in the classroom throughout the project ; • Intermediate presentations; • The final presentation; • Final report (content, structure, quality of writing); • The individual exam for certain parts of the course. <p>Different grades may be given to students in the same group depending on their attendance at the sessions, their answers to the questions asked during the intermediate and final defenses, their participation in writing the report, etc.</p> <p>In their written reports, students are required to systematically indicate all parts where AIs (such as ChatGPT) have been used, e.g. in footnotes, specifying whether the AI was used to search for information, to write the text or to correct it. Sources of information must be systematically cited in accordance with bibliographic referencing standards. Students remain responsible for the content of their work, regardless of the sources used.</p>
Teaching methods	Ex-cathedra teaching, seminars, supervised practical work. Work in groups of 3 to 5 students.
Content	<p>IMPORTANT NOTE: IN CASE OF FORCE MAJEURE (E.G., AN EPIDEMIC), THE CONTENT, ACTIVITIES, TEACHING METHODS AND EVALUATION METHODS MAY BE ADAPTED</p> <p>A part of the activity will be dedicated to the learning of the fundamental notions necessary to carry out the project:</p>

	<ul style="list-style-type: none"> • General introduction to BIM; • Learning a BIM software (Revit); • Architectural design; • General design of buildings and rules of pre-dimensioning of structures; • Reminders of design and calculation of superficial and deep foundations. <p>The other part will be dedicated to the project itself, with the following steps</p> <ul style="list-style-type: none"> • Familiarization with the specifications and program established by the client or his representative (written by the teachers): geographical context, characteristics of the land, neighboring buildings and structures, available communication routes, type of occupation, number of floors requested, etc. ; • General architectural and structural design of the building and first sketch, specific to each group of students; • Establishment of a refined sketch of the building and carried out on a software allowing the BIM approach (Revit); • Choice of a structural system and type of foundations; • Description of the loads; • Design and sizing of structural elements; • Design and sizing of foundations; • Refinement of the BIM model and initial sketches; • Choice of completions (roof and facades); • Realization of formwork plans, reinforcement, framework; • Realization of the measurements and estimation of the cost of the works with the help of the BIM model; • Realization of a work schedule using the BIM model.
Inline resources	See MOODLE page of the course.
Bibliography	See MOODLE page of the course.
Other infos	One or more construction site visits may be organized as part of the project.
Faculty or entity in charge	GC

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Civil Engineering	GCE2M	7		
Master [120] in Architecture and Engineering	ARCH2M	7		