lbarc1261
2021

Structural analysis 2

5.00 credits	22.5 h + 45.0 h	Q1

Teacher(s)	Pelsser Yvette ;Rondeaux Jean-François ;
Language :	French
Place of the course	Bruxelles Saint-Gilles
Prerequisites	*The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.*
Main themes	This teaching unit provides an introduction to the analysis of load bearing structures. It forms part of the continuous process of learning about structures and their behaviour. The course introduces fundamental concepts which enable students to • formulate all the stages in the analysis of a structure : production of a static diagram, assessment of stress and internal loads. • maintain a dialogue with an engineer specialised in this field. The following topics are covered: • Extended, compressed and bent structures • Tensile (cables) and compressed (arches) structures • Isostatic and hyperstatic structures • Lowering of loads • Stability of form (slender elements) and stability of the whole (bracing).

Learning outcomes	**At the end of this learning unit, the student is able to :**
	
	    Specific learning outcomes:
	    By the end of the course, students are able to
	    1. undertake an overall analysis of a structure, i.e.:
	
	      • formulate the vertical and horizontal stresses acting on a structure
	      • produce the static diagram which shows this
	      • formulate the conditions of overall stability
	      • formulate the conditions of stability / instability of an isolated structural element
	      • analyse the structural behaviour of supports and assemblies.
	
	    2. use graphic and analytical methods applied to principles of balance, the determination of internal loads and associated constraints, the determination of deformations in the context of compressed, extended and bent structures (isostatic and hyperstatic structures).
	    3. identify the influence of hyperstaticity on the mechanical behaviour of a structure.
	    4. develop a logical procedure which
	
	      • on one hand, summarises acquired knowledge and demonstrates mastery of basic concepts and
	      • on the other hand, makes a link with other disciplines, particularly the architectural project.
	
	    Contribution to the learning outcomes reference framework:
	    With regard to the learning outcomes reference framework of the Bachelor's degree in Architecture, this teaching unit contributes to the development, the acquisition and the assessment of the following learning outcomes:
	    Make use of other subjects
	
	      • *Interpret the knowledge of other subjects*
	      • *Make use of other subjects to ask questions about the design and implementation of an architectural project*
	
	    Use the technical dimension
	
	      • *Be familiar with and describe the main technical principles of building*
	      • *Observe and assess the main construction principles of a building*
	      • *Acquire an instinctive understanding of structures to use in producing a creative work of architecture*

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Bibliography	M-A. STUDER, F. FREY, *Introduction à l'analyse des structures*, Presses polytechniques et universitaires romandes, Lausanne, 2004 P. LESTUZZI, L. PFLUG, *Analyse des structures et milieux continus*, Structures en barres et poutres, Presses polytechniques et universitaires romandes, Lausanne, 2014 A. MUTTONI, *L'art des structures*, Presse polytechniques et universitaires romandes, Lausanne, 2012 R. MOUTERDE, F. FLEURY, *Comprendre simplement la résistance des matériaux. La structure, principes et enjeux pour la conception.*
Faculty or entity in charge	LOCI

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Architecture (Bruxelles)	ARCB1BA	5	LBARC1143 AND LBARC1160	🔍