UCLouvain

lbarc1160

2019

Structural Analysis 1 : fundamentals of statics and strength of materials

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

4 credits	22.5 h + 30.0 h	Q2

Teacher(s)	Pelsser Yvette ;
Language :	French
Place of the course	Bruxelles
Main themes	This teaching unit provides an introduction to the understanding of the mechanical working of load-bearing structures and their analysis. It forms part of the continuous process of studying the main architectural structures. This teaching unit will provide the main concepts designed to: • analyse simple linear structures by means of tools from statics and materials resistance. • maintain a dialogue with an engineer specialised in this field. • The following topics are covered: • Basic concepts in mechanics: force and moment • Characteristics of sections: centre of gravity, quadratics, main axes of inertia • Balance conditions of simple isostatic structures: hypotheses, force systems, support reactions • Internal loads and associated constraints: assessment and quantification • Mechanical properties of materials and deformation.
Aims	**Specific learning outcomes:** By the end of the course, students are able to • apply the fundamental principles of statics in the case of flat structures subject to the action of a system of forces. • produce the static diagram corresponding to a simple loaded structure. • use graphic methods applied to questions of statics, enabling the visualisation of forces understanding of their effects on the structure being studied. • use analytical instruments applied to the principle of balance of a flat structure, to the calculations of the reactions at the supports, to establishing internal loads and associated constraints. • undertake a critical analysis of simple extended, compressed or bent structures subject to usual loading. • formulate the mechanical properties of common materials - steel, wood, concrete and glass : law of behaviour, fragility and ductility. 1 • formulate the resistance conditions of a structure with regard to geometric factors and stress of the selected material. **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* **Use the technical dimension** • *Be familiar with and describe the main technical principles of building* • *Acquire an instinctive understanding of structures to use in producing a creative work of architecture* - - - - *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".*
Bibliography	M-A. STUDER, F. FREY, Introduction à l'analyse des structures, Presses polytechniques et universitaires romandes, Lausanne, 2004 M. SALVADORI, M. LEVY, Pourquoi ça tombe ?, éd. Parenthèses, Paris, 2009 M. SALVADORI, M. LEVY, Comment ça tient ?, éd. Parenthèses, Paris, 2009 A. MUTTONI, L'art des structures, Presse polytechniques et universitaires romandes, Lausanne, 2015

Faculty or entity in charge	LOCI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Architecture (Bruxelles)	ARCB1BA	4		