UCL Université catholique de Louvain

LAUCE2185

2014-2015

Dynamics of structures

5.0 credits	30.0 h + 30.0 h	1q

Teacher(s) :	Coyette Jean-Pierre ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	Course slides, exercices and solutions
Prerequisites :	LAUCE1181; LMECA2410
Main themes :	Finite element modelling for linear and nonlinear structural dynamics; Random dynamics; Fluid-structure interaction.
Aims :	AA 1.1, AA 1.2 and AA 1.3. After completing this course, the student should be able to: Understand the basic ingredients of a finite element method for structural dynamics in a linear or (materially/geometrically) non-linear context, select appropriate computational procedures, control convergence and stability conditions of selected methods and correctly use computed results; Characterize random excitations, describe stationary and unstationary processes, establish a link between spectral and transient descriptions of such excitations, evaluate the response of structures subjected to random excitations, perform the selection of appropriate computational procedures, interpret and further exploit computed results (threshold statistics, estimation of duration life, etc.); Describe physical aspects related to fluid-structure interaction in the elasto-acoustic context, formulate appropriate coupled models, handle free surface effects and sloshing modes in containers, evaluate coupled modes in hydro-elastic systems, compute the forced response of vibro-acoustic systems. *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".*
Evaluation methods :	Examination with/without course notes (to be fixed) ' 4 hours maximum.
Teaching methods :	Ex-cathedra course based on available slides (iCampus) for volume 1; Teacher supported project for volume 2.
Bibliography :	-- Course slides (iCampus) ; -- « Random vibrations : Theory and Practice », P.H. Wirsching, T. L. Paetz et H. Ortiz, John Wiley, 1995; -- « Théorie des vibrations, application à la dynamique des structures », M. Géradin et D. Rixen, Masson 1996 ; -- « Fluid structure interaction », H.J.P. Morand et R. Ohayon, John Wiley, 1995.
Other infos :	-- Use of Matlab scripts ; -- Use of industrial software (MSC Nastran, Actran, etc.) for the project.
Cycle and year of study :	> Master [120] in Civil Engineering > Master [120] in Mechanical Engineering > Master [120] in Electro-mechanical Engineering
Faculty or entity in charge:	GC