COMPLÉMENTS DE DYNAMIQUE DES STRUCTURES, OPTIMISATION

STRUCTURAL DYNAMICS

Lecturers: **Sebastien BESSET**

| Lecturers : 4.0 | TC : 4.0 | PW : 4.0 | Autonomy : 0.0 | Study : 8.0 | Project : 0.0 | Language : FR

Objectives

The aim of this course is to deepen the techniques of modal synthesis: truncation effects, structural modifications, and to extend the dynamic models to the situations of structures subjected to large displacements and / or combined loads, to anticipate and control the associated phenomena during the design process: risks of instability and floating. The pedagogical content is based on additional training in the form of courses and TD, a practical session on the effect of a static pre-load on the dynamic behavior of a structure and a project which will serve as a support example.

Keywords : Component mode synthesis, large displacements, prestress loading

Programme	- Modal synthesis: description of the dynamic behavior of a structure based on the eigenmodes. Definition of the number of modes taken into account depending on the domain Frequency of excitation, effects of modal truncation. Prediction of the effect of a localized structural change. - Large displacements, static pre-stresses: equations on simple cases, qualitative prediction of the expected phenomena, implementation of simulations. - TP: modifications of the eigenmodes of a structure subjected to a static loading increasing. Buckling phenomenon. - BE: project to design a structure or to simulate the behavior of a structure.
Learning outcomes	• To be able to propose a model of predictive simulation of dynamic behavior of a structure. • To be able to gather the necessary information and estimate their degree of importance and reliability. • To know how to evaluate the validity limits of a model. • To understand the concepts necessary for the use of a dynamic computation code
Independent study	Objectifs : Students are faced with a modelling problem in a quasi-industrial application. Méhodes : The teacher presents the problem and intervenes as a resource.
Core texts	T. Gmür, *DYNAMIQUE DES STRUCTURES : ANALYSE MODALE NUMÉRIQUE.*, Presses Polytechniques et Universitaires Romandes, 1997 Michel Géradin, Daniel Rixen *THÉORIE DES VIBRATIONS, APPLICATION À LA DYNAMIQUE DES STRUCTURES.*, Elsevier-Masson, 1999 Olgierd Cecil Zienkiewicz*LA MÉTHODE DES ÉLÉMENTS FINIS*, McGraw Hill, 1979
Assessment	Final mark = 67% Knowledge + 33% Know-how Knowledge N1 = 100% continuous assessment Know-how N2 = 100% continuous assessment