

Semester 2
Major: High Temperature Materials (HTM)

Vibrations – Finite Elements

Course code: AVF2

ECTS Credits: 5

Department	: MSISI	Lectures	: 15h00
Lecturers	: M. Beringhier	Tutorials	: 12h30
Year of study	: 1 st year	Laboratory sessions	: 15h00
Semester	: 2 nd semester	Project	:
Assessment method(s)	: 1 written test + practicals	Home works	:
Language of instruction	: English	Total hours	: 42h30
Type of courses	: Compulsory		

Objective: To learn how to analyse the results given by F.E.M. for trusses and beams structures.

Prerequisites: course of structure mechanics

Content:

1. **Finite element**
 - Structural framework
 - F.E.M. applied to a 2D problem solving
2. **Vibrations**
 - Vibrations of single degree of freedom systems
 - Vibrations of multiple degree of freedom systems
 - Vibrations of rectilinear beams

Recommended reading:

- J.F. Imbert, *Analyse des structures par éléments finis*, Cépaduès, 1991
J.N. Reddy, *An introduction to the finite element method*, Mac GrawHill, 1993
B. Drouin, J.M. Senicourt, F. Lavaste, G. Fezans, *De la mécanique vibratoire classique à la méthode des éléments finis*, Volumes 1 et 2, AFNOR, 1993
A.A. Shabana, *Theory of Vibration, an introduction*, Springer-Verlag, 1996
M. Del Pedro, Pierre Pahud, *Mécanique vibratoire*, Presses Polytechniques et Universitaires Romanes, 1989
M. Gérardin, D. Rixen, *Théorie des vibrations – Application à la dynamique des structures*, Masson, 1993
Zienkiewicz O.C., *The Finite Element Method*, 4th edition, 2 volumes, Mc Grow Hill, 1989
Batoz J.L., Dhatt G., *Modélisation des structures par éléments finis*, 3 volumes, Hermès, 1990

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