



Unit information

Program	Ciências Mecânicas (53001010053P0)
Course unit	STRUCTURAL DYNAMICS
Unit code	PCMEC
Unit number	0206
Credit points	4
Period	01/01/2012 -
Professor	Adriano Todorovic Fabro, Marcela Rodrigues Machado
Prerequisites	Não

Unit outline

Objective:

This course aims to develop skills for understanding the characteristics and physical nature of the phenomenon of vibrations in structures that support the appropriate use of modeling software and experimental techniques in industry.

Purpose:

The course provides theoretical background and presents analytical methodologies for analyzing the dynamic behavior of flexible structures with an emphasis on medium and high frequencies within the audible frequency spectrum. At the end of the course, the student is expected to have a deep knowledge of continuous and discrete models and understand the benefits and limitations of characterizing the dynamics of a structure by means of modes or waves.

Contents:

Module 1 - Introduction, Free and forced vibration 1GDL and NGDL, Modal analysis of continuous systems, Average behavior: modes at high frequencies, power and energy, injected power, kinetic energy and mean square velocity, **Module 2** - Waves in bars, beams and plates, Power and energy, Propagation, reflection and transmission of mechanical waves, Excitation and forced response: input mobility in infinite systems, Free and forced response: wave/mode duality, Periodic systems.

Assessment

2 exams (75% of the grade); 1 final paper (25% of the grade)
Mention will be given to the students based on their final grades, according to the UnB criteria. The discipline professors will solve any omission cases.

Obs:

Reference:

1. F. Fahy e D. Thompson, Fundamentals of Sound and Vibration, CRC Press, 2019.
2. M. A. Savi e A. S. de Paula, Vibrações Mecânicas, LTC, 2017.
3. D. J. Inman, Engineering Vibration - 2e, Prentice-Hall, 2001.
4. L. Meirovich, Fundamentals of Vibrations, McGraw-Hill, 2001.
5. K. F. Graff, Wave Motion in Elastic Solids, 1991. 6) F J Fahy, P Gardonio, Sound and Structural Vibration: Radiation, Transmission and Response, 2006.