



Coupled Problems: Vibro-Acoustics.

January 25th - 26th 2018

**Mechanical Engineering
Dynamics and Control
Eindhoven University of Technology**

**Structural Dynamics and Acoustics
Department of Mechanical Engineering
University of Twente**

General

This course will give an introduction to various aspects on vibro-acoustics. It focuses on numerical/theoretical aspects (finite element methods/boundary element methods to solve the Helmholtz equation as well as source localization techniques) but some experimental (specifically source localization) techniques are covered as well. This course is part of the 3TU Engineering Mechanics training program for PhD students.

Local organization

The course is organized by the Dynamics and Control group of the TU/e and the Structural Dynamics and Acoustics and Engineering Fluid Dynamics group of the University of Twente. It will be hosted by the TUe. The local organizing committee is composed of

- Geertje Janssen (secretary)
- Ines Lopez Arteaga

Lecturers

- Ines Lopez Arteaga (TU/e)
- Ysbrand Wijnant (UT)

Lecture notes

Lecture notes will be distributed during the course.

Prerequisites

Undergraduate courses in Applied Mathematics (partial differential equations). The Finite Element Method and Boundary Element Method that are used are explained in sufficient detail.

Contents

The course will be hosted by the Eindhoven University of Technology on Thursday 25th and Friday 26th, at the Eindhoven University of Technology, GEM-Z 0.05.

Note: this is a preliminary program!

Thursday January 25th 2018.

10.00 Welcome (coffee/tea)

10.30 - 11.30 Sound radiation from structures (Lopez)

- a) Bending waves in beams and plates
- b) Sound Radiation from infinite structures
- c) Sound Radiation from finite structures

11.30 - 12.30 Boundary Element Method in Acoustics (Wijnant/Lopez)

12.30 Lunch

13.30 -16.00 Inverse Acoustics (Lopez/Wijnant)

- a) General background and overview of methods
- b) Beamforming
- c) Fourier-based NAH
- d) Inverse BEM

16.00 Coffee/Discussion

Friday January 26th 2018.

9.00 - 10.30 Statistical Energy Analysis (SEA) (Lopez)

- a) History and theoretical background
- b) Current developments and applications
- c) Practical work

10.30 - 11.30 Finite Element Method in Acoustics (Wijnant)

- a) Fluid Structure Interaction

11.30 – 12.30 Practical work (Computer assignment) (Wijnant)

12.30 Wrap-up/Feedback (Lopez/Wijnant)

13.00 Lunch

Fee/Registration

The course is free for registered members of the graduate school Engineering Mechanics and for the research members of the contributing research groups. The course fee for non EM members is € 100 for students and € 400 for other participants. They will receive an invoice after accepted registration.

Participants need to register by completing the on line registration form that can be found <http://www.em.tue.nl/events/index.php/2/2016> and returning it **before January 11th 2016** to the Secretariat of the Graduate School Engineering Mechanics, Eindhoven University of Technology. Members of the Graduate School Engineering Mechanics receive priority in case of over-subscription.

Further information about the educational programme and other activities of the Graduate School on Engineering Mechanics can be found at: www.em.tue.nl.