Coupled Problems: Vibro-Acoustics.

March 5th - 6th 2020

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 varies 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 University of Twente. The local organizing committee is composed of

- Debbie Zimmerman (secretary)
- Ysbrand Wijnant

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 University of Twente on Thursday 5th and Friday 6th,
Note: this is a preliminary program!

Thursday March 5th 2020.
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 -16.30 Inverse Acoustics (Lopez/Wijnant)

a) General background and overview of methods
b) Beamforming

Coffee halfway

c) Fourier-based NAH
d) Inverse BEM

Friday March 6th 2020.
9.00 - 10.30 Duct acoustics: 2-port models and sound absorption (Lopez)

a) 2-port modeling for duct acoustics
b) Sound absorption strategies in ducts
c) Micro-perforated plates

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. https://engineeringmechanics.nl/courses/ **before March 2nd 2020.**
Members of the Graduate School Engineering Mechanics receive priority in case of over-subscription.

For more information about hotel accommodation on the campus of the University of Twente please contact Debbie Zimmerman (secretary): d.b.zimmermanvanwoesik@utwente.nl

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