

VIBRATIONS AND ACOUSTICS PRACTICAL DETAILS



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Course content

Acoustics:

- A1. Definitions
- A2. Power, intensity,...
- A3. Attenuation/Absorption
- A4. Transmission and Insulation
- A5. Refraction, Diffraction ...
- A6. Guided propagation
- A7. Practical cases

- VA1. Fourier analysis
- VA2. Resonances
- VA3. Vibroacoustics
- VA4. Measurements

Vibrations:

- V1. Introduction/1DOF
- V2. MDOF / modeshapes
- V3. FE models/continuous
- V4. Vibrations Sources
- V5. Effects of vibrations
- V6. Design and Remedial measures

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Course schedule

- Theory (36h) : Prof. Arnaud Deraemaeker
Prof. Jean-Louis Migéot

Not compulsory (but strongly advised)

- be on time!
- be quiet!

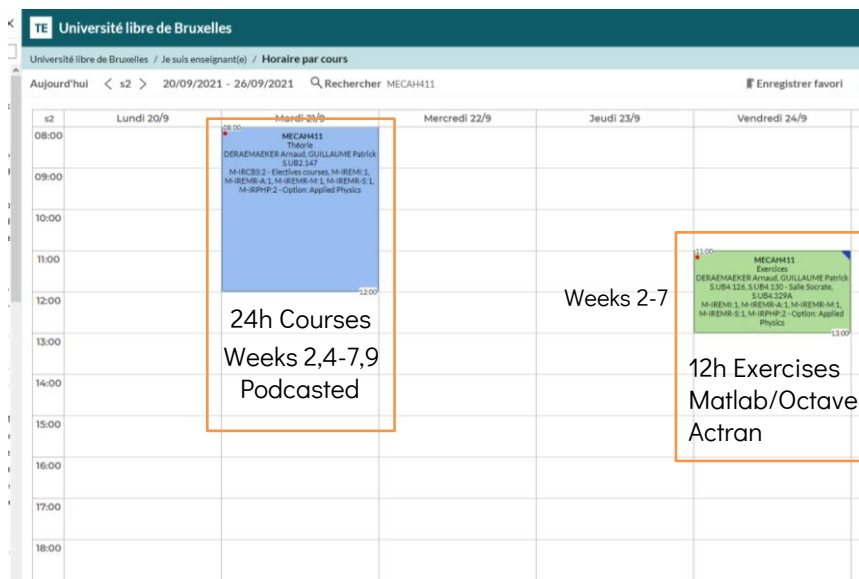
- Practice (24h) : Exercises : 12h
Vibroacoustics project: 12h

Compulsory

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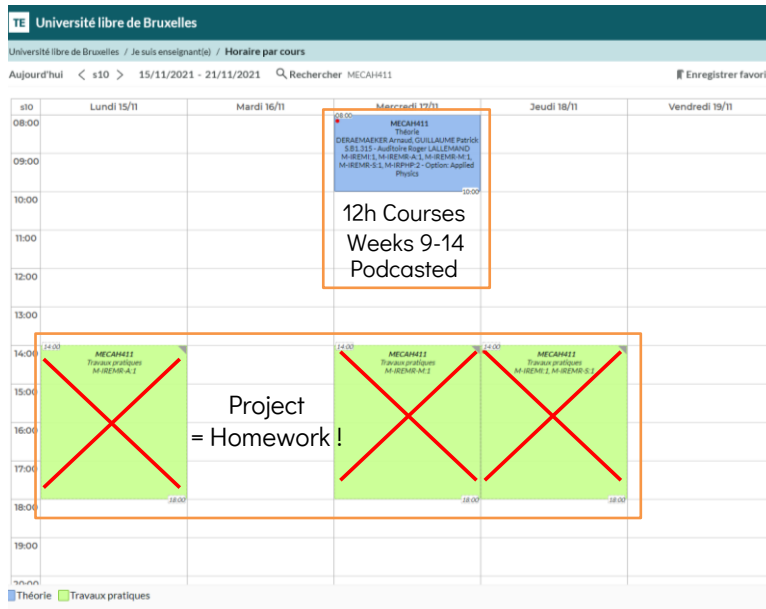
Course schedule



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Course schedule



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Flipped class principle

- Watching pre-recorded videos/reading material before coming to the class <https://youtu.be/FN1gSfpl13I>
- During the class :
 - Wooclap sessions to consolidate knowledge <https://app.wooclap.com/events/YQFDJT/0>
 - Questions and answers
 - Clarifications of the concepts not understood by the majority
 - Practical cases discussed in more details

FLIPPED



- Interactions are a necessity for continuous evaluation of the teaching/learning process
- Flipped class will work if you play the game and will fail if you don't

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Course schedule

Because of the flipped class organization, lectures start at 8:00AM but end ... when there are no more questions from the students or no more additional material to share by the teachers. There is also no fixed time or fixed order for the acoustic or dynamic part of the course.

24h Courses
Weeks 2,4-7,9
Podcasted

Weeks 2-7

12h Exercises
Matlab/Octave
Actran

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Course material and organization

Vibrations course material available at:

<https://arnoresearch.com/vibrations-and-acoustics-2021-2022/>

Acoustics course material available at:

<https://migeot.eu/acoustic-engineering/>

Possibility to buy the corresponding book in French or English (25€). Order by sending an e-mail to jean-louis@migeot.eu before September 30th. Books will be available ~2 weeks later.

Course podcasting



→ We need (constructive) feedback from you. Tell us when you like or dislike some videos. Let us know those that are clear and useful and those that could use some reworking !

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Course evaluation

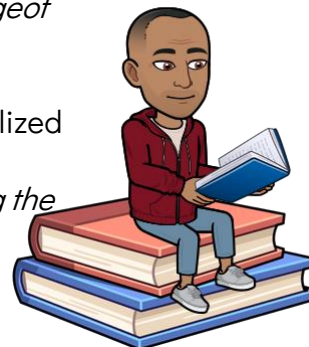
Evaluation :

-Theory : Oral examination (January) :
40% Vibrations evaluated by Arnaud Deraemaeker
40% Acoustics evaluated by Jean-Louis Migeot

-Practice : Exercises:
not part of the evaluation but absence penalized
Project:
20% evaluated by Jean-Louis Migeot during the oral examination

> 50% : pass

< 50% : fail -> Second session in August/September



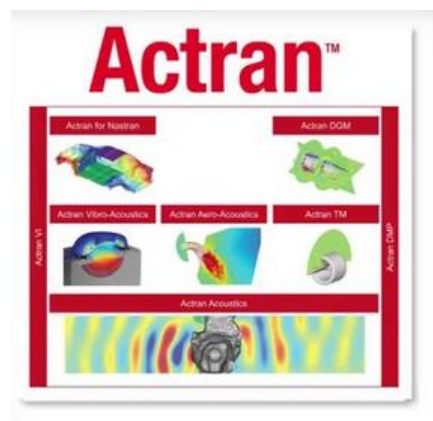
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ACTRAN Student Edition

ACTRAN is a finite element program for the modelling of dynamic, acoustic and vibro-acoustic systems. It was initially developed by Jean-Pierre Coyette (UCL) and Jean-Louis Migeot (ULB) and is widely used by engineers and scientists worldwide.

The **student edition of ACTRAN** is going to be used during the exercise sessions (weeks 2-7) and during the project (weeks 7 to ...).



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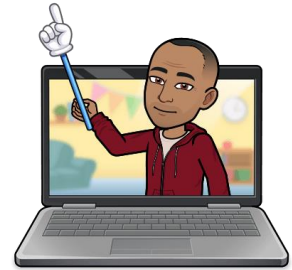
ACTRAN Student Edition

ACTRAN is available on the EPB computers but you can also install the software freely on your own computers.

To do so, you need to **register NOW** at <https://www.mscsoftware.com/page/actran-student-edition>

The exercise session of October 1st will be dedicated to

- (1) Giving you basic information about ACTRAN
- (2) Assisting you with the installation of ACTRAN



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Course objectives

Main objectives

- Understanding the fundamental concepts in vibrations and acoustics applied to mechanical engineering problems
- Ability to apply these concepts to practical problems with a design-oriented mind.



→ We care that you become a good engineer useful to our society.

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Philosophy of teaching and learning

Group working vs individual assessment

-> Learn to work in groups and benefit from the others, representative of real working conditions

-> Verify that you have the sufficient knowledge to work as an engineer (individual assessment), representative of what is expected from you to advance in your career.



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Philosophy of teaching and learning

No spoon feeding

-> You learn by doing yourself and by doing mistakes.
Listening and copying is not learning



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Questions ?

