# Aéroacoustique

ECTS credits
2 credits

## In brief

**Course langage:** French

# Presentation

## Learning objectives

This course introduces the concepts and phenomena specific to sound generation and propagation in resting or moving media, as well as the basics of aero acoustics. The objective of the course is to enable a student, when he/she becomes an engineer, to master the basic mathematical and physical notions necessary to solve problems in acoustics, aeroacoustics and vibration, in particular by using commercially available numerical tools: to know how to evaluate reasonable orders of magnitude, to know how to master the different levels of approximation implied by these numerical modeling tools, to know how to interpret and critically analyze the results obtained, etc.

There are no particular prerequisites. The 1st year courses in mechanics and mechanics of continuous media are sufficient.

## Description of the programme

The course is organized in two parts.

- In the first part, we first recall the basics of acoustics (notions on waves and propagation, the different types of sources...), then we examine different applications (propagation in a stratified atmosphere or in a confined environment...).

- In the second part, we focus on aero-acoustics, its experimental characterization and its modeling for the implementation of numerical simulations. For this, we present the classical models, and of increasing complexity, such as the approaches of Lighthill, Ribner or Corcos. Finally, some examples of recent numerical simulations are given to illustrate the limits of these models

## Generic central skills and knowledge targeted in the discipline

- Know how to model and analyze acoustic or aero-acoustic phenomena (C2)

- Master the methods of modeling and numerical simulation in acoustics or aero-acoustics (C2)
- Be able to calculate the main characteristics (levels, frequency peaks) of acoustic or aeroacoustic phenomena (C2)
- Be able to interpret experimental results (C2)

## How knowledge is tested

DS: supervised assignment, 100%.

## Bibliography

1. Anselmet, P.-O. Mattei, Acoustique, aéroacoustique et vibrations, ISTE Éditions (2015).
2. Lévy, Acoustique industrielle et aéroacoustique, Hermès (2002).

## Teaching team

Fabien Anselmet (ECM)

Yannick Knapp (Université d'Avignon et Pays du Vaucluse)

## Sustainable Development Goal

Sustainable cities and communities

Responsible consumption and production

| **Total des heures** | | **24h** |
|---|---|---|
| CM | Master class | 16h |
| TD | Directed work | 8h |

# Useful info

## Name responsible for EU

### Lead Instructor

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