Aerodynamics

ECTS credits
1 credits

Semester
Fall

In brief

Course langage: French

Presentation

Learning objectives

In this aerodynamics course, the targeted skills and knowledge correspond to the minimum level required, either to interact with specialists in these fields or to deal with common classical problems on one's own, or to deepen this knowledge by reading specialized books or by participating in complementary specialized training.

Description of the programme

This module presents the so-called "thin wing" theory, which allows, in particular, thanks to simple tools which are derived from the theory of potential flows, to evaluate the lift of aircraft wings. On the other hand, the presentation by two representatives of the transport sector (automobiles and helicopters) of the most recent methods used in the industry makes it possible to clearly identify the hard points which prevent, in particular, from improving their performance even more. The huge difference in complexity between these two types of approaches justifies that only simplified tools can be presented in the course. These tools are nevertheless still used in aeronautics as part of feasibility and pre-dimensioning studies. This course is completed by an introduction to compressible flows and to the methods of resolution which make it possible to describe the discontinuities (or shocks) in a compressible flow.

Generic central skills and knowledge targeted in the discipline

- Know how to model and analyze an aerodynamic problem or multiphase flows, by choosing the most relevant level of modeling
- Master the modeling/numerical simulation methods associated with these types of situations
- Interpret experimental results

How knowledge is tested

Project: report writing, 50%.

Writing of practical Work reports, 50%.

Bibliography

1. Borghi, R., & Anselmet, F. (2013). *Turbulent Multiphase Flows with Heat and Mass Transfer (Fluid Mechanics)* (1st ed.). Wiley-ISTE.
2. Mailliat, A. (2012). *Les Milieux aérosols et leurs représentations*. EDP Sciences.
3. Paraschivoiu, I. (1998). *Aérodynamique subsonique*. Éditions de l'École polytechnique de Montréal.

Teaching team

Fabien Anselmet (ECM)

Malek Abid (AMU)

Pierre Boivin (CNRS-M2P2)

Sustainable Development Goal



Affordable and clean energy



Climate action

Total des heures		**24h**
CM	Master class	10h
TP	Practical work	6h
TD	Directed work	8h

Useful info