



## 2<sup>ND</sup> AND 3<sup>RD</sup> YEAR SPECIALISATION

# AERONAUTICS

Aeronautics must adapt to future requirements. On the one hand, growing demand from travelers for a fast, safe and economical means of transport, suggests that civilian air traffic will double by 2030-2040. On the other hand, growing public attention and sensitivity towards ecological and environmental problems is putting considerable pressure on the development of aeronautics.

In order to adapt, the aeronautics sector must respond accordingly to new challenges:

- > on a **scientific and technical** level, reducing the "environmental footprint" of civilian aircraft
- > on a **cultural** level, with the "nuclearisation" of this means of transport
- > on a **human** level, with specific training needs in new techniques and applications in aeronautics

The Aeronautical Specialisation provides general knowledge in the fields of aerodynamics, aeronautical materials and structures, allowing the Centralian engineer to contribute to the far-reaching future developments in aeronautics.



## COURSE CONTENT

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| <ul style="list-style-type: none"> <li>&gt; Gas dynamics</li> <li>&gt; Flight dynamics</li> <li>&gt; Introduction to numerical computation</li> <li>&gt; Aircraft structure modelling</li> <li>&gt; Inviscid aerodynamics</li> <li>&gt; Aircraft design and construction</li> <li>&gt; Turbulence modelling</li> <li>&gt; Aircraft propulsion</li> </ul> | <ul style="list-style-type: none"> <li>&gt; Project 1</li> <li>&gt; Aeroacoustics</li> <li>&gt; Structural dynamics</li> <li>&gt; Computational aerodynamics</li> <li>&gt; Passive safety of aeronautic structures</li> <li>&gt; Project 2</li> <li>&gt; Internship</li> </ul> |
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## INDUSTRY SECTORS

- > Aircraft construction (Airbus, Eurocopter, BAE Systems, Stelia Aerospace, Dassault Aviation, Saab Aerospace, MBDA)
- > Engine/Components manufacturers (Safran/SNECMA, Turboméca, Rolls-Royce, Techspace Aero, DAHER, GKN, Sagem)
- > Research and development (ONERA, CNES, DLR, MBDA, Ariane Espace)
- > Simulation (Thalès, Altran, Dassault Systems)
- > Servicing/Maintenance /Logistics (Airports, Supply chains)

## CAREER PROSPECTS

- > Trade/finance/logistics
- > Research/CFD
- > Engines
- > Materials/structures
- > Production
- > Design/flight testing

## DOUBLE DEGREE PROGRAMMES WITH:

- > University of Cranfield, Imperial College (GB)
- > Georgia Tech, Michigan, Pennsylvania, Minnesota Universities (USA)
- > KTH University (Sweden), Keio University (Japan), McGill University(Canada)
- > Politecnico di Milano (Italy), Delft University of Technology (Netherlands)

## TEACHING STAFF

**HEAD OF SPECIALISATION:**  
Guy Capdeville

### LECTURERS:

I. Calmet, L. Gornet, P. Rozycki, H. Oudin, L. Perret, P. Cosson, B. Conan, Ph. Blot (Industry), L. Paté (SNECMA)

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## EXAMPLES OF PAST R&D PROJECTS

- > Numerical modelling of the reduction drag of a wing with Gurney flaps.
- > Aircraft of VLA kind with hybrid engine.
- > Design of a propulsive system by MHD.
- > Aerodynamic design of an electric ULM.
- > Control of the boundary-layer separation close to a wing.
- > Flight simulation of a shaped hypersonic vehicle.
- > Trajectory optimization of a drone.

## EXAMPLES OF INTERNSHIPS UNDERTAKEN BY PREVIOUS STUDENTS

- > Improving comfort in Falcon aircrafts. (Dassault)
- > Analysis and definition of a sensor in the Soyouz world. (ArianeEspace)
- > Computation of aircraft structures by using NASTRAN, (AIRBUS)
- > Contribution to micro-gravity research effects (AIRBUS)
- > Implementation of a Java code for nozzle modelling (SNECMA)
- > Technical study of airport logistics (AIRBUS)
- > Design and study of a methodology to evaluate aircrafts noise (AIRBUS)

