



## Introduction

Design of a turbojet engine, with aerodynamic and mechanical specifications. Multi-disciplinary project organization.  
Keywords: turbojet engine, compressor, turbine, aerodynamics, thermodynamics, structural mechanics, ensemble dynamics

## Semester

S09

## Programme

## Learning Outcomes

- Formulate an engineering problem
- Use knowledge and know-how for the detailed design of a system

## Employment Sectors

## Requirements

## Assesment

Participation, written report and defense

## Option Website

## Additional Information

To begin with, thermodynamic cycle calculations are used to define the overall architecture of the reactor to provide the thrust determined during the aircraft project. A one-dimensional analysis then leads to the definition of the number of components constituting this engine. 'Zooms' on particular components are finally made to



## **PROPULSION AERONAUTICS**

**Lecturers:** Jérôme BOUDET, Laurent BLANC, Olivier DESSOMBZ

| Lecturers : 0.0 | TC : 0.0 | PW : 0.0 | Autonomy : 0.0 | Study : 0.0 | Project : 0.0 | Language : AN

### **Objectives**

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Design of a turbojet engine, with aerodynamic and mechanical specifications. Multi-disciplinary project organization.

**Keywords :** turbojet engine, compressor, turbine, aerodynamics, thermodynamics, structural mechanics, shaft dynamics

### **Programme**

The thrust determined during the aircraft project being specified, thermodynamic cycle calculations are used to define the overall architecture of the jet engine. A one-dimensional analysis then leads to the definition of the number of sub-components. 'Zooms' on particular components are finally made as practical and in-depth examples of expertise. For example:

- Detailed design of compressor stages, from 3D mechanical and aerodynamic simulations. Definition of a compromise between aerodynamics and mechanics.
- Analysis of the overall dynamics (tree, disks, links...).

### **Learning outcomes**

- Formulate an engineering problem.
- Use knowledge and know-how for the detailed design of a system.

### **Independent study**

**Objectifs :** Progress on design.

**Méthodes :** Simulations with different levels of fidelity.

### **Core texts**

N.A. Cumpsty, *COMPRESSOR AERODYNAMICS*, Krieger Pub, 2004  
B. Lakshminarayana *FLUID DYNAMICS AND HEAT TRANSFER OF TURBOMACHINERY*, John Wiley and Sons, Inc., 1996  
F. F. Ehrich *HANDBOOK OF ROTORDYNAMICS*, 2004

### **Assessment**

Participation, report and oral presentation.