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## 2SC5193 – Aircraft design

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**Department:** DOMINANTE - CONSTRUCTION VILLE TRANSPORTS, DOMINANTE - GRANDS SYSTÈMES EN INTERACTION

**Language of instruction:** FRANCAIS

**Campus:** CAMPUS DE PARIS - SACLAY

**Workload (HEE):** 40

**On-site hours (HPE):** 27,00

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### Description

The goal of this training is to let you discover the different stages of an aircraft design process in both a theoretical and a practical perspective. You will be introduced to the typical methods used in an aircraft design office, and apply this knowledge by doing the preliminary design of your own aircraft. After completing this training course, you will have acquired knowledge and skills that will enable you to work out the main aircraft characteristics and layout in a very short time frame.

### Quarter number

ST5

### Prerequisites (in terms of CS courses)

Have to follow the elective course "Airplane control".

### Syllabus

When a team commits to design a new aircraft or to modify an existing aircraft, the project will always follow the same pattern. The process starts by analyzing the market and existing products. Next is the conceptual design which is followed by the preliminary design and detail design before sending the drawings to the workshop which will build a prototype. Obviously, at each stage, several iterations are made as necessary before proceeding to the next stage. In the process, we will begin by a more global or synthetic approach of aircraft design before getting into more and more detail. We will go from a basic concept into full optimization, from using parameters derived from simple statistical data to using sophisticated algorithms.

### Grading

Evaluation will take place the last day of the course and include : an oral presentation to present your project and followed by a question and answer session.



## Resources

Teacher: industrial partner.

## Learning outcomes covered on the course

Student will learn how to:

- Define the layout and configuration of the new aircraft.
- Work out estimates for empty weight and maximum take-off weight.
- Compute wing loading.
- Work out estimates for lift and drag ✧ Work out performance estimates (take-off, climb, cruise, landing).
- Make an analysis of the aircraft's stability and control.
- Compute the applied loads ✧ Select the structural materials.
- Estimate the costs (design, manufacturing, operational).

Of course, the general concepts are not only valid for aircraft design but can equally be applied to the development of any other conceivable product or service.

## Description of the skills acquired at the end of the course

- Analyze, design and implement complex systems with scientific, technological, human and economic components (C1).
- Develop in-depth skills in a scientific or sectoral field and a family of professions (C2).
- Act, undertake and innovate in a scientific and technological environment (C3).
- Have a sense of value creation for his company and his customers (C4).
- Be operational, responsible, and innovative in the digital world (C6).
- Know how to convince (C7)