



**AUTOMOTIVE &  
AERONAUTICS  
DESIGN PROGRAMME**

STUDY IN ENGLISH, LIVE IN PARIS

# AN INNOVATIVE PROGRAM TO OPERATE NUMERICAL TOOLS, ALIGNED WITH INDUSTRIAL REQUIREMENTS

The modern aeronautical and automotive industries need engineers who know more than the traditional skills. They need to acquire the latest and most technologically advanced computer skills and to be able to work in an international environment.

## PROGRAM IN BRIEF

### Aim

Learn and operate CAE tools to design and fit aeronautical and automotive systems and subsystems.

### Program benefits

- Teaching faculty heavily involved in the industrial sector ;
- Work with industrially relevant computation software and methods ;
- Study in a multicultural environment.

### Skills acquired

- CAD design and FEM/CFD simulation ;
- Development of capacity to work in project mode ;
- Understanding of the role of numerical tools in a design process.

### Course break down

- Lectures ;
- Labwork ;
- Project team work.

### Academic period

- 4 months from January to May. ;
- 2 weeks of vacation to discover Europe or France.

**Language:** English

**Number of credits:** 30 ECTS



## A SHORT TRAINING TO BECOME QUICKLY OPERATIONAL

ESTACA offers a one-semester program in CAE and Design applied to the Aeronautical and Automotive sectors. The objective of this program is to provide students with the means of achieving high quality design, cost reduction and best time-to-market skills. Combining the training in CAE and its immediate application to a design project carried out in an international team, optimizes the training period for maximum results, after which the students are immediately operational.

**Benoit SAGOT**, program Director



## MODULES & PARTNERS

### COMPUTER AIDED ENGINEERING - 2 ECTS

Upon completion of this course, the student will be able to autonomously use the major features of the CATIA V5 solutions: part design and assembly design. An introduction to surface design is provided, for further use in interdisciplinary applications (CFD or FEM).

- Catia design and simulation (Labwork)

### SIGNAL PROCESSING - 4 ECTS

This course introduces signal processing basics: signal representation, classification of signals, standard functions such as Laplace transform, convolution, correlation. Fourier transform is introduced. Matlab labworks provide an opportunity to apply the concepts of sampling process, the Shannon theorem. Experimental sessions in the Acoustic department are planned to illustrate the fundamental principles and practical techniques such as FFT (Fast Fourier Transform).

- Signal Processing (Lecture)
- Matlab Labs (labwork)
- Exp Signal Processing (labwork)

### COMPUTATIONAL FLUID DYNAMICS - 5 ECTS

This course introduces the main key stages of producing an accurate CFD (computational fluid dynamics) simulation. The lecture is oriented to a simplified presentation of the finite volume method, together with an illustration of the different meshing strategies, to obtain a reliable simulation. Students will use the industrial software STAR-CCM+, with different case set-up for both automotive and aeronautics applications (winglet, car drag evaluation ...).

A lecture on heat transfer is provided, to develop the ability to conduct thermal analysis, for classical engineering applications.

- Computational Fluid Dynamics (Lecture)
- Matlab CFD (Labwork)
- CFD with STAR-CCM+ (Labwork)
- Heat Transfer (Lecture)

### HYDRAULIC SYSTEMS - 2 ECTS

This module provides a deep understanding into dynamic physical systems which are analyzed and designed by engineers. The labworks emphasize the key features for modelling multiphysics systems such as coupled thermo-hydro-mechanical application (car suspension, hydraulic piston pump ...).

- Hydraulic systems simulation (Labwork)

### STRUCTURAL DESIGN - 5 ECTS

This course presents the basic fundamentals and techniques of stress analysis, using real structural problems to illustrate the fundamental principles and practical techniques.

Labworks introduce this FEM methodology with Abaqus.

- Finite Element Method (Lecture)
- FEM Simulation with CATIA (Labwork)
- Dynamic Structure Analysis (exp. Labwork)

### TECHNICAL PROJECT - 8 ECTS

To experience team working and to develop analysis and synthesis skills necessary to project management applied to aeronautic or automotive domains :

- to improve technical and organizational skills ;
- to develop communication skills ;
- to develop ability to project ;
- to acquire an expertise in methodologies and software used in industries.

At the end of the project, groups are required to report and present findings.

- Project

### FRENCH LANGUAGE AND CULTURE - 4 ECTS

To improve students' oral and written proficiency in French language, and to give them a better knowledge and comprehension of French culture :

- basic written skills (grammar, spelling, writing) ;
- written comprehension (newspaper analysis, ...) ;
- listening comprehension (reports or films) ;
- oral expression (role plays, speech,...).

This course also aims to prepare students to the DELF exam.

- French Language and Culture (Lecture)



### A RICH EXPERIENCE AT ESTACA

The strong international focus, the diversity of opportunities as well as the excellent reputation as one of France's most renowned «Grande École d'Ingénieurs» were the main reasons for my decision. The combination of learning and operating CAE tools to design aeronautical and automotive systems and subsystems and its immediate application to an engineering design project is what makes the program so exciting and recommended. Most of the lecturers and professors come directly from industry and have years of experience in engineering. A French & Intercultural language class with fun excursions and activities in Paris is included in the program. Individual mentoring and high personal interaction with the lecturers was a welcome contrast to my current academic experience at the Technische Universität Berlin. In short, a semester at ESTACA Paris enriched me academically, culturally, and personally as well as offered me optimal conditions for a successful stay abroad in France.

**Long DINH,**  
Technische Universität Berlin student  
(Deutschland - AAD Program 2020)



## ONE YEAR IN FRANCE TO STUDY, EXPLORE, SHARE AND ENJOY

Engineering, interculturality, friendship, food, and French culture. The AAD program is this and more! On early 2020, I arrived to ESTACA with 8 other Purdue students. Excited to explore France again, I was unaware of the unique experience I was about to live. My first day I was surprised to see that I had AAD teammates from Mexico, Latvia, Germany, Korea, and many other places. During the day, I got to work close to them and our ESTACA professors, while in the afternoons we would hang out in the charming city of Paris. Living with a host family, allowed me to improve my French significantly, and even though the pandemic hit, I was determined to stay in this beautiful country. During the online period of my semester, I kept on learning about fluid dynamics, controls, and heat transfer, and I used the confinement as a way of developing an international collaboration called Project Polaris of which l'ESO (a student organization at ESTACA) is part. The faculty at ESTACA was very supportive and kind, and thanks to them I managed to do an internship at Paris in a startup called ThrustMe. After studying and working in France for a year, I can say that I truly cherish that opportunity and that I look forward to visiting ESTACA once again. Share, explore, and enjoy; that's my piece of advice!"

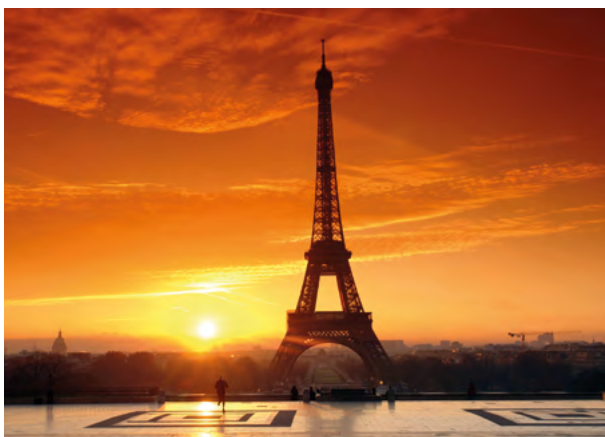
**Roy RAMIREZ,**  
student from Purdue University (USA - AAD Program 2020)

## ESTACA PARIS-SACLAY CAMPUS IN SAINT-QUENTIN-EN-YVELINES

Located west of Paris, 10 min. from « the Château de Versailles » and 30 min. from the Eiffel Tower, the ESTACA-Paris Saclay engineering school offers a wonderful environment for students on international programs. Opened in 2015, this campus is 5 min. from the station Saint-Quentin-en-Yvelines, a town with ideal facilities for students in terms of accommodation, university restaurant, sports, culture, etc.

Saint-Quentin-en-Yvelines, located in the Paris-Saclay cluster, is the second economic hub west of Paris, and houses a great deal of industries in the transport sector and academic and scientific partners involved in the transport and mobility sectors.

Many French «Grandes Écoles» and universities have set up there and are part of the Université Paris-Saclay, of international reputation, forming the training and research pole of the Paris-Saclay technological cluster, Silicon Valley «à la française».



One of my favorite aspects of the AAD program was the diversity of experiences. I had originally applied to the program hoping to learn engineering through a cross cultural lens, however, after attending ESTACA for the few months I was there, I gained so much more. The AAD program not only gave me a space to collaborate with students from all over the world, but it also presented a design focused curriculum unique to any courses I had taken before. While at ESTACA, I was able to develop my French language skills, learn about French culture, apply my engineering knowledge in a more practical environment, learn from a great group of professors, make new friends from a wide variety of backgrounds, and explore France and Europe with all the wonderful people I met! I had a wonderful experience at ESTACA and would highly recommend the AAD program to anyone considering applying.

**Caroline DUEMLING,**  
Purdue University (USA - AAD Program 2020)

# ESTACA GRADUATE ENGINEERING SCHOOL

Founded in 1925, ESTACA is a member of ISAE group, 1<sup>st</sup> world cluster in aerospace training and research. ESTACA is highly specialized in the fields of aeronautics, automotive, space, railway and naval industries.

The training courses constantly evolve to meet the requirements of companies and adapt to the emergence of new technologies or disciplines. ESTACA's graduates undertake the design, development and production of transport systems and components. The industry has ranked ESTACA among the best engineering schools for its expertise in the transportation fields.

## ESTACA IN FIGURES

### 3 campuses

ESTACA Paris-Saclay, ESTACA Laval and ESTACA Bordeaux

### 420 graduates

per year

### 2,300 students

### 10,000 alumni

### 2 research

teams

## ISAE IN FIGURES

Group of the 6 most prestigious French engineering programs in Aerospace: ENSICA, SUP'AERO, ENSMA, Ecole de l'air et de l'Espace, ENAC, ESTACA

### 5,500 students

at a high scientific level in aerospace

### 550 doctoral

students

### 68,000 alumni

### 150

foreign partner universities



The AAD programme is a rundown of advanced engineering modules, a perfect opportunity to broaden your scope of understanding or to find out what you want to specialize in. Over the course of the semester we became good friends in the class despite our differing backgrounds. The professors are reasonable and flexible, which allowed us to make the best out of our stay. And last but not least, we made friends with the international office and with the French students.

**Miroslav SOSKA,**  
student from Southampton University  
(UK - AAD Program 2021)

# PRACTICAL INFORMATION

## SCHEDULE

This total length of this program is 18 weeks, with two weeks of vacation during the period.  
It starts at the beginning of the last week of January, and finishes at the end of May.

## ELIGIBILITY

This program is open to all foreign students holding a bachelor Degree or having completed two years of studies in an Engineering degree. Applicants should have English language proficiency (TOEFL iBT 79-TOEIC 785-IELTS 6.0).

## CERTIFICATE OF COMPLETION

A certificate of completion (30 ECTS) will be given to students who complete the entire program.

The academic performance is assessed according to exams, project evaluation, reports, attendance and class participation.

## TUITION FEES (for free movers only)

4,000 euros

## ADMISSION PROCESS

Application available on the website: <http://www.estaca.fr>

Deadline for application: 15th of october



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### For more information

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