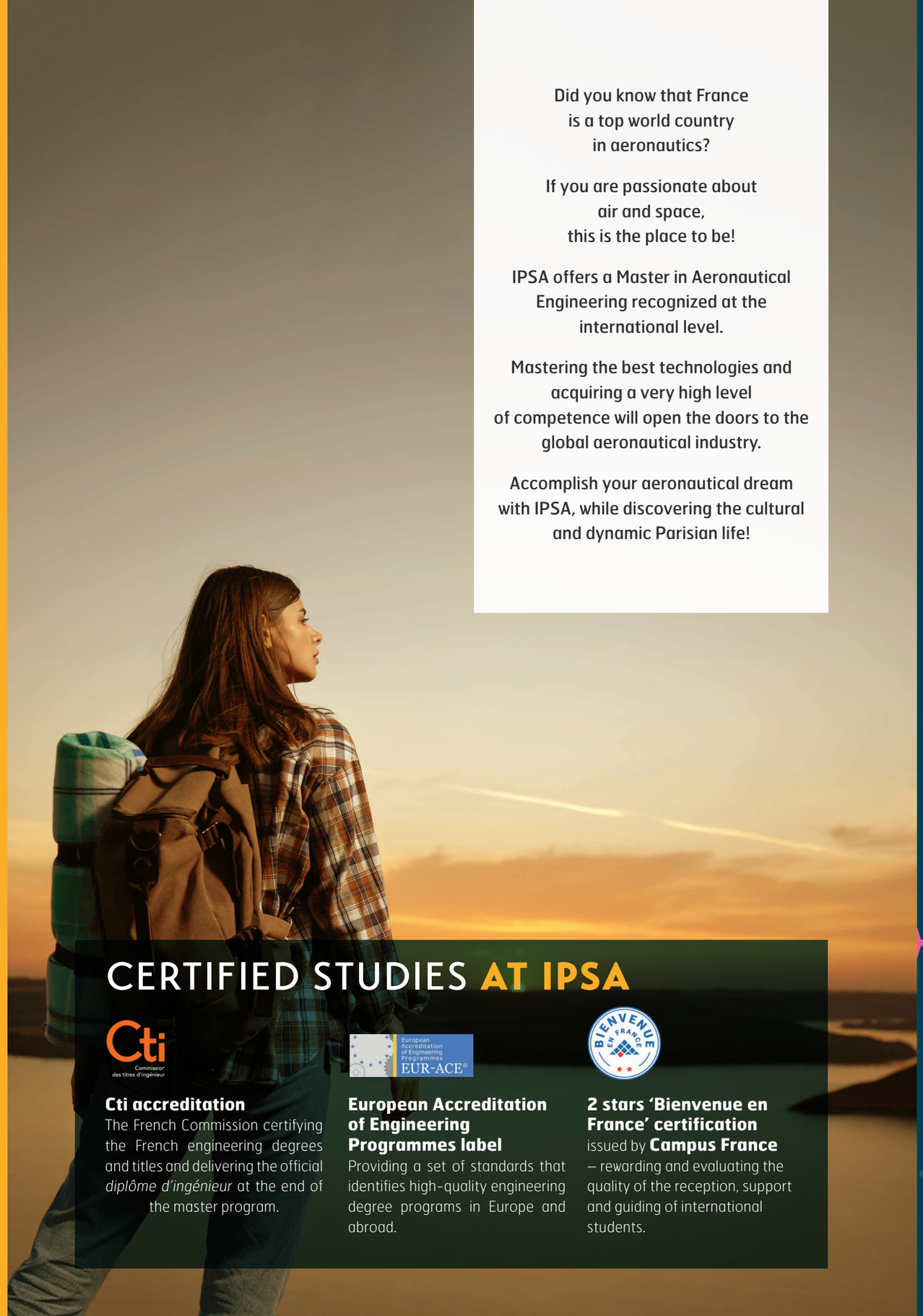
IPSA
AERONAUTICS
SPACE AND SUSTAINABLE MOBILITY

MASTER IN AERONAUTICAL ENGINEERING

Polytechnic Institute of Advanced Sciences / School authorised to award the title of engineer

This school is a member of the IONIS EDUCATION GROUP



Did you know that France
is a top world country
in aeronautics?

If you are passionate about
air and space,
this is the place to be!

IPSA offers a Master in Aeronautical Engineering recognized at the international level.

Mastering the best technologies and acquiring a very high level of competence will open the doors to the global aeronautical industry.

Accomplish your aeronautical dream with IPSA, while discovering the cultural and dynamic Parisian life!

CERTIFIED STUDIES AT IPSA

Cti accreditation
The French Commission certifying the French engineering degrees and titles and delivering the official *diplôme d'ingénieur* at the end of the master program.

European Accreditation of Engineering Programmes label
Providing a set of standards that identifies high-quality engineering degree programs in Europe and abroad.

2 stars 'Bienvenue en France' certification
issued by **Campus France** – rewarding and evaluating the quality of the reception, support and guiding of international students.

IPSA, WHERE THE AERONAUTICAL ENGINEERING DREAM COMES TRUE

IPSA (Institut Polytechnique des Sciences Avancées) is a **Graduate School of Engineering specialized in Air, Space and Sustainable Mobility,** offering a 5-year syllabus 100% dedicated to Aeronautics and Space. The interest in 'everything Aerospace' is a particular source of motivation for the School and the passion is shared by both students and lecturers.

Since its creation in 1961, IPSA has been driven by the constant concern to match the training provided to students with the needs of companies. Thus, IPSA's **Master in Aeronautical Engineering** is composed of majors and specializations which constitute the basics of acquiring and deepening essential and solid knowledge in this field. This program is continuously evolving and is updated under the guidance and work of the School's Development Department.

The ***diplôme d'ingénieur,*** equivalent to a master's degree in Aeronautical Engineering awarded by IPSA certifies graduates' ability to tackle any problem related to aeronautics and space. IPSA training also allows graduates to work in related advanced fields of aeronautics and space, particularly in land transport, which uses techniques and technologies similar to those used in aeronautics.

IPSA IN FIGURES

2 COURSES
Master of Engineering
Bachelor of Engineering

2 CAMPUSES
Paris, Toulouse

2.500 STUDENTS

+110 PARTNER UNIVERSITIES
all over the world

800 PARTNERSHIPS
with leading companies

80 STUDENT ASSOCIATIONS

5.000 GRADUATES in key positions in companies

WHY STUDY AT IPSA, IN FRANCE ?

#1

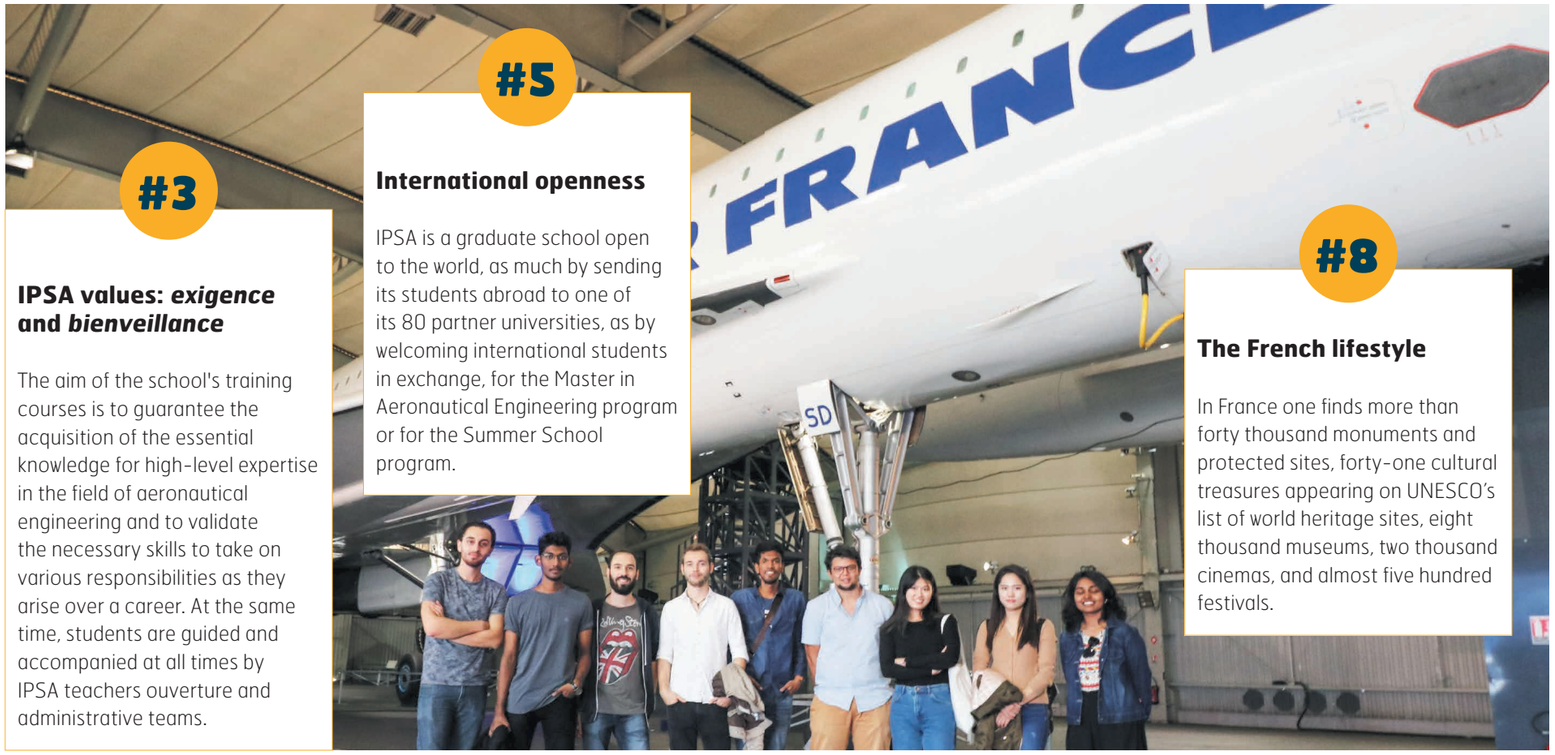
Innovation: the quality of an engineering formation à la française

France is unique by its engineering education system. Graduate Schools of Engineering must update continuously their curriculum and the quality of the trainings they provide in order to receive a Cti accreditation.
By completing the master program, IPSA students are rewarded with a *Diplôme d'ingénieur* issued by the Cti.

#2

Passion for space and aeronautics since 1961

Founded in 1961 by a group of aeronautical engineers and integrating IONIS Group very quickly afterwards, IPSA has distinguished itself from engineering schools by its curriculum focused mainly on the field of aeronautics and space from the beginning. The passion for aeronautics and space is transmitted from teachers to students. From their first year at IPSA, students get familiar with the aeronautical environment and become more and more specialized every year.



#3

IPSA values: *exigence* and *bienveillance*

The aim of the school's training courses is to guarantee the acquisition of the essential knowledge for high-level expertise in the field of aeronautical engineering and to validate the necessary skills to take on various responsibilities as they arise over a career. At the same time, students are guided and accompanied at all times by IPSA teachers ouverture and administrative teams.

#5

International openness

IPSA is a graduate school open to the world, as much by sending its students abroad to one of its 80 partner universities, as by welcoming international students in exchange, for the Master in Aeronautical Engineering program or for the Summer School program.

#8

The French lifestyle

In France one finds more than forty thousand monuments and protected sites, forty-one cultural treasures appearing on UNESCO's list of world heritage sites, eight thousand museums, two thousand cinemas, and almost five hundred festivals.

#4

Career opportunities

Having a developed network with more than 700 companies and an alumni association, IPSA creates an environment and multiple connections that propel students into the aeronautical future.

#6

France, an attractive destination for international students

France is among the top five hosts of international students and the leading French-speaking host.

#7

A certification system that highlights excellence in international student services

The "Bienvenue en France" label recognizes educational institutions that provide high-quality support services for international students.

FRENCH KNOW-HOW IN AERONAUTICS

French aeronautics and space industry is number one in Europe for the production of civil and military airplanes and helicopters: Airbus, Falcon, Mirage, Rafale, Vulcain, and more. The nation's rocket engines are also renowned, as are its launching systems, satellites, and the navigation systems used on Ariane rockets. The European Space Agency (ESA) has its headquarters in Paris and liaison offices in Brussels, Moscow, Washington, and Houston, as well as an office in the European space port in French Guyana.

France is the world's second-largest exporter of aeronautics (after the United States and ahead of Germany); in Europe, it plays a pivotal role in aeronautical assembly. Flagship programs have earned the nation's aeronautics industry world-class status. These include the Ariane rocket (the generic designation for a family of European satellite launch vehicles), the Airbus A380 consortium, and the Rafale fighter aircraft.

Source: Campus France, 2019

IPSA's Master in Aeronautical Engineering fully meets the future expectations of French and world's industry in the aeronautical field.

THE MASTER IN AERO NAUTICAL ENGINEERING

The Master in Aeronautical Engineering is a full-time 2-year program starting every year in September and taking place in the Parisian Campus (Ivry-sur-Seine).

Are you passionate about aircraft and the future of aerospace?
Are you a bachelor graduate in Aerospace Engineering, Mechanical Engineering, Electrical and Electronic Engineering, Mechatronic Engineering or related fields?
If the answer is yes, this master program is for you !

OBJECTIVES

The teaching program provided by IPSA is constructed in order to meet the needs of companies in the aeronautical and space sector and to adapt to new energy management issues and sustainable development issues.

IPSA training aims to give its students the essential scientific and technical knowledge necessary for a first job in a company in the aeronautic sector. An important component of teaching also concerns humanities, business sciences and English in order to broaden the scope of skills of IPSA future engineers.

2 MAIN OBJECTIVES

The possibility for IPSA students to occupy various positions within a company (Research and Development, Systems Projects, Production, Manufacturing, Maintenance and Logistics Support, Implementation and Operation of operational systems, Tests, Quality etc.)

Exercising a profession in cutting-edge fields related to aeronautics and space but also to other fields of application (land and sea transport, energy etc.)

Through the training provided, students acquire a solid scientific and technical culture, and develop their ability to work in a team through projects and compulsory internships.

LEARNING APPROACH

The master program is based on a balance between academic and practical activities: lectures, tutorials, seminars, design consultancy, projects related to industrial environments and internships.
The student is the main actor in their training by choosing a major and different options allowing them to personalize their courses and obtain expertise in a field of their choice.
Business conferences and international openness provide additional skills in building student's critical thinking and ability to make decisions.

LANGUAGE

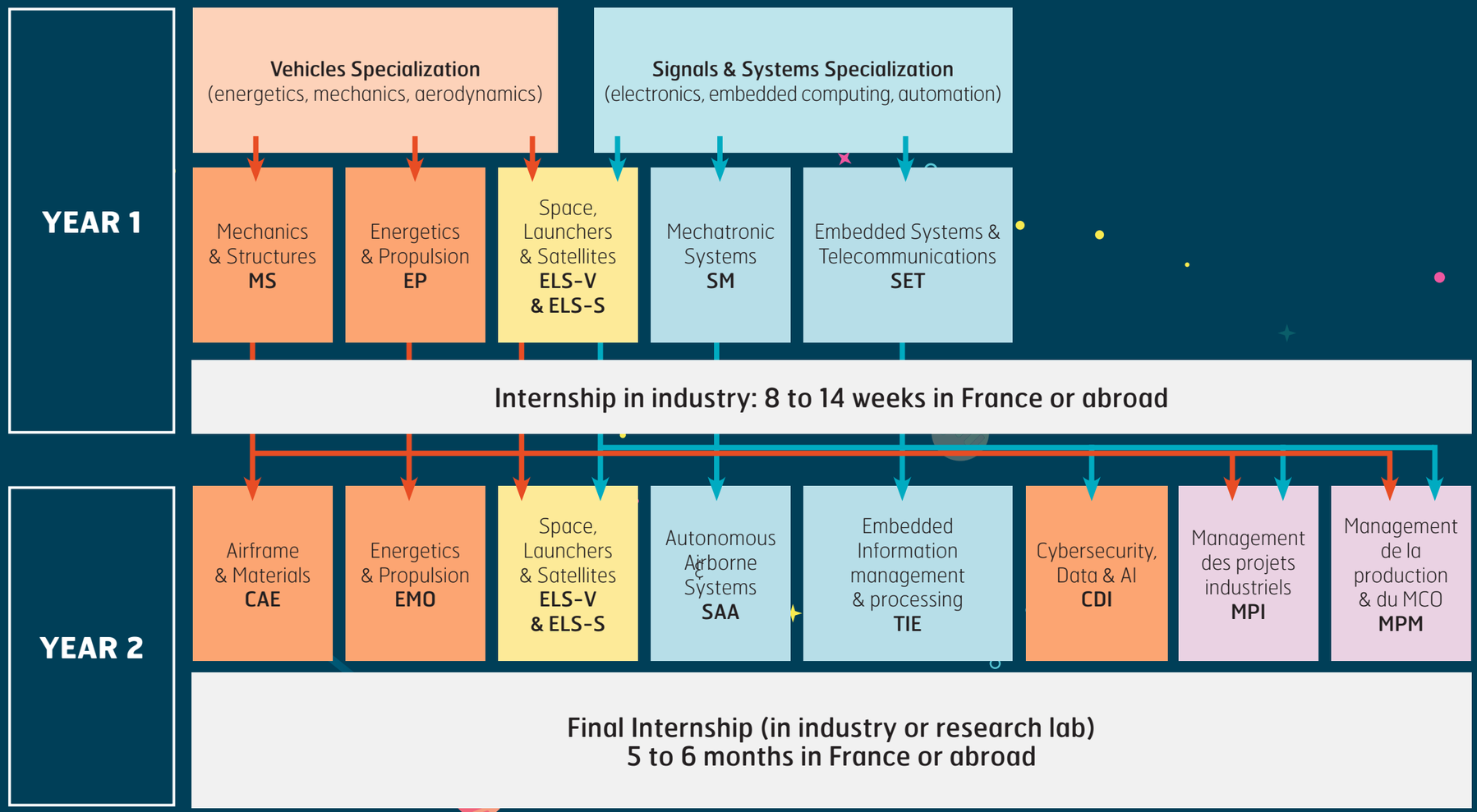
The master is mainly taught in English.
Some courses are taught in French from the second semester.
All along the master program, students benefit from intensive French language courses as they must reach B2 level in French at the end of the study years in order to obtain their degree.

THE CURRICULUM

4 semesters of 30 ECTS each
2 majors : Vehicles and Signals & Systems

In the first semester, students choose one major guided by the professors and according to their previous formation.
In the second semester each student chooses among 5 options of study, according to their major.
In the third semester each student chooses among 8 options of study, according to their major and their previous option choice.

The master includes 2 internships: the first internship takes place at the end of the first year and lasts 4 weeks minimum. The second internship takes place in the last semester and it lasts 6 months. It will most likely lead the student to his first job.



SEMESTER 1

Cultural integration	French language program for engineers Intensive French language courses Getting over culture shock and going beyond national stereotypes
Common core	Bioinspired Algorithms with Applications in Control and Design of Dynamical System Linear & Continuous Systems Design Introduction to 3D Printing Environmental humanities Systems Engineering
Vehicles Major	Introduction to Mechanical Vibrations and Structural Dynamics Numerical techniques for resolving PDEs Real Fluid Dynamics Climate Engineering Introduction to CFD
Systems Major	Digital Control System Design Aerodynamics : incompressible fluid dynamics Aerodynamics : compressible fluid dynamics Microcontrollers and their applications Advanced Mathematical tools for Data Science and Decision Making - Data Science Project

SEMESTER 2

Cultural integration	French language programme for engineers	
Common core	Engineering sciences Electives modules Introducing Project to Research or Innovation (PIRI) Human Sciences Business exposure	**Electives :** • Introduction to Machine Learning • Operational Research (in FR) • Observational technics in Astrophysics • Radar signal processing: radar detection and tracking • And others **PIRI :** • Use of nuclear fuel and radioisotopes for space missions • Machine Learning - applications • The Smart 3D Metrology Digital Ecosystem • Radiation protection during a thermal nuclear propulsion spaceflight • And others
Vehicles Major	Fluids dynamics Numerical calculations in mechanics and structures (FEM) Energetics and sustainable design Plates and Hulls Theory	**EP:** Turbomachine design, thermal motors for drone & light aircraft, Nuclear energy and propulsion, Aeroacoustics **MS:** Aircraft structures design, Composite materials, CAD CATIA, Behavior law for materials **ELS:** Space mechanics, Space optics, Plasma physics and propulsion
Systems Major	Complex information systems modelling Real time systems Embedded networks Physical approach to aeronautical automated systems Introduction to Machine Learning	**SET:** Advanced applications of RPGA circuits, Telecommunications, Microwaves and waveguides, Distributed Artificial Intelligence **SM:** Power electronics in aeronautics, Introduction to robotics, Power electronics and actuators, Distributed Artificial Intelligence **ELS:** Space mechanics, Space optics, Plasma physics and propulsion
Summer industrial internship	4-14 weeks	

SEMESTER 3

Common core	Human Sciences Corporate knowledge Master project IPSA	**Master projects examples :** • Modelling of clamp tightening on composite hydrogen storage vessel • Study of composite hydrogen storage tanks • Path planning algorithms for autonomous vehicles • The Nuclear Energy in the Space Exploration • Design of a complete "green" mobility hub (in FR)
Vehicles Major	Hypersonic aerodynamics introduction Reliabilty & fatigue of structures Computational Fluid Dynamics (CFD) Reliability and fatigue of structures Airborn and ground payload Cost management Supply chain Project management	**EMO :** Turbine engines, Combustion, Aeroaccoustics, Turbulences, Alternatives energies propulsion **CAE :** Vertical flight, Calculations of structural materials, Finite Element Method (FEM), Multi-body mechanical simulation, Nonlinear numerical simulation in structural mechanics **ELS :** Satellites design, Launchers design, Space propulsion systems, Payload integrationa and launchers **MPI :** International negotiations, Management control, Risk analysis, Business management simulation **MPM :** Supply chain, Quality management, Production management control, Stock management, Airworthiness
Systems Major	Aircraft modelling Deep Neural Network & Deep Learning Deterministic systems & stochastic observers (Kalman filter) Systems design & fast prototyping Cost management Supply chain Project management	**TIE :** Real-time Embedded systems, Embedded systems: image processing with FPGA, High Performance GPU Computing techniques, Electromagnetic compatibility & antennas, Airborne sensors, and data transmission **SAA :** Artificial intelligent control, Intelligent systems, Drones & visual servoing, Nonlinear systems control **ELS :** Satellites design, Launchers design, Space propulsion systems, Payload integration and launchers **CDI :** Cybersecurity, Data & AI **MPI :** International negotiations, Management control, Risk analysis, Business management simulation **MPM :** Supply chain, Quality management, Production management control, Stock management, Airworthiness

SEMESTER 4

Final 6-month internship monitored by IPSA and final presentation on-campus in front of the Graduate Committee

MULTIDISCIPLINARY RESEARCH ENVIRONMENT

At the crossroads of the industrial and academic worlds, research is one of the fundamental triggers of IPSA pedagogy. IPSA places innovation at the heart of its engineering training with its research laboratories encompassing the diverse fields of aerospace.

RESEARCH ACTIVITY AT IPSA TARGETS 4 MAIN GOALS:

1

To train and mentor students in order to enhance their innovation abilities through fundamental and applied research activity provided by faculty members. More specifically, an Initiation to Research and Innovation Program provides a gradual framework to support students at the Master level. The main objectives are an introduction to research methodology on a particular topic and engaging in a first supervised research or R&D (in companies) project during the last academic semester.

2

To pass on the scientific and technological skills and expertise of the faculty members within the educational programs. This is conducted through the active participation of faculty members and researchers in the updating and upgrading of the programs and the mentoring of innovative projects carried out by technical student associations within IPSA's Student Lab.

3

To contribute to the production and development of knowledge through applied research in the fields of aeronautics and space (publications in scientific journals, participation in major scientific events, project management).

4

To access networks where the pooling of resources is to the benefit of all, owing to partnerships with the industry, universities or schools and institutions.

IPSA LABORATORIES :

- Laboratory of autonomous aerial systems - LS2A
- Laboratory of intelligent systems - LS2I
- Laboratory of aerodynamic testing and modelling – LEMA
- Laboratory of thermics and thermodynamics - L2TI
- Laboratory of mechanics of materials and structures - L2MS
- Laboratory of numerical simulation and computing – LSNC

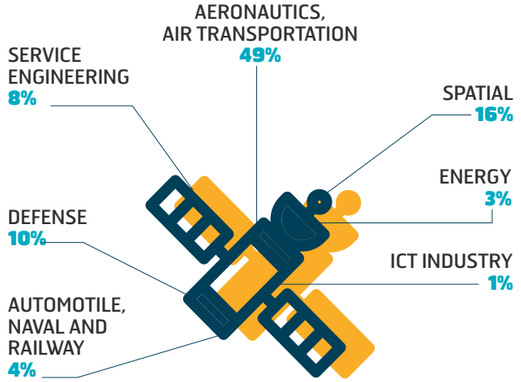
READY TO JOIN IPSA RESEARCH TEAM?

LIFE AFTER IPSA: MAKING A CAREER OUT OF THE AERONAUTICAL PASSION

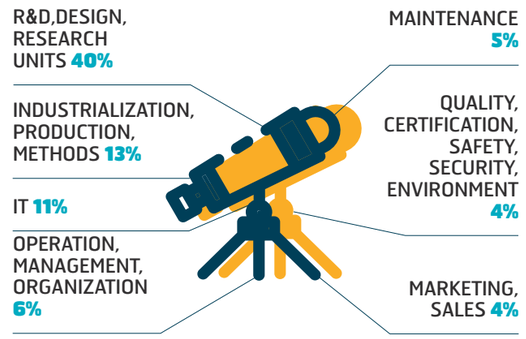
Since its creation more than 60 years ago, IPSA has maintained strong relations with the aerospace industry. Boosted by a network of Alumni occupying key positions in large companies in the sector, the school is recognized as a reference by professionals of this field.

Alumni Association: alumni.ipsa.fr

COMPANIES' BUSINESS SECTORS



GRADUATES' FIELDS OF ACTIVITY



TOP COMPANIES

- ABYLSEN
- ACCENTURE
- AÉROPORTS DE LA CÔTE D'AZUR
- AÉROPORTS DE PARIS
- AIR CARAÏBES
- AIR FRANCE
- AIRBUS
- AKKA TECHNOLOGIES
- ALSTOM
- AMAZON
- ARCELLORMITTAL
- ARIANEGROUP
- ARMÉE DE L'AIR ET DE L'ESPACE
- ATR AIRCRAFT
- AVIONS MAUBOUSSIN
- CAPGEMINI
- CEA
- CNES
- COLLINS AEROSPACE
- CS GROUP
- DAHER
- DASSAULT AVIATION
- DASSAULT SYSTÈMES
- DIRECTION GÉNÉRALE DE L'ARMEMENT
- DRONE VOLT
- EDF
- ENGIE
- EUROCONTROL
- EUTELSAT
- FAURECIA
- FORTIL
- GAMA
- INGELIANCE TECHNOLOGIES
- LATECOERE
- LIEBHERR AEROSPACE
- MICHELIN
- MI-GSO
- NEXTER
- NIMROD TECHNOLOGIES
- NORAUTO
- ONERA
- OPUS AEROSPACE
- PSA PEUGEOT-CITROËN
- RATP
- RENAULT
- SAFETY LINE
- SAFRAN
- SERMAT
- SETEC
- SIEMENS
- SII GROUP
- SIRIUS SPACE SERVICES
- SNCF
- SOPRA STERIA
- STELIA AEROSPACE
- TARMAC AEROSAVE
- TELESPAZIO
- THALES
- TOYOTA
- TRANSAVIA
- TUNISAIR
- TURGIS & GAILLARD INDUSTRIE
- UNISTELLAR
- VALEO
- VEOLIA
- VINCI

PROFESSIONAL INSERTION, FIRST JOB IN AERONAUTICS & SPACE

- 89% of 2022 graduates found their first job within two months after obtaining their degree
- 65% of them work in the aeronautics and space sector, some graduates have created their own companies

STUDENT LIFE À LA FRANÇAISE

The passion and the dynamism of IPSA students (IPSAliens) materialize through student associations. Whether they are cultural, sports or technical clubs, students lead innovative, sometimes ambitious projects, where technological venture is at stake. Design and launch of rockets or drones, construction of a full-size flight simulator for a Boeing 777, pilot training, model airplanes, but also music, team sports, video and many other activities either at a local, national or international level... IPSA student life is full of passion.

80 ASSOCIATIONS

Every student finds their place at IPSA, because associations are numerous and reflect, by their diversity, the multiplicity of student profiles :

TECHNICAL
IPSA VEGA, IPSA Flight, IPSA Space Systems, Aero IPSA, I-TECH, IPSA novation, Mach 0.1, IPSA Aero RC, IPSA One etc.

LEISURE AND CULTURE
BDE (Bureau des elèves), BDA (Bureau des Arts), Dreamage, IPS'Airsoft

PROFESSIONAL LIFE
IPSA Consult, ISA (International Student Act)

SPORTS
BDS (Bureau des Sports), IPSA KART, IPSA Para, BOULIP'S, IPSA Wax

HUMANITARIAN
STUD'Act

BUDDY SYSTEM

Every international student has an IPSA buddy (student) that shows them around and helps discover and get familiar with the French academic and cultural life.

ACCOMODATION

IPSA doesn't have dormitories. However, IPSA has an online platform to help students find accommodation : logement.ipsa.fr
This platform gives access to a wide selection of offers from residences and private owners. It also gives access to a multilingual team available 6 days a week to help with the documents, the financial help, etc.
The IPSA buddy is there to help the student as well.
Finding an accommodation in Paris can be quite difficult, especially at the beginning of each semester.
IPSA does recommend searching for an accommodation as early as possible.

JOIN IPSA MASTER IN AERONAUTICAL ENGINEERING !

ELIGIBILITY

The Master in Aeronautical Engineering is open to international candidates holding a 3-year bachelor's degree (or equivalent) in Aerospace Engineering, Mechanical Engineering, Electrical and Electronic Engineering, Mechatronic Engineering or related fields.

ONLINE APPLICATION

All documents must be in French or English, in PDF format.
- Curriculum Vitae
- Official university transcripts
- Certified copy of the bachelor's degree
- 2 letters of recommendation
- Copy of passport
- English proficiency certificate: TOEFL 79, TOEIC 785, IELTS 5,5 or Cambridge BULATS record results
- Copy of ID photo
- Statement of purpose
- Proof of payment of 110€ for the application fee by Flywire. Click here to make your payment.

Application documents must be sent to freemover@ipsa.fr
The eligible candidates will be invited to an **online interview**.

APPLICATION DEADLINE: MAY 31ST

CONTACT

IPSA

63 bis boulevard de Brandebourg - 94200, Ivry-sur-Seine

freemover@ipsa.fr

IPSA is located in the South East of Paris. It is easily accessible by road and public transports.

ipsa.fr

ipsa.ecole | ecole.ipsa | IPSA | @IPSA | ipsaOfficiel | ipsa.ecole

ABOUT IONIS EDUCATION GROUP

Founded in 1980 by Marc SELLAM, IONIS Education Group has today become the leading private-sector higher education group in France. The 29 schools and entities it comprises in 27 cities across France and abroad bring together almost 35 000 students in the fields of business, marketing, communication, management, finance, data-processing, computing, digital applications, aerospace, energy, transport, biotechnology, innovation and e-sports ... IONIS Education Group's mission is to craft New Intelligence for Enterprise, both today and in the future. The principle values instilled in the Group's future graduates are an outward-looking international perspective, a keen awareness of the import of innovation and an entrepreneurial mindset which embraces adapting to change. It is these values which will turn them into key actors in tomorrow's economy, joining ranks with our Alumni networks which already represent over 100 000 members.

https://www.ionis-group.com/