

## Aerospace Engineering courses at Sapienza

The long tradition of Sapienza University in the field of aerospace education dates back to the establishment in 1926 of the School of Aeronautical Engineering, which offered postgraduate training to a limited number of engineers.

The subsequent expansion of the aerospace industry, and of activity in the sector, made it necessary to provide a more complete structure of teaching devolved to a wider range of users; this led in 1980 to the establishment of a 5-year degree course in Aeronautical Engineering, within the Faculty of Engineering. In 1990, teaching in the space sector was introduced alongside aeronautics, and the degree course was given the new name of Degree in Aerospace Engineering. Today, the programmes include a three-year combined aeronautics and space engineering course (**Degree in Aerospace Engineering**) and two separate Graduate Degrees: one in **Aeronautical Engineering** and the other in **Space and Astronautical Engineering**.

Typically, the teaching offer at Sapienza is based on **interdisciplinarity** that reflects technological developments in aerospace over recent decades, as well as the particular characteristics of the industry, where multidisciplinary skills are increasingly recognized as an added value .

**Internationalisation** is another special feature of our courses, which offer the possibility to spend 1-2 semesters at the most important European schools of Aerospace Engineering, via the ERASMUS transfer programmes and the PEGASUS network.

Within the Degree Courses, our students take part in **international activities** such as the Design/Build/Fly (DBF) competition that takes place every year in the U.S., where the world most important aeronautical schools are represented and where Sapienza has regularly obtained prestigious results.

Similarly, in the space field our students have taken part in the European Student Moon Orbiter (ESMO) project promoted by the European Space Agency.

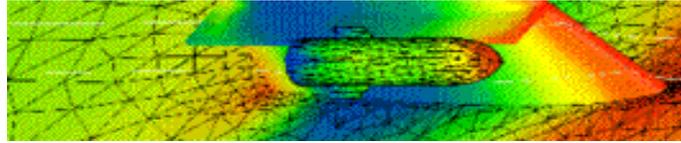
The main **career prospects** for Aerospace Engineering graduates are in the aeronautical and space industries, air transport service companies, national and international research agencies, space agencies, and universities.

Additionally, thanks to the general character of the training given, other career opportunities are found in the engineering-related sectors. The job locations may be regional, national or, more and more often, anywhere in Europe.

Further information about the teaching offer, how to enroll on the courses, and social opportunities for students, is available online at [www.ingaero.uniroma1.it](http://www.ingaero.uniroma1.it), along with other information about the research topics on which the faculty staff are engaged.

Within the Degree Thesis, the Masters, and the PhD courses, the students can take part in international research programmes that have achieved highly significant outcomes, for instance by contributing to the structural and propulsion design of the VEGA European launcher, or participating in the Mars Express, which proved the existence of water on Mars, and the Cassini-Huygens missions, which discovered an ocean below the surface of Titan.

The report Thomson Reuters **2015 State of Innovation** in the Aerospace & Defense, places the Sapienza in 3rd place in the world and the 1st in Europe among the **most influential Scientific-Research Institutions in Aerospace (2004-2014)**.



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## Academic Council of Aerospace Engineering

1350 students

120 graduates/year [Degree]

60 graduates/year [Graduate Degrees]

60 specific courses in this sector

40 tutors in the aerospace sectors

### Degree Courses

- Bachelor Degree in Aerospace Engineering
- Master of Science Degree in  
Aeronautical Engineering
- Master of Science Degree in  
Space and Astronautical Engineering

### Level 2 Masters

- Space Systems and services
- Space Transport systems:  
Launchers and re-entry vehicles
- Civil aviation management

### Research PhD

- Aeronautical and Space Engineering



SAPIENZA  
UNIVERSITÀ DI ROMA

Master of Science Degree in

Aeronautical Engineering

2016 - 2017

**The Graduate Degree Course in Aeronautical Engineering** offers the student advanced disciplinary and professional training, alongside specific engineering skills that enable them to address complex problems requiring the analysis, development, simulation, and optimisation of the various components of a fixed or rotating wing aircraft.

Teaching focusses mainly on the most advanced investigative and design tools and on innovation in the aeronautics industry, with particular reference to improving efficiency, weight reduction, and reducing chemical and noise pollution.

In terms of methodologies and applications, the two years of the Graduate Degree Course further develop the solid body of knowledge acquired in the Degree Course.

Year 1 which is shared by all the curricula, consolidates the student understanding of the typical sectors of aeronautical engineering and covers the basics of telecommunications, automation, and electronics, which are not addressed in the three-year Degree Course in Aerospace Engineering.

Year 2 offers two different curricula one of which deals with disciplines (aerodynamics, propulsion, and structures), and the other deals with topics (flight systems and air transport).

The Graduate Degree Course in Aeronautical Engineering belongs to an Italian-French network that provides for reciprocal recognition with other selected universities and Grandes Ecoles in Paris, Grenoble, Toulouse, Nantes, and Nice.

CAREER PROSPECTS

**Companies**

- AgustaWestland
- Aerosekur
- Airbus
- Alenia Aeronautica
- Alitalia
- Avio
- Carlo Gavazzi
- ELV
- Nuovo Pignone
- Selex ES
- Sitael
- Telespazio
- Thales Alenia Space
- Vitrociset
- Vulcanair

**Management companies**

- Aeroporti di Roma
- Alitalia C.A.I.
- Meridiana
- Sea

**Regulatory bodies**

- ENAC
- ENAV

**Research centres**

- CIRA
- CSM
- INSEAN
- VON KARMAN INSTITUTE

**Curriculum: Flight systems and air transport**

Students selecting this curriculum are training to the understanding of various disciplines (aerodynamics, mechanics of flight, automation, robotics, and electronics) to solve problems relating to the flight and ground segments of the air transport system.

The graduate will be a systems engineer operating in a scenario that integrates telecommunications, navigation, surveillance, on-board systems, flight simulation, and airport technical installations, in the technological aspects of aircraft management and air traffic control.

Year 1	Year 2
<i>Semester 1:</i>	<i>Semester 1:</i>
• Control systems	• Artificial intelligence I
• Gasdynamics	• Aircraft aerodynamics and design
• Aircraft structures	• Aircraft guidance and navigation
<i>Semester 2:</i>	• Airport infrastructure
• Air traffic control	• Aeronautical electrical systems
• Aircraft flight dynamics	• Digital control systems
• Aircraft engines	• Helicopter flight mechanics
	<i>Semester 2:</i>
	• Environmental impact of aircraft engines
	• Air Traffic control



The course is taught in English.

**Curriculum: aerodynamics, propulsion, and structures**

Criteria and techniques for designing aircraft engines, along with understanding of the tools for determining the performance of propulsors are imparted in this curriculum. The student will acquire the ability to use theoretical, numerical, and experimental methods for the analysis and aerodynamic design of a complete aircraft or its components.

The graduate will be an engineer specialised in the numerical, theoretical, and experimental analysis of aeronautical materials and structures, possessing technological, design and construction skills relating to fixed and rotating wing aircraft.

Year 1	Year 2
<i>Semester 1:</i>	<i>Semester 1:</i>
• Control systems	• Aircraft aerodynamics and design
• Gasdynamics	• Computational aerodynamics
• Aircraft structures	• Experimental aerodynamics
<i>Semester 2:</i>	• Noise and vibration control
• Air traffic control	• Combustion
• Aircraft flight dynamics	• Experimental testing for aerospace structures
• Aircraft engines	• Turbulence
	<i>Semester 2:</i>
	• Aerospace materials
	• Aeroelasticity
	• Computational gasdynamics
	• Environmental impact of aircraft engines
	• Hypersonics
	• Nonlinear analysis of structures
	• Thermal and thermoelastic analysis of aerospace structures

