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 programes 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**, 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 or 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).**
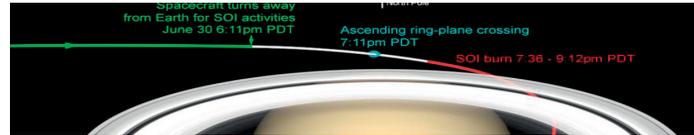
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Academic Council of Aerospace Engineering

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
- Thee-year course in Aerospace Engineering
- Graduate Degree in Aeronautical Engineering
- Graduate Degree in Space and Astronautical Engineering

Level 2 Masters
- Satellites and orbiting platforms
- Space transport systems
- Civil aviation management

Research PhD
- Aeronautics and Space Engineering

SAPIENZA
UNIVERSITÀ DI ROMA

Graduate Degree Course in

Space and Astronautical Engineering

2015 - 2016

The Graduate Degree Course in Space and Astronautical Engineering offers the student advanced disciplinary and professional training alongside specific engineering skills that enable them to address complex problems requiring analysis, development, simulation, and optimisation. It also trains them in the fundamental elements of manned and interplanetary space missions that use astronautical vehicles and re-entry capsules, with particular reference to their systems and scientific aspects.

Graduates holding our Degree in Space and Astronautical Engineering possess the attitude and abilities that enable them to build, manage, and operate satellites and/or space transport systems.

Year 1, which is the same for the first three curricula, consolidates the student understanding of the typical sectors of space engineering (gas dynamics, space construction, mechanics of space flight, rocket propulsion, and space systems) 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 a choice of different curricula that provide more in-depth knowledge of the structures and propulsion systems of launch vehicles, space platforms, Earth observation, and the planning of space and interplanetary missions.

The following 7 courses of the second year are taught in English: Aerospace materials, Artificial intelligence 1, Liquid rocket engines, Multibody space structures, Navigation systems, Spacecraft control, Solid rocket motors.

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.

EMPLOYMENT PROSPECTS

Companies
AgustaWestland
Airbus
Alenia Aermacchi
Selex ES
Avio
ELV
Nuovo Pignone
Thales Alenia Space
Vulcanair
CAE
Aerosekur

Management companies
Aeroporti di Roma
Alitalia
Meridiana
Sea

Regulatory bodies and Service providers
ENAC
ENAV

Research centres
CIRA
INSEAN
CSM

Curriculum:
Launch vehicles

Students selecting this curriculum will specialize in the design of: solid and liquid-fuelled propulsion systems; launch and orbital entry trajectories; launcher guidance, navigation, and control; launcher structural design. Benefitting from Sapienza's involvement in the VEGA program, the student acquires knowledge at system level that extends from the concept and design of a launch vehicle to the implementation of a launch campaign.

Curriculum:
Missions

This curriculum prepares engineers specialized in earth orbit and solar system exploration missions. Orbital design and orbital control are studied, with particular reference to the most advanced techniques of trajectory analysis and optimization. Attention is also given to areas of significant technological relevance and interest such as robotic missions, and missions that use satellite constellations and formations.

Curriculum:
Satellites

This curriculum is oriented to the overall design of a satellite system, with particular reference to: the general architecture of the platform; energy and thermal balance; structural and technological design; telecommunications, electrical and electronic subsystems; and orbital control and trim systems. The student can make use of a very large number of different laboratories and can benefit from the teaching staff experience in designing, constructing, launching small platforms and operating them in orbit.

Curriculum:
Remote sensing from Space

This curriculum is designed for students interested in the specialization in the field of exploitation of satellites for communications, and for acquisition and processing of surface-level imagery using optical and radar systems. Students will analyze the whole development cycle of remote sensing missions from payload design to image processing and to use of specific information extraction techniques.