



Università degli Studi di
Napoli Federico II



Overview of teaching activities in Aerospace Engineering at the University of Naples Federico II

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The University of Naples was established by Frederick II of Hohenstaufen, King of Sicily and Holy Roman Emperor on 5 June 1224. In recognition of its founder, the university, today one of the largest in Italy, is named Federico II.

It is one of the oldest European universities to be founded by a head of State; the oldest in Italy.

Differently from other Italian educational institutions, which were the product of corporate initiatives or under the strong influence of the Pope, the University of Naples was established to create an institution of higher learning.

The Faculty of Engineering of the University of Naples Federico II has its roots in the *École d'Application des Ponts et Chaussées*, founded in Naples by Joachim Murat, King of Naples, General and brother-in-law of Napoléon Bonaparte, on 4 March 1811. Today the Faculty offers 34 engineering courses and 3 PhD schools.



*The Neapolitan *École d'Application des Ponts et Chaussées* was organized on the French model of the *École Polytechnique*.*

The Study Courses in Aerospace (former Aeronautical) Engineering hold a distinguished heritage



The “Gabinetto di Costruzioni Aeronautiche” (Laboratory of Aeronautical Constructions) of the University of Naples was established by Gen. Prof. Umberto Nobile, polar explorer, scientist and engineer, in 1926.



Today, according to Italian laws and Bologna Agreement, the Study Courses in Aerospace Engineering are structured in three levels:

Laurea degree in Aerospace Engineering (3 years)

Laurea Magistrale degree in Aerospace Engineering (2 years)

Ph.D. in Aerospace Engineering (3 years)

Thesis developed by students of Aerospace Engineering frequently foresee ground and flight testing and industrial cooperation (including stages). Some experiments have been carried out onboard the International Space Station



Achieved Laurea degrees per year	Achieved Laurea Magistrale degrees per year	Achieved Ph.D. degrees per year
100====→ (8% of the Faculty)	75====→ (9% of the Faculty)	10 (12% of the Faculty)

Laurea degree in Aerospace Engineering (3 years)

- Basic Mathematics, Physics, Chemistry, Statistics, Computer Science, Numerical Methods**
- Basic Industrial Engineering (Mechanical Drawing, Continuum Mechanics, Systems Engineering, Electrical Engineering, Materials, Reliability and Quality Control)**
- Basic Aerospace Engineering (Flight Mechanics, Aerospace Structures, Aerospace Systems, Thermodynamics and Fluid Dynamics, Aerospace Propulsion)**
- Electives: Aircraft Maintenance, Production, Regulation, Structural Testing, Computer Aided Design**

Laurea Magistrale degree in Aerospace Engineering (2 years)

(1st year)

→ **Advanced Mathematics**

→ **Advanced Mechanical Engineering and Management**

→ **Advanced Aerospace Engineering (Flight Dynamics, Aerospace Structures, Avionics, Aircraft Aerodynamics)**



One of the Wind Tunnels of the Department of Aerospace Engineering

Laurea Magistrale degree in Aerospace Engineering (2nd year)

Aircraft major	Fluid dynamics major	Space major
Aircraft preliminary design	Computational fluid dynamics	Space systems
Advanced aircraft structures	Fluid Stability	Microgravity
Modal analysis and aeroelasticity	Theoretical fluid dynamics	Hypersonic fluid dynamics and reentry

Electives: Rotorcraft, Materials, Aerospace Remote Sensing, Combustion, Turbulence, Military Aircraft Propulsion, Signal Processing

Laurea Magistrale stage and thesis dissertation

Ph. D. Course in Aerospace Engineering (3 years)

Most positions with grants sponsored by the University or by private and public industries and organizations

Research and study curriculum, including internship abroad

Students also from external institutions, such as:

- Italian Air Force**
- Italian Aerospace Research Center**
- Alenia Aeronautica**
- National Institution for Astrophysics**
- Carlo Gavazzi Space**



Wind Tunnel test

Ph. D. School in Aerospace Engineering (3 years)

Some recent research topics:

- Aircraft design, structures and configurations;
- Stereo Particle Image Velocimetry;
- Computational Fluid Dynamics;
- Buffeting and aerodynamic noise;
- Dynamic impact on aerodynamic surfaces and on propulsion systems;
- UAV and Sense and Avoid techniques;
- Space Fluid Dynamics and Microgravity
- Aerospace remote sensing systems;
- Aerothermodynamics, Stability and Controllability analysis of reentry vehicles;
- Planetology and solar system exploration;
- Renewable energy.



UAV equipped with obstacle detection facilities