

# Master Aerospace Engineering Aerodynamics and Wind Energy (AWE)

## MSc Programme



The MSc track in Aerodynamics and Wind Energy combines fundamental and applied research disciplines of aerospace and wind-power systems, focusing on the development of new analysis techniques and their application in design. It is aimed at those who wish to acquire experience with both experimental and numerical methods as well as design procedures and optimisation techniques.

<b>Degree</b>	Master of Science
<b>Starts</b>	September
<b>Type</b>	Full-time
<b>Credits</b>	120 ECTS, 24 months
<b>Language</b>	English
<b>Application deadline</b>	
- Dutch degree	May 1 <sup>st</sup>
- Non-Dutch degree	
• EU/EFTA	April 1 <sup>st</sup>
• Non-EU/EFTA	January 15 <sup>th</sup>
<b>Scholarships</b>	<a href="http://tudelft.nl/scholarships">tudelft.nl/scholarships</a>

The objective of this track is to provide you with the opportunity to become a specialist with specific knowledge in analysis of aerodynamic systems, and the methods used for their application in design. You will obtain a thorough fundamental basis in aerodynamics as well as in modern techniques to investigate such systems.

You build experience through courses, a directed internship and a supervised final research project. The consolidation of the theoretical aspects treated in the various research topics is made possible by a wide range of experimental and computer facilities available for the MSc students.

### Profiles

Students can graduate within one of two thematic profiles, which determines the courses followed in the first year of the MSc.

#### Aerodynamics

The aerodynamics profile covers the fundamentals of mathematics, flow physics, and flow analysis methods. Its courses include Partial Differential Equations, Gasdynamics, Aircraft Aerodynamics, Computational Fluid Dynamics, Experimental Simulations and Flow Measurement Techniques.

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FIRST YEAR	SECOND YEAR
ETHICS COURSE	INTERNSHIP OR J.I.PROJECT
CORE + PROFILE COURSES	MASTER THESIS PROJECT
PROFILE ELECTIVES	
FLEX ELECTIVES	

After successful completion of the profile programme you will:

- Have an advanced knowledge of viscous and compressible flows, and of the influence of flow phenomena on external flow aerodynamics.
- Have an advanced knowledge of the design of wind tunnel experiments, and have experience with modern measurement techniques including laser Doppler anemometry, infrared thermography, and particle image velocimetry.
- Have an advanced knowledge of the modern computational methods for both incompressible and compressible flows, as well as advanced concepts in turbulence computation, mimetic methods, efficient time marching, uncertainty quantification and data assimilation.

## Wind Energy

The wind energy profile covers methods and systems of energy extraction from wind. Both wind turbine and kite power systems are considered. Profile courses include: Airborne Wind Energy, Wind Turbine Design, Site Conditions for Wind Turbine Design and Wind Turbine Aeroelasticity. After successful completion of the MSc programme you will:

- Have in-depth knowledge of low speed aerodynamics and its application to energy extracting devices such as wind turbines and kites.
- Have thorough systems knowledge regarding these energy extraction devices.
- Be able to apply advanced analysis and design techniques in at least one of the following areas: wind turbines, wind farms or kite power systems.

- Have insight in related disciplines such as boundary layer meteorology, structural design and dynamics, control and operations.
- Has knowledge of the noise generation mechanisms in wind-turbines, of sound propagation in realistic terrain and atmospheric conditions, and the implications of noise reduction on wind-farm economy.

## Career Prospects

Graduates specialised in the Aerodynamics Profile are eminently qualified to work in the design of air and land transportation systems. Given their knowledge of flow physics and experience with experimental and computational techniques, there are also opportunities in the large number of industries where flows play an important role, such as offshore engineering, resource extraction, and process engineering, to name a few. Since the Aerodynamics specialty has a substantial fundamental component, its graduates are also well prepared for careers in fundamental or applied research.

For graduates specialised in the Wind Energy Profile, the recent rapid expansion in the number and size of wind turbines offers ample opportunities in the wide diversity of fields that make up the wind energy industry, including wind turbine manufacturing and engineering, wind farm development, consultancy, financial services, and research and academia.



21<sup>st</sup>

QS World Ranking (faculty)



1.263

MSc students



43%

international MSc students



100%

English-language programme

## Career Perspective



79%

job within 3 months



40%

job in Aerospace sector



60%

job in other sectors such as Engineering, Management, Consultancy, etc.