



**TUM School of Engineering and Design  
Technical University Munich**

**Degree Program M.Sc. Aerospace  
- Structure, content, application -**

**Daniel Hartenstein, M.A.  
Academic Program Coordinator  
[coordination.asg@ed.tum.de](mailto:coordination.asg@ed.tum.de)**

# Facts and figures TUM School of Engineering and Design



number of students (B.Sc.,  
M.Sc.)

**approx. 11.600**



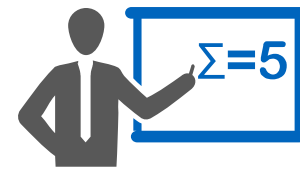
first-semester students  
Bachelor + Master per year

**approx. 4.700**



number of degree programs

**42**



number of professors

**124**



number of research  
associates

**approx. 1.600**

# Departments at the TUM School of Engineering and Design

## Aerospace & Geodesy



## Architecture



## Civil and Environmental Engineering



## Energy and Process Engineering



## Engineering Physics and Computation



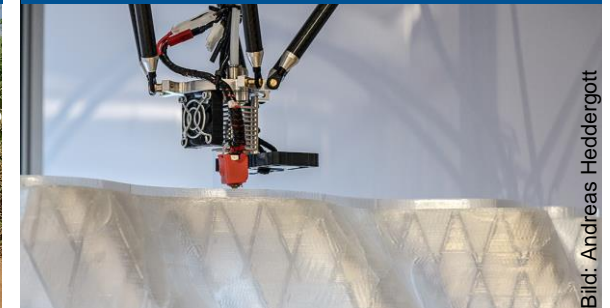
## Mechanical Engineering



## Mobility Systems Engineering



## Materials Engineering



# Dept. of Aerospace & Geodesy: Chairs and professorships

Aviation	
<b>Aerodynamics of Air- and Spacecraft</b> Prof. Christian Breitsamter	<b>Helicopter Technology</b> Prof. Manfred Hajek
<b>Aircraft Design</b> Prof. Mirko Hornung	<b>Rotorcraft and Powered Lift Vehicles</b> Prof. Ilkay Yavrucuk
<b>Autonomous Aerial Systems</b> Prof. Markus Ryll	<b>Sustainable Future Mobility</b> Prof. Agnes Jocher
<b>Carbon Composites</b> Prof. Klaus Drechsler	<b>Turbomachinery and Flight Propulsion</b> Prof. Volker Gümmer
<b>eAviation</b> Prof. Sophie Armanini	
<b>Flight System Dynamics</b> Prof. Florian Holzapfel	

Astronautics
<b>Astronautics</b> Prof. Ulrich Walter
<b>Lunar and Planetary Exploration Technologies</b> Prof. Philipp Reiß
<b>Space Propulsion</b> Prof. Chiara Manfretti/Prof. Oskar Haidn

Geodesy	
<b>Astronomical and Physical Geodesy</b> Prof. Roland Pail	<b>Engineering Geodesy</b> Prof. Christoph Holst
<b>Big Geospatial Data Management</b> Prof. Martin Werner	<b>Geodetic Geodynamics</b> Prof. Florian Seitz
<b>Cartography</b> Prof. Liqiu Meng	<b>Geoinformatics</b> Prof. Thomas Kolbe
<b>Communication and Navigation</b> Prof. Christoph Günther	<b>Land Management</b> Prof. Walter de Vries
<b>Data Science in Earth Observation</b> Prof. Xiaoxiang Zhu	<b>Photogrammetry and Remote Sensing</b> Prof. Uwe Stilla
<b>Earth System Modelling</b> Prof. Niklas Boers	<b>Remote Sensing Technology</b> Prof. Richard Bamler
	<b>Satellite Geodesy</b> Prof. Urs Hugentobler

**50+ professorships until 2024**

# Structure of M.Sc. Aerospace

- 2-year (= 4 semesters) full-time study programme
- 120 credits to successfully complete the programme
- The following figure shows the number of credits allocated to each subject area of the program:



- **No fixed curriculum: Students are able (and required!) to devise their individual study plan**
- For more information and the course catalogue, see: <https://wiki.tum.de/x/vwl0N>

# Contents 1

- **Core modules:**
  - **Total systems** (e.g. design of an aircraft, spacecraft or helicopter)
  - **Propulsion systems** (e.g. motor, flight power unit and gas turbine, space craft power unit)
  - **Fluid dynamics/aerodynamics** (aerodynamics of aircraft, aeroelastics, aeroacoustics)
  - **Structure** (e.g. finite elements, design and construction of composite structures)
  - **Dynamics and control technology** (e.g. helicopter flight physics, orbit and flight mechanics)
  
  - Plus many more from aerospace/aeronautics, mechanical engineering, computer science, physics...
  
- **Supplementary courses:**
  - From aerospace and other TUM engineering and natural science disciplines
  - Sharpening of individual profiles
  - Insight into research trends and professional fields for aerospace engineers

# Contents 2

- **Practical (Lab) Courses:**
  - Introduction to practical methods in aerospace engineering
  - Projects in small groups
  - E.g. Flight Test Techniques, Embedded Systems and Robots, Future Transportation
- **Research Internship/research practice:**
  - scientific work on engineering problem, either alone or in group
- **Key competencies:**
  - Soft skills, applied ethics, foreign language courses/German as a foreign language etc.

# Language of instruction

- Hybrid degree programme: Courses in English and German
- Possibility to study exclusively in one of the two languages
- NOTE: Language requirement: Proof of **either** German **or** English, but **not** both
- For language certificates accepted at TUM, see: <https://www.tum.de/en/studies/application/application-info-portal/admission-requirements/language-certificates>
- Approx. 50% courses in English, with tendency rising



# Application: Formal issues

- Application possible for winter semester and summer semester
- Deadlines:
  - Winter: 01 April – 31 May
  - Summer: 01 September – 30 November
- Application online via TUMonline. See: <https://www.tum.de/en/studies/application/master/application-master>
- International applicants (= non-EU), see: <https://www.tum.de/en/studies/application/application-info-portal/application-international>
- Target group for M.Sc. Aerospace programme: Persons with a Bachelor's degree in engineering or natural science subjects

# Application: Aptitude assessment procedure

Evaluation of required basic competencies from Bachelor's degree	Points for good marks	Points for motivational letter
higher mathematics	above 3.0 (= average mark)	correct spelling and grammar
engineering mechanics		logical and clear structure
materials science		well-structured presentation of relationship between personal interests and content of programme
thermodynamics		
fluid mechanics		
automatic control		
CAD/machine elements		

# Evaluation results

admission	Invitation to written aptitude test(s)	rejection
Offer of study place	Held on Garching Campus: In March for summer semester In August for winter semester	One more chance of applying for the degree programme
Enrollment process can start	Choose between English or German duration 60 minutes	
	Pass all tests = admission otherwise rejection	

More information and details about aptitude assessment procedure: <https://wiki.tum.de/x/Zgl0N>

# Student initiatives

- TUM Hyperloop: Development of climate-neutral, ground-based transportation system  
<https://tumhyperloop.de/#home>
- WARR: Development and construction of aeronautical technologies, e.g. rocket propulsion, space elevator, Mars rover...  
[https://en.wikipedia.org/wiki/WARR\\_\(TUM\)](https://en.wikipedia.org/wiki/WARR_(TUM))
- HORYZN: Design, simulation and building of aviation prototypes  
<https://horyzn.org/>
- MOVE III: Development and operation of a small satellite  
<https://www.move2space.de/missions/move-iii/>

# Possible professional fields for aerospace engineers

- aerospace systems
- propulsion technology
- armaments
- materials technology or components
- civil aviation
- defence and security
- space travel
- automotive sector
- universities and research institutions
- public service and service sector



Department of Aerospace and Geodesy  
TUM School of Engineering and Design  
Technical University Munich



# MISSION SPACE VALLEY

EUROPEAN RESEARCH CENTER OF  
THE MUNICH METROPOLITAN AREA

Ottobrunn • Taufkirchen • Garching • Oberpfaffenhofen • Munich  
Now new at TUM. [www.asg.ed.tum.de](http://www.asg.ed.tum.de)