Department of Aerospace and Geodesy
Technical University of Munich

Bachelor of Aerospace

Ottobrunn/Taufkirchen
March 2021
Vision für den Campus Taufkirchen/Ottobrunn
TUM Department of Aerospace and Geodesy

Launched by TUM on May 9, 2018 as an engineering department

- **22** Professors
- **900+** Students, thereof 27% female and 49% international
- **5** Locations: Ottobrunn/Taufkirchen, Garching, Oberpfaffenhofen, Munich, Wettzell
“Space Valley” in the Metropolitan Region of Munich
MISSION ERDE

NUR WER DIE WELT IM GANZEN BEGREIFT, KANN SIE IM GANZEN BEWEGEN.

Die europäische Fakultät für Luftfahrt, Raumfahrt und Geodäsie.
Jetzt neu an der TUM. www.lrg.tum.de
Research

Cutting-edge research, innovative teaching and technology development with social relevance

Mobility & Urbanization
Smart networking of traffic • high-precision surveying • urban planning • navigation & communication • autonomous flight • new materials & manufacturing processes • simulation & tests

Environment & Food
Quantifying global and local processes • climate protection measures • "space weather" • space debris • traffic turnaround & "green flying • increasing yields in agriculture • food security

Security & Cooperation
Technical security & reliability • data protection • global cooperation • international security

Fascination & Knowledge
Space exploration • creation and development of the universe • promoting enthusiasm for technology • attracting international talents

Global trends & disruptive changes ➤ Innovations and new business models
Why study Aerospace now?!

… because the Third Revolution in Aerospace needs you

And why in Munich…. BECAUSE THE FUTURE IS HERE

Urban Air Mobility

Communication & Navigation

Hyperloop Technology

Micro-Satellites & Re-usable Rockets

Unmanned Aerial Vehicles

Exemplary some companies of this industry:

Mynaric

Picture: TUM Hyperloop

Picture: Isar Aerospace

TUM students 4 times winner

Exemplary some companies of this industry:
Bavaria builds the whole aircraft!

Exemplary some companies of this industry in Bavaria.
Hidden champions in front of our door…

Who owns the airplanes?

Who integrates the systems?

Where is the insurance?

Who tests the aeroplanes?

Exemplary some companies of this industry in Bavaria.
Student Groups

Join student initiatives, design, build your ideas, compete and have fun!

**WARR:** CubeSats
Nano-Satellites
Space Elevator
Origin of Hyperloop

**Akaflieg:**
Design
Build
Fly

**Horyzn:**
Create a startup and take off vertically

**Hummingbirds:**
Make turbines hum

**AkaModell:**
Model your way to success
Research – from theory to practice

May 2019:
Vision
Augmented Autoland

Touchdown point
(3.6m longitudinal deviation)
Inventors that changed our world

- Carl von Linde: Air Liquefaction
- Rudolf Diesel: Combustion Engine
- Oskar von Miller: Water Power Technology
- Claude Dornier: Aircraft Technologies
- Willy Messerschmidt: Aircraft Technologies
- Heinz Maier – Leibnitz: Neutron Research
Global Rankings

TUM is one of the world's Top Aerospace Universities

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
<th>Country</th>
<th>Nation</th>
<th>Academic Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Massachusetts Institute of Technology (MIT)</td>
<td>🇺🇸</td>
<td>⚪</td>
<td>189.0 35.2</td>
</tr>
<tr>
<td>14</td>
<td>University of Maryland, College Park</td>
<td>🇺🇸</td>
<td>⚪</td>
<td>188.6 27.2</td>
</tr>
<tr>
<td>15</td>
<td>The University of Texas at Austin</td>
<td>🇺🇸</td>
<td>⚪</td>
<td>185.0 34.7</td>
</tr>
<tr>
<td>16</td>
<td>Technical University of Munich</td>
<td>🇩🇪</td>
<td>⚪</td>
<td>177.2 31.0</td>
</tr>
<tr>
<td>16</td>
<td>Technion-Israel Institute of Technology</td>
<td>🇮🇱</td>
<td>⚪</td>
<td>177.2 42.1</td>
</tr>
<tr>
<td>18</td>
<td>Stanford University</td>
<td>🇺🇸</td>
<td>⚪</td>
<td>176.8 20.2</td>
</tr>
</tbody>
</table>

Academic Ranking of World Universities (Shanghai Ranking) for Aerospace Engineering

TUM is #2 in Europe and #1 in Germany!

Times Higher Education Employability Ranking:
Number 1 in Germany

The Technical University of Munich is Germany's best university for employability. The top 5 universities are located in Munich. Two out of the other top five universities are located in Berlin, and the last is located in Heidelberg.

2019

#6 WORLDWIDE !!!!
## Professorships

Strengthening future fields of research – bridging between disciplines - attracting ambitious young talents

<table>
<thead>
<tr>
<th>Aeronautics</th>
<th>Space</th>
<th>Geodesy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbomachinery and Flight Propulsion</td>
<td>Sustainable Future Mobility</td>
<td>Geodetic Geodynamics</td>
</tr>
<tr>
<td>Prof. Volker Gümmer</td>
<td>Prof. Agnes Jocher</td>
<td>Prof. Florian Seitz</td>
</tr>
<tr>
<td>Aircraft Design</td>
<td>Autonomous Aerial Systems</td>
<td>Communication and Navigation</td>
</tr>
<tr>
<td>Prof. Mirko Hornung</td>
<td>Prof. Markus Ryll</td>
<td>Prof. Christoph Günther</td>
</tr>
<tr>
<td>Carbon Composites</td>
<td>eAviation</td>
<td>Communication and Remote Sensing</td>
</tr>
<tr>
<td>Prof. Klaus Drechsler</td>
<td>Prof. Sophie Armanini</td>
<td>Prof. Uwe Still</td>
</tr>
<tr>
<td>Flight System Dynamics</td>
<td></td>
<td>Geodesy</td>
</tr>
<tr>
<td>Prof. Florian Holzapfel</td>
<td></td>
<td>Prof. Thomas Wunderlich</td>
</tr>
<tr>
<td>Helicopter Technology</td>
<td></td>
<td>Land Management and Land Tenure</td>
</tr>
<tr>
<td>Prof. Manfred Hajek</td>
<td></td>
<td>Prof. Walter de Vries</td>
</tr>
<tr>
<td>Aerospace Aerodynamics</td>
<td></td>
<td>Cartography</td>
</tr>
<tr>
<td>Prof. Christian Breitsamter</td>
<td></td>
<td>Prof. Liqiu Meng</td>
</tr>
</tbody>
</table>

### 50+ professorships until 2024
Curriculum

Frontloading & Clean Sheet Approach

Ready for take-off after four semesters

Made in the 21st century To prepare for tomorrow
## Modules –
### Aerospace on the 1st day – competences for the challenges of tomorrow

<table>
<thead>
<tr>
<th>1st Semester (Winter)</th>
<th>2nd Semester (Summer)</th>
<th>3rd Semester (Winter)</th>
<th>4th Semester (Summer)</th>
<th>5th Semester (Winter)</th>
<th>6th Semester (Summer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Mathematics I</td>
<td>Advanced Mathematics II</td>
<td>Advanced Mathematics III</td>
<td>Test, Analysis, and Simulation</td>
<td>Engineering Internship</td>
<td>Bachelor’s Thesis</td>
</tr>
<tr>
<td>Aerospace Materials Science and Processing</td>
<td>Aerospace Structures and Elements</td>
<td></td>
<td></td>
<td>Engineering Project</td>
<td></td>
</tr>
<tr>
<td>CAD/TD für Aerospace Engineers</td>
<td>Thermodynamics I</td>
<td>Thermodynamics II</td>
<td>Heat Transfer</td>
<td>(optional) Engineering Elective</td>
<td>(optional) Engineering Elective</td>
</tr>
<tr>
<td>Engineering Computer Science I</td>
<td>Engineering Computer Science II</td>
<td>Fluid Mechanics I</td>
<td>Fluid Mechanics II</td>
<td>Supplementary Course</td>
<td>Supplementary Course</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>Introduction into Geodesy</td>
<td>System Elective</td>
<td>Modeling Elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction into Aerospace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key:**
- To complete within first year
- Required Core Subjects
- Pass/Fail Requirements
- Core Electives
- Additional Electives
- Practical Engineering Experience
- Bachelor’s Thesis
You want to join us? – Are you ready? - Aptitude Assessment

What you need to fulfill

Stage 1
- university entrance qualification („Hochschulzugangsberechtigung“ - HZB) grades in Maths, Sciences (or Informatics), English
- pre-study internship (8 weeks)
- proof of language skill (German A2, English ≥B2)

Stage 2 (for aptitude scores between 71 and 77): assessment interview

Admission with 78 points
Example 1 (decent average)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>HZB-average</td>
<td>2,5</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1,9</td>
</tr>
<tr>
<td>Physics</td>
<td>1,5</td>
</tr>
<tr>
<td>English</td>
<td>1,5</td>
</tr>
</tbody>
</table>

Admission with 78 points
Example 2 (weaker at Maths)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>HZB-average</td>
<td>1,5</td>
</tr>
<tr>
<td>Mathematics</td>
<td>2,8</td>
</tr>
<tr>
<td>Physics</td>
<td>2,6</td>
</tr>
<tr>
<td>English</td>
<td>2,6</td>
</tr>
</tbody>
</table>

Admission with 78 points
Example 3 (weak average)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>HZB-average</td>
<td>3,2</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1,0</td>
</tr>
<tr>
<td>Physics</td>
<td>1,0</td>
</tr>
<tr>
<td>English</td>
<td>1,0</td>
</tr>
</tbody>
</table>
Join us to conquer the skies of tomorrow reach for the stars and make the world a better place