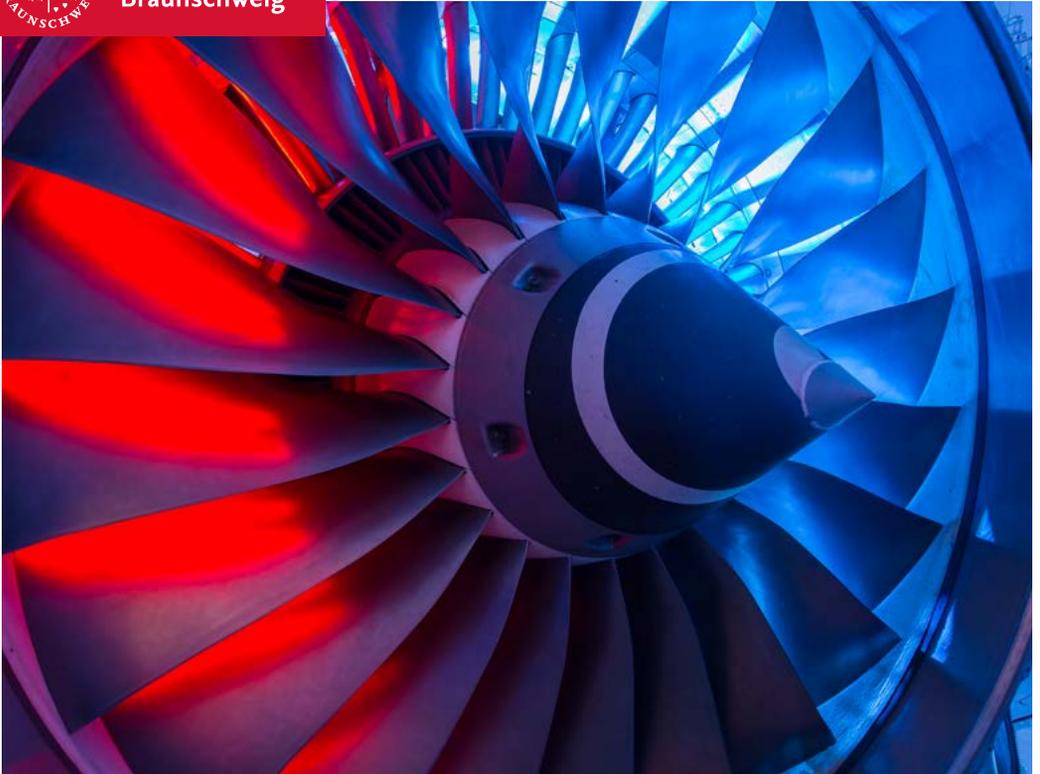




Technische  
Universität  
Braunschweig



TU BRAUNSCHWEIG  
summer school



# Summer School 2024

Summer School for Advanced  
Sustainable Aviation Technologies

# Key facts

<b>Time period</b>	02–13 September 2024
<b>Registration deadline</b>	15 July 2024
<b>Event form</b>	Online (02–06 September) and on site (09–13 September)
<b>Participation fee</b>	Free of charge
<b>Registration fee</b>	approx. 363 € (for enrolling as an exchange student) <sup>1</sup>
<b>Language of instruction</b>	English (on the level B2/C1)
<b>Workload</b>	90 hours, divided into virtual and on-site phases
<b>Credits</b>	3 ECTS credits
<b>Certificate</b>	Graded certificate
<b>Target group</b>	Master students of any discipline with a strong interest in sustainable aviation technologies, preferably students of TU Braunschweig and its partner universities

<sup>1</sup> The fee covers reduced prices for food in the cafeterias, reduced prices for museums, cinemas, and similar local culture as well as sport offers, and includes free travel in all local trains and public transport in all of Lower Saxony. You need to enrol as an exchange student at our university to have access to all university services. However, enrolling is not necessary to participate in the Summer School programme.

**Any questions?**  
**Please do not hesitate to contact us, we are happy to help!**  
 Joana Zimmer  
 ☎ +49 531 391 14339  
 ✉ summerschool@tu-braunschweig.de

# Course overview

Please note that this preliminary course overview may be subject to change on short notice.

	Online part					On-site part at TU Braunschweig				
	Mon, 02 Sep	Tue, 03 Sep	Wed, 04 Sep	Thu, 05 Sep	Fri, 06 Sep	Mon, 09 Sep	Tue, 10 Sep	Wed, 11 Sep	Thu, 12 Sep	Fri, 13 Sep
	WebEx	WebEx	WebEx	WebEx	WebEx	NFF, room 024	NFF, room VW	NFF, room 024	NFF, room 024	NFF, room VW
<b>08:30–10:00</b>		Materials and Structures (Degenhardt)	Emissions and climate aspects (Grewe)	Operational Considerations for Aircraft Engine MRO (Kremer)	Lifecycle Assessment (Herrmann)	Welcome (Ferraro and Pester)	Electrical Systems (Terörde)	tba	Group work with expert consultants	Project Presentation (Group 1)
<b>10:00–10:30</b>	Coffee Break					Coffee Break				
<b>10:30–12:00</b>	Introduction (Bauknecht)	Advanced Systems Engineering (Staack)	Combustion Fundamentals for Sustainable Aviation (Dinkelacker)	Noise Prediction and Assessment (Bertsch)	Power Electronics for Aviation (Mertens)	Group Work with Expert Consultants				Project Presentation (Group 2)
<b>12:00–13:00</b>	Lunch Break					Lunch Break				
<b>13:00–14:30</b>	Aircraft Aerodynamics (Bauknecht)	Airline Operations Research (Stiller)	Combustion Emissions (Ferraro)	Sustainable Air Traffic Management (Korn)	Overall Aircraft Requirements (Reckzeh)	Group Work with Expert Consultants	Visit to Hannover Airport Departure 12:00 from NFF Start 14:00, 1 hour guided tour and 1 hour exhibition), back in BS at 17:30	Group Work with Expert Consultants		Project Presentation (Group 3)
<b>14:30–14:45</b>	Coffee Break					Coffee Break		Coffee Break		
<b>14:45–16:15</b>	Energy Supply - Batteries (Garnweitzer, Michalowski)	Improving aircraft performance through flow control (Bauknecht)	Flight Control (Beyer)	Fuel cells for Aviation (Wittmann)	Online Quiz (Ferraro)	Braunschweig Guided City Tour Start at 16:00, meeting point „Tourist-information“	Aerospace Lab Tour - TU Braunschweig: IFAS, ISM, IFL (End 16:15)	Group Work with Expert Consultants	Closing Ceremony	
<b>16:15–16:45</b>	Break							Break		
<b>16:45–18:15</b>	Virtual Campfire (Pester and Göschel)					Departure 15:04 from NFF; Bus no. 411 to „Rathaus“		Barbecue (courtyard IFAS/ISM; open end)		

# Modules and projects

<b>Lecture modules</b> <small>(online preparation phase and on-site morning sessions)</small>	<ul style="list-style-type: none"> <li>» Advanced Aircraft Performance/Design</li> <li>» Advanced Propulsion Systems (BLI, UBHR, Open Rotor, Distributed Propulsion)</li> <li>» Air Traffic Management &amp; Operations Research</li> <li>» Advanced Design Methods (MDO, Digital Twin)</li> <li>» Future Aviation Fuels and Energy Carrier – Advantages, Disadvantages and Risks</li> <li>» “The Airline Perspective” (Fleet Planning and Operation)</li> <li>» Other Disciplines (e.g. Life-Cycle Assessment, Climate Modelling)</li> </ul>
<b>Project work</b> <small>(defining problems with industry partners)</small>	<ul style="list-style-type: none"> <li>» Definition of Top-Level Requirements and Basic Mission Description for a Future “Low-Emission-Aircraft”</li> <li>» First Preliminary Design of Aircraft</li> <li>» First Preliminary Design of Propulsion System</li> <li>» Assessment and Discussion of Pros and Cons</li> <li>» Aspects of Integration into the Global Aviation Systems</li> </ul>
<b>Project ideas</b> <small>(4–5 students per group estimated)</small>	<ul style="list-style-type: none"> <li>» Sustainable Aviation Solutions for Reg./Short Range</li> <li>» Sustainable Aviation Solutions for Medium Range</li> <li>» Sustainable Aviation Solutions for Long Range</li> </ul>



Photo: Kristina Rottig/TU Braunschweig

**The world is facing an enormous challenge in transferring aviation into a more sustainable and greener transport mode.**

In the long run, sustainable and emission-free flights over the entire aviation sector from short range to long range operation are the current priority and require enormous research and

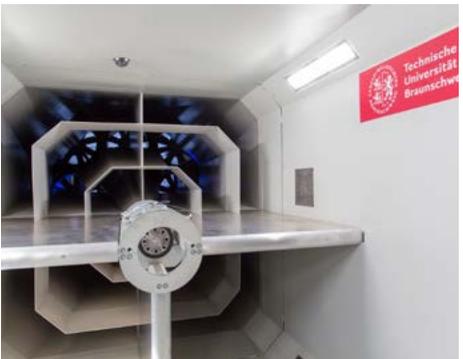
development activities which can by no means be limited to classical aerospace disciplines. Instead, they require new interdisciplinary approaches, methods and teams covering all aspects from aerospace, from materials to structures, from energy to propulsion as well as aircraft design, electrical engineering and even economic and social sciences.

Of course, this all starts with an up to date insight in the most current state of the art in aviation. In our Summer School course, you can acquire both theoretical knowledge and practical project experience in the field



to address these grand challenges, and to connect with fellow students from different countries.

The programme is divided into two parts: The basic knowledge about methods and technologies will be given in lectures held by professors from the partner universities TU Delft and Tampere University as well as from aviation industry experts during the virtual phase. Afterwards, you will put your knowledge into practice. The on-site phase will consist of additional lectures in Braunschweig to gain specific insights and well as a hands-on



Photos: Sebastian Olschewski/TU Braunschweig; Walter Bergmoser/TU Braunschweig

project that will be conducted in international and interdisciplinary teams, supervised by professors. The Summer School will be complemented by a rich social programme: There will already be some joint online evening events to exchange ideas during the online phase. During the on-site phase, participants will spend the afternoons taking part in activities in Braunschweig. You will get to know the city, the university's research airport as well as one of TU Braunschweig's research facilities. You will also have enough time to explore the city on your own and to get to know your fellow students.

# Impressions of our Summer Schools

Visits to institutes

Braunschweig's historic centre

Campus of TU Braunschweig

Botanical Garden

Free-time activities

Research Airport

Photos: Lasse Ebbecke/TU Braunschweig; Simone Fürst/TU Braunschweig; Christopher Vehrke/TU Braunschweig

# Application

**Please apply until 15 July 2024.** Registration may be closed before the deadline in case the maximum of participants is reached.

Please use the application form that you can find on our website:

→ [www.tu-braunschweig.de/summer-school](http://www.tu-braunschweig.de/summer-school)

After filling out the form, please send it to us via email:

✉ [summerschool@tu-braunschweig.de](mailto:summerschool@tu-braunschweig.de)



Photo:  
Stephan Nachtigall/TU Braunschweig